

Community series: Police trauma, loss, and resilience, volume II

Edited by

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and Katy Kamkar

Published in

Frontiers in Psychology



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ISSN 1664-8714
ISBN 978-2-8325-4923-0
DOI 10.3389/978-2-8325-4923-0

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Community series: Police trauma, loss, and resilience, volume II

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Citation

Papazoglou, K., Schlosser, M. D., Kamkar, K., eds. (2024). *Community series: Police trauma, loss, and resilience, volume II*. Lausanne: Frontiers Media SA.
doi: 10.3389/978-2-8325-4923-0

Table of contents

- 05 **Editorial: Community series: police trauma, loss, and resilience, volume II**
Michael David Schlosser, Konstantinos Papazoglou and Katy Kamkar
- 07 **Workplace aggression, wellbeing, and job satisfaction: The specificity in border police organizations**
Concha Antón, Merlin Patricia Grueso-Hinestroza, Juan C. Espinosa and Mirela Turc
- 20 **Mental health and social support among Royal Canadian Mounted Police cadets**
Jolan Nisbet, Laleh Jamshidi, Katie L. Andrews, Sherry H. Stewart, Robyn E. Shields, Taylor A. Teckchandani, Kirby Q. Maguire and R. Nicholas Carleton
- 30 **Putative risk and resiliency factors among Royal Canadian Mounted Police cadets**
Juliana M. B. Khoury, Laleh Jamshidi, Robyn E. Shields, Jolan Nisbet, Tracie O. Afifi, Amber J. Fletcher, Sherry H. Stewart, Gordon J. G. Asmundson, Shannon Sauer-Zavala, Gregory P. Krätzig and R. Nicholas Carleton
- 41 **Attitudes toward organizational change and their association with exhaustion in a sample of Italian police workers**
Lara Colombo, Daniela Acquadro Maran and Annalisa Grandi
- 51 **Hostage negotiator resilience: A phenomenological study of awe**
Jeff Thompson and Elizabeth Jensen
- 66 **Examining mental health knowledge, stigma, and service use intentions among Royal Canadian Mounted Police cadets**
Katie L. Andrews, Laleh Jamshidi, Robyn E. Shields, Taylor A. Teckchandani, Tracie O. Afifi, Amber J. Fletcher, Shannon Sauer-Zavala, Alain Brunet, Gregory P. Krätzig and R. Nicholas Carleton
- 75 **Prophylactic relationship between mental health disorder symptoms and physical activity of Royal Canadian Mounted Police Cadets during the cadet training program**
Taylor Teckchandani, Rachel L. Krakauer, Katie L. Andrews, J. Patrick Neary, Jolan Nisbet, Robyn E. Shields, Kirby Q. Maguire, Laleh Jamshidi, Tracie O. Afifi, Lisa M. Lix, Shannon Sauer-Zavala, Gordon J. G. Asmundson, Gregory P. Krätzig and R. Nicholas Carleton

- 83 **Daily survey participation and positive changes in mental health symptom scores among Royal Canadian Mounted Police Cadets**
Robyn E. Shields, Taylor A. Teckchandani, Gordon J. G. Asmundson, Jolan Nisbet, Rachel L. Krakauer, Katie L. Andrews, Kirby Q. Maguire, Laleh Jamshidi, Tracie O. Afifi, Lisa M. Lix, Alain Brunet, Shannon Sauer-Zavala, Gregory P. Krätzig, J. Patrick Neary, Jitender Sareen and R. Nicholas Carleton
- 91 **Cardioautonomic lability assessed by heart rate variability changes in Royal Canadian Mounted Police cadets during the cadet training program**
Taylor A. Teckchandani, J. Patrick Neary, Katie L. Andrews, Kirby Q. Maguire, Laleh Jamshidi, Jolan Nisbet, Robyn E. Shields, Tracie O. Afifi, Shannon Sauer-Zavala, Lisa M. Lix, Rachel L. Krakauer, Gordon J. G. Asmundson, Gregory P. Krätzig and R. Nicholas Carleton



OPEN ACCESS

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RECEIVED 01 December 2023

ACCEPTED 24 April 2024

PUBLISHED 10 May 2024

CITATION

Schlosser MD, Papazoglou K and Kamkar K
(2024) Editorial: Community series: police
trauma, loss, and resilience, volume II.
Front. Psychol. 15:1348111.
doi: 10.3389/fpsyg.2024.1348111

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Editorial: Community series: police trauma, loss, and resilience, volume II

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KEYWORDS

police officer, officer wellness, resilience, trauma, mental health

Editorial on the Research Topic

Community series: police trauma, loss, and resilience, volume II

Policing is a profession marked by myriad challenges, where officers regularly confront traumatic incidents, grapple with loss, and endeavor to maintain resilience amid adversity. As custodians of public safety, law enforcement personnel face a spectrum of stressors that profoundly impact their mental and emotional wellbeing. The second volume of the Community Series explores these critical issues, offering valuable insights and perspectives from frontline officers, mental health professionals, and researchers. The following are the titles and a brief description of these crucial articles included in *Community series: police trauma, loss, and resilience – Volume II*.

Cardioautonomic lability assessed by heart rate variability changes in Royal Canadian Mounted Police cadets during the cadet training program. This study examines variations in cardioautonomic lability during the Royal Canadian Mounted Police (RCMP) Cadet Training Program, revealing potentially important differences in heart rate variability between cadets with and without clinically significant anxiety symptoms (Teckchandani T. A. et al.).

Daily survey participation and positive changes in mental health symptom scores among Royal Canadian Mounted Police Cadets. Investigating the impact of daily survey participation on mental health symptom scores among RCMP cadets, this research highlights the positive correlation between daily survey completion and reductions in symptoms related to various mental health disorders (Shields et al.).

Prophylactic relationship between mental health disorder symptoms and physical activity of Royal Canadian Mounted Police Cadets during the cadet training program. Examining the relationship between physical activity and mental health disorder symptoms among RCMP cadets, this study underscores the significant role of physical activity in reducing symptoms of anxiety-related disorders during the training program (Teckchandani T. et al.).

Examining mental health knowledge, stigma, and service use intentions among Royal Canadian Mounted Police cadets. This study investigates mental health knowledge, stigma, and service use intentions among RCMP cadets, revealing higher levels of mental health knowledge and service use intentions among cadets compared to serving RCMP officers, with implications for reducing stigma and promoting help-seeking behaviors (Andrews et al.).

Hostage negotiator resilience: a phenomenological study of awe. Exploring awe as a resilience practice for law enforcement crisis and hostage negotiators, this research demonstrates how reflecting on awe experiences positively impacts negotiators in both their professional and personal lives, suggesting potential interventions to enhance resilience (Thompson and Jensen).

Attitudes toward organizational change and their association with exhaustion in a sample of Italian police workers. This study examines attitudes toward organizational change and their association with exhaustion among Italian police workers, emphasizing the importance of addressing workplace aggression to enhance job satisfaction and wellbeing among officers (Colombo et al.).

Mental health and social support among Royal Canadian Mounted Police Cadets. Investigating the relationship between perceived social support and symptoms related to mental disorders among RCMP cadets, this research highlights the protective role of social support against anxiety-related disorders among cadets, with implications for promoting psychological wellbeing (Nisbet et al.).

Putative risk and resiliency factors among Royal Canadian Mounted Police Cadets. This study compares putative risk and resiliency factors among RCMP cadets to young adult populations, suggesting that cadets may possess psychological strength, implying that the nature of police work rather than inherent individual differences might contribute to the higher prevalence of mental health disorders among active-duty RCMP officers (Khoury et al.).

Workplace aggression, wellbeing, and job satisfaction: the specificity in border police organizations. This study explores workplace aggression and its impact on wellbeing and job satisfaction among Romanian Border Police officers. Findings suggest that workplace aggression negatively predicts job satisfaction and wellbeing, underscoring the need for interventions to reduce such behaviors (Antón et al.).

Through empirical research, case studies, and firsthand accounts, these articles collectively illuminate the multifaceted

nature of police trauma, loss, and resilience, offering valuable insights to inform interventions, support systems, and cultural shifts within law enforcement communities. As we navigate these critical issues, let us strive to create a safer, healthier, and more resilient future for all those who serve.

Author contributions

MS: Writing – original draft, Writing – review & editing. KP: Writing – original draft, Writing – review & editing. KK: Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of interest

KP is the owner, founder, and director of ProWellness Inc.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 26 July 2022

ACCEPTED 06 September 2022

PUBLISHED 13 October 2022

CITATION

Antón C, Grueso-Hinestroza MP,
Espinosa JC and Turc M (2022) Workplace
aggression, wellbeing, and job satisfaction:
The specificity in border police
organizations.
Front. Psychol. 13:1004153.
doi: 10.3389/fpsyg.2022.1004153

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Workplace aggression, wellbeing, and job satisfaction: The specificity in border police organizations

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In male-dominated work contexts, the challenges faced by women and their impact on wellbeing and work attitudes have been documented, most extensively in other than police organizations. This study was conducted as a cross-sectional quantitative descriptive correlational predictive study to validate a model of relationships among workplace aggression, job satisfaction, and wellbeing at work with a sample of 1,066 female and male officers from the Romanian Border Police. The results obtained in the study showed that no differential gender effects were found, although women reported higher levels of workplace aggression than men (1.61 vs. 1.52; $F=4.20$, $p=0.04$). Also, workplace aggression significantly and negatively predicted job satisfaction ($R^2=0.27$) and wellbeing at work ($R^2=0.31$). In conclusion, although this research is an exploratory approach to the study of workplace aggression in the Romanian police organization, it can generate interventions that would lead to the reduction of undesirable behaviors such as verbal aggression, malicious jokes, discrimination, perception of inequalities, gossip, and defamatory words. In the future lines of research, different sources and conditions of victims and witnesses can be considered the. We also studied the limitations of the study and the future lines of research.

KEYWORDS

workplace aggression, job satisfaction, wellbeing at work, police organization, gender

Introduction

In Europe, policing involves a series of practices aimed at protecting the free exercise of rights and ensuring security and justice. Paradoxically, evidence suggests that law enforcement officers are particularly susceptible to workplace aggression (Segurado et al., 2008; Yu and Lee, 2020; Chitra and Karunanidhi, 2021).

Researchers' interest in the study of workplace aggression is based on its high prevalence in organizations and the apparently limited capacity of norms and protocols to prevent it

(Ragins and Cornwell, 2001). Despite certain limitations linked to methodological aspects and the wide range of figures offered (Barling et al., 2009), evidence suggests that its prevalence is higher in public organizations. In addition to the high tolerance of workplace aggression being common in other types of organizations, the reasons for this include low mobility of employees, difficulty in escaping from one's reputation when changing positions within the same organization, and the bureaucratic nature of the organization (Zapf et al., 2003). Other factors include stressful and competitive work environments (Coyne et al., 2003; Stanton et al., 2021) where there are high-power differentials in hierarchies and an authoritarian leadership style (Mikkelsen and Einarsen, 2001), the requirement for high cooperation (Zapf et al., 2003), work overload (Quine, 2001), perceived uncontrollability (Zapf et al., 2003), and role conflict and ambiguity (Quine, 2001; Jennifer et al., 2003; Agervold and Mikkelsen, 2004; Skogstad et al., 2007).

Police organizations, particularly border police, are public service entities rated as highly stressful with a high level of daily (Siu et al., 2015; Wolf, 2017; Demou et al., 2020; Lentz et al., 2020) and uncontrollable risk (Cartwright and Roach, 2021; Chitra and Karunanidhi, 2021; Jackman et al., 2020; Papazoglou et al., 2020b), which face numerous situations, such as humanitarian crises at borders, that have the capacity to generate conflict and role ambiguity for their members (Antón, 2009; Acquadro Maran et al., 2020; Queirós et al., 2020). In these organizations, high cooperation is required (Rexeis, 2017), there is a strong hierarchy, and often an authoritarian leadership style (Piotrowski et al., 2021). All of these characteristics put the work environment at a potential risk of experiencing workplace aggression (Segurado et al., 2008; Yu and Lee, 2020; Chitra and Karunanidhi, 2021). However, no specific study has been conducted on border policing.

According to empirical evidence, not all people are equally likely to be victimized by workplace aggression. Gender, age, seniority, position, ethnic or racial group, and affective-sexual orientation were the variables analyzed to identify the potential victims (Aquino and Thau, 2009; Stanton et al., 2021). In the case of police and other male-dominated organizations, the most studied group, especially in relation to sexual harassment, has been women (García, 2021). In general, it has been argued in academia that women are more likely to suffer workplace aggression (Chitra and Karunanidhi, 2021), although in practice, there seems to be no awareness of this reality (Antón et al., 2021).

The presence of women in police organizations has been described as tokenistic due to their under-representation in the workforce, especially in operational positions and at high hierarchical levels (García, 2021). This under-representation has been associated in the literature with innumerable undesirable effects on their wellbeing such as perception of isolation, loss of identity, low self-esteem, low self-efficacy, stress (Castelhana et al., 2012; Morabito and Shelley, 2018; Chu, et al., 2020) and also low job satisfaction, and lack of affective and continuance commitment (Krimmel and Gromley, 2003; Guillaume et al., 2011; Strohshine and Brandl, 2011).

Among the affective consequences of exposure to workplace aggression that have received the most attention in the literature is emotional wellbeing at work (Schat and Kelloway, 2000; LeBlanc and Kelloway, 2002; Nel and Coetzee, 2020; Alfandari et al., 2022) and job satisfaction (Budd et al., 1996; Keashly et al., 1997; Tepper, 2000; Quine, 2001; Vartia and Hyyti, 2002; Lapierre et al., 2005; Duffy et al., 2006; Aquino and Thau, 2009; Rodríguez-Muñoz et al., 2009; Caillier, 2021), probably because of the important organizational and personal consequences associated with both constructs. In sum, the impact of workplace aggression on wellbeing at work and job satisfaction not only has a potential personal cost but also affects performance and society as a whole.

In academic literature, psychological wellbeing is related to desirable aspects such as positive effect, self-esteem, and life satisfaction, while its absence is related to the prevalence of psychological distress such as negative effect, stress, and low life satisfaction (Jackman et al., 2020). On the other hand, job satisfaction, resulting from the emotional response to the events workers experience in organizations, is a variable that is associated with organizational commitment and job performance (Antón, 2009; Kumar, 2021; Nalla et al., 2021; White et al., 2021). Although these topics have some relevance in studies conducted in police organizations, they have been investigated less frequently (Jackman et al., 2020; Papazoglou et al., 2022), and only a few have investigated the impact of workplace aggression on them (Simmons-Beauchamp and Sharpe, 2022), in particular, on women (Bastarache, 2020; García, 2021).

Border police in Europe include among their functions the work performed in border crossing points and navy for border surveillance, migration, border crossing criminality prevention and combat, and operational support and participation in FRONTEX missions. The Romanian Border Police is a relatively young body, the result of a demilitarization process in 2002, which currently operates as a police-type institution with a national scope of action. It is composed of the General Inspectorate of the Border Police, which is the central structure, subordinated to the Ministry of Interior, while the second level is composed of the 5 Territorial Inspectorates (Giurgiu, Timișoara, Oradea, Sighetu Marmației, and Iași) and the Coast Guard. It is responsible for guarding 3,147 km of borders, of which 2,070 km represents the second-longest external border in the EU. At the time of this study, there were approximately 12,000 employees of which 2,600 were women.

According to data provided by EUROSTAT (2022), female police officers have an average representation of 21.28% in European police forces, so the percentage of women in the Romanian Border Police is in the average range. Organized along similar lines to the model of the institutions of the EU states, it has made significant efforts in the field of preventing and combating cross-border criminal phenomena and in the implementation and enforcement of the existing internal and international legislation, so that at the Romanian borders and its specific activities match international standards. Due to their functions and nature, border police forces are highly stressful work environments in which the

occurrence of workplace aggression can have an incremental effect with undesirable consequences, particularly in women. In view of all the above reasons, the aim of this research is to analyze the impact of exposure to workplace aggression on the job satisfaction and wellbeing of female and male border police officers, and to analyze whether this effect occurs differentially.

Theoretical framework

Workplace aggression

Psychological harassment, bullying, workplace trauma, scapegoating, work abuse, victimization, petty tyranny, emotional abuse, oppression, subrogation, abusive behavior, antisocial behavior at work, psychological terror, moral harassment, sexual harassment, psychological violence in the workplace, psychological harassment, mobbing, bossing, discrimination, incivility, and workplace aggression are some of the names used to describe situations of violence in the workplace (De Elena, 2005; Neall and Tuckey, 2014). In addition, scholarship has narrowed down the forms of victimization, distinguishing the sexual ones from the rest, as well as according to the agent, the intensity of the behaviors, and their persistence over time. Other authors have attempted to develop broad definitions of the construct capable of encompassing a wide variety of behaviors whose ultimate aim is to cause harm to the work environment.

Schat and Kelloway (2000, p. 191) define workplace aggression as “behavior by an individual or individuals within or outside an organization that is intended to physically or psychologically harm a worker or workers and occurs in a work-related context.” Some authors have pointed out that coworkers and managers are the main sources (Al-Shamaileh et al., 2022). In the framework of this research, workplace aggression is understood as an over-arching construct that encompasses all behaviors intended to cause psychological but also physical harm, regardless of whether these are direct or indirect, from the agent causing the harm (superior, co-worker, subordinate, citizen) including sexual harassment and incivility at work. This approach is consistent with research that highlights similar behaviors of different forms of workplace violence (Buchanan and Fitzgerald, 2008), including indirect aggression (Ragins and Cornwell, 2001; Dionisi and Barling, 2018), and that “facilitates the inclusion of different bodies of literature that cover essentially the same antecedents and consequences of negative workplace interactions” (Neall and Tuckey, 2014, p. 226).

Aquino and Thau (2009) consider that workplace victimization occurs “when an employee’s wellbeing is harmed by an act of aggression perpetrated by one or more members of the organization” (p. 718). In this context, the authors related wellbeing to the satisfaction of psychological and physiological needs, including a sense of belonging, the feeling of worthiness, the belief that one has the ability to predict and cognitively control one’s environment, and being able to trust others.

A significant amount of research on workplace aggression has examined the differences between men and women with respect to the exposure and perceived severity of such behaviors. Although a considerable number of cases have found a higher prevalence among women (Björkqvist et al., 1994; Aquino and Bradfield 2000; Cortina et al., 2001; Salin, 2001, 2003; Tehrani, 2004; Escartin et al., 2013), particularly in cases of intersectional harassment (Rabelo and Cortina, 2014), no consistent pattern of relationship can be affirmed in the research, as more than a few studies have found it to be an irrelevant variable (Einarsen and Skogstad, 1996; Leymann, 1996; Vartia and Hyyti, 2002; Hansen et al., 2006) or prevalent in men (Jennifer et al., 2003).

This disparity in results appears to be related to the role played by other variables in men’s and women’s perceptions such as the type of behaviors studied, the gender and status of the harasser, the gender ideology of the observer, organizational tolerance of harassment, and the age and seniority of those being harassed (Sigal and Jacobsen, 1999; McCabe and Hardman, 2005; Bowling and Beehr, 2006). In a meta-analysis, Rotundo et al. (2001) found that women perceived a wider range of socio-sexual behaviors as harassment than men, although the size of the difference was not large. The meta-analysis found significant differences in perceptions between women and men regarding hostility in the work environment, derogatory attitudes towards women, and pressure in dating or physical sexual contact, but none in the case of sexual advances or sexual coercion. Other analyses, such as that by Stockdale et al. (2004), find that people with a sexist patriarchal worldview are particularly insensitive to the same-sex rejection-based harassment of men, a form of harassment that is particularly prevalent in men.

On the other hand, it is important to distinguish between the recognition of the existence of violent behaviors in the work environment and self-categorization as bullied or discriminated against. The attributional model of bullying by Samnani et al. (2013) argues that exposure to negative behaviors will hardly be perceived as bullying when there is high consensus (they are very common), high consistency (they are spread over time and normalized), or low distinctiveness (they are directed at the whole group). This and other studies (e.g., Tuckey et al., 2009) highlight the importance of context in the occurrence and perception of different forms of workplace aggression.

In police contexts, several studies on workplace aggression have focused on women as targets of sexual harassment (Shadmi, 1993; Martin, 1996). Although the inclusion of women in European policing began with their incorporation into ancillary, women’s, and childcare work, policing models in Europe today follow an inclusive strategy. This strategy, promoted by laws prohibiting gender discrimination in the workplace, encounters, different forms of resistance that imply the real maintenance of inequalities between men and women according to Brown (1997), and which include, among others, discrediting, the spread of rumors, and sexual harassment.

Research on police officers on all continents reveals the persistence of a police culture that emphasizes the values associated

with masculinity and questions the role of women in the police (Antón et al., 2021). In relation to workplace aggression, this culture not only favors the existence of violence against policewomen but also supports the organization's tolerance of such violence (Simmons-Beauchamp and Sharpe, 2022).

The rejection of the presence of women within the police has been related to the threat to the maintenance of hegemonic masculinity, which would be challenged along with the acceptance of unnecessary use of force and myths about policing and masculinity (Hunt, 1984; Herbert, 2001; Messerschmidt, 2016). This rejection translates to different obstructive behaviors. As García, (2021) argues, "Nothing makes resistance to women in policing more obvious than gender discrimination, sexual harassment, and assault in policing" (p. 119). Furthermore, Wade and Brittan-Powell (2001) found that not only men who endorse an ideology of traditional masculinity, but also men who rely on a male reference group for their professional self-concept, are anti-gender equitable and prone to sexual harassment, which is relevant in police organizations.

On the other hand, ironic as may seem from the analysis of the content of police work and the proven effectiveness of policewomen (Herbert, 2001), the wrong gender approach permeates police culture and reaches institutional practices, including selection, promotion, evaluation processes, decision-making, and the organization of work itself (Natarajan, 2008; García, 2021). In a qualitative study of 28 European police officers, Antón et al. (2021) found widespread perception of gender discrimination in institutional practices among policewomen.

Recent research continues to highlight the prevalence of certain forms of workplace aggression towards women in police settings. Steinþórsdóttir and Pétursdóttir (2018), for example, examine different forms of violence in the Icelandic police force. In their study, women were 10 times more likely to experience sexual harassment than men by their male supervisors, colleagues, subordinates, and the male public. Significantly, the figures show that harassment more often comes from within rather than from outside, which reinforces the idea of resistance to women joining police organizations. Men however find that they are more bullied than women (Steinþórsdóttir and Pétursdóttir, 2018).

On the other hand, a notable finding in several research studies is that female police officers tend to either engage in neutralizing harassing behavior or accept it as a way to fit into organization (García, 2017; Brown et al., 2020).

Job satisfaction and workplace aggression

Lambert et al. (2016) defined job satisfaction as "an effective/emotional response by an employee concerning his/her particular job and whether the employee likes the job" (p. 23). It is a positive emotional state resulting from an individual's evaluation of their work experiences (Locke, 1976), which implies that job satisfaction derives from employees' judgment of the characteristics of the job and work environment.

Studies of the antecedents of job satisfaction have been based on three broad dimensions: individual, task-related, and environment-related characteristics (Johnson, 2012; White et al., 2021). Regarding individual characteristics, evidence has led to the conclusion that variables such as race, gender, or education have a weak or inconsistent relationship with job satisfaction (White et al., 2021). On the other hand, studies analyzing the relationship between job satisfaction and task characteristics have shown statistically stronger relationships, especially in circumstances where workers consider that their work makes a relevant social contribution (White et al., 2021). Finally, studies analyzing the characteristics of the organizational environment and its relationship with job satisfaction show that job satisfaction is best explained by variables related to organizational support and coworker relationships (Zeng et al., 2020; White et al., 2021).

Although there is a widely accepted assumption that workplace aggression experiences have a negative impact on job satisfaction (Ertureten et al., 2013), some research findings suggest that the relationship between the two variables is not simple. Some authors stress the need to contextualize experiences to understand their meaning and how they affect satisfaction. For example, in a study analyzing a sample of local police officers, Segurado et al. (2008) found that discriminatory practices are widespread and supported by a corporate culture that values power, hierarchy, and control as guiding principles of internal functioning, so that they are assumed to be a part of the nature of police work. In other work environments, greater acceptance of inequalities has been found (Loh et al., 2010). Some national cultures, masculine organizational cultures (Power et al., 2013), and cultures that are characterized by a low 'human orientation' may be more tolerant or even accepting of discriminatory behavior so that it does not have a negative effect on job satisfaction Giorgi et al. (2015). These arguments align with the hypotheses proposed from the attributional model of bullying by Samnani et al. (2013).

In their meta-analysis, Lapierre et al. (2005) found that the impact of workplace aggression on satisfaction was weaker for men than for women. Lutgen-Sandvick et al. (2007) found that witnesses of workplace bullying had lower job satisfaction, although higher than those who were directly bullied. Giorgi et al. (2015) pointed out that satisfaction is more a result of people's perceptions and self-labeling than of actual exposure to violent behavior in the work environment.

Wellbeing at work and workplace aggression

Wellbeing is conceived as a multifaceted construct that can be viewed from physical, emotional, psychological, and mental perspectives (Gerhardt et al., 2021). Specifically, it describes how well individuals feel in life, including the social, health, and material aspects (Diener et al., 2018). Thus, a low level of wellbeing is a strong predictor of negative psychological outcomes, such as sleep disorders, depression, anxiety, fatigue, burnout, and

depression (Onyishi et al., 2021). Similarly, empirical evidence indicates that low levels of wellbeing are related to behavioral problems, such as suicidal ideation and alcohol abuse, and physiological symptoms, such as headaches, decreased immune function, musculoskeletal pain, and cardiovascular disease (Onyishi et al., 2021). Finally, at the organizational level, low levels of wellbeing are related to absenteeism, inefficiency, problem-solving ability, creativity, work engagement, and productivity (Onyishi et al., 2021).

Workplaces play a crucial role in workers' psychological wellbeing. (Jackman et al., 2020). Research has consistently found a direct and negative effect of workplace aggression experiences on psychological wellbeing at work (Buchanan and Fitzgerald, 2008), which has been explained by the excessive physical and psychological arousal involved in dealing with them. Although some authors have concluded that it is the subjective experience of victimization that has a negative impact on wellbeing (Nielsen and Einarsen, 2012), in many other cases, mere exposure seems to be sufficient to generate a decrease in workers' wellbeing (Dehue et al., 2012; Giorgi et al., 2015). Hewett et al. (2018) analyzed the potential moderating effect that self-labelling would have on the relationship between exposure to bullying behaviors and wellbeing, finding that the effect of self-labelling was very small, although it was a determinant in the coping strategies developed by workers. Research suggests that workers' psychological wellbeing decreases when they witness the bullying of another person, that is, when victimization is indirect (Hoel et al., 2004; Dionisi and Barling, 2018; Sprigg et al., 2019).

The relationship between workplace aggression and police wellbeing has been little or only tangentially studied. Ellrich (2016) found that burnout increases patrol cops' risk to violent victimization but also favors the development of positive attitudes toward the use of violence. This study focuses exclusively on exposure to workplace aggression developed by citizens against police officers. Police officers interviewed by Milliard (2020) included workplace bullying as a source of stress. Recently, Bastarache (2020) reported that discriminatory and sexual harassment deteriorate the occupational health of Canadian police officers. Focusing on the moral damage caused by involvement in events that deeply transgress one's moral values and expectations, such as workplace aggression, either as a perpetrator or passive witness, Papazoglou et al. (2020a) found that this has an important impact on the development of post-traumatic stress disorder in police officers.

Bourbonnais et al. (2007) and Ricciardelli et al. (2020) found that in Canadian correctional officers, intimidation and psychological harassment at work increased the likelihood of psychological distress, especially in women. In another environment close to police organizations in terms of culture and gender imbalance, Fitzgerald et al. (1999) conducted a study with 28,000 military personnel in which they tested an integrated model of sexual harassment. Their results showed that the processes of sexual harassment are the same for men and women in the military, although the impact of sexual harassment on work

satisfaction and psychological wellbeing was more pronounced for women than for men. In contrast, Parker and Griffin (2002) found that sexual harassment follows different patterns for male and female police officers, with no impact on men's distress. De Haas et al. (2009) in research with police officers who had experienced sexual harassment report a similar impact on the mental and physical health of men and women, although female police officers were more frequently harassed and more concerned about this issue. The possibility of a differential impact of harassment between male and female police officers has been rarely studied, with inconclusive empirical evidence, and the authors stress the need for further research in this area (De Haas et al., 2009; Krakauer et al., 2020).

Research aim and hypotheses

This study analyzes the relationships between workplace aggression and the wellbeing and job satisfaction of border guards. According to the literature review, it is possible that there are differences between male and female border guards; therefore, we also explore this possibility.

As a result, in the present study, four hypotheses were structured, in which (1) female police officers will report more experiences of workplace aggression than their male counterparts (H1), (2) workplace aggression is predictive of participants' job satisfaction (H2) and wellbeing at work (H3); the relationship between workplace aggression and psychosocial outcomes varies according to gender (H4) 4a (workplace aggression and job satisfaction) and 4b (workplace aggression and wellbeing at work; see Figure 1).

Materials and methods

Design

This study is a descriptive correlational research with predictive purposes in which a multi-group analysis of the partial least squares (PLS) was carried out.

Participants and procedure

This study involved 1,100 officers from the Romanian Border Police. Regarding the sample strategy we used a stratified random sampling technique. The layers were the territorial border guard structures from every district located on the Romanian borders, all the sectorial structures and the border crossing points in the airports. At least two respondents were randomly chosen from each specialized working area (BPC, LBS, N, MC, and OS) and every organizational structure. The sample was reduced to 1,066 (96.91%) because of the exclusion of 34 records due to atypical scores on the variables of analysis. Of the final sample, 16.4%

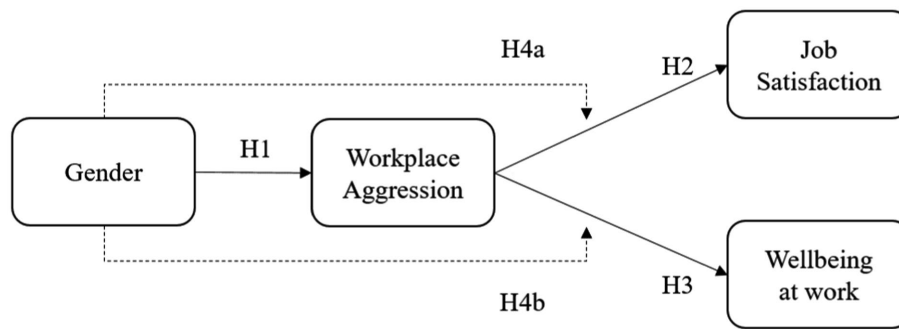


FIGURE 1
Hypothesized model.

TABLE 1 Demographic profile of participants of the study ($N=1,066$).

Variables	Categories	Freq.(%)
Age	18–25 years old	117 (11.0)
	26–35 years old	295 (27.7)
	36–45 years old	459 (43.1)
	46–60 years old	194 (18.2)
Gender	Male	888 (83.3)
	Female	174 (16.3)
Tenure	0–5 years	280 (26.3)
	5–10 years	81 (7.6)
	10–25 years	619 (58.1)
	25 or more	86 (8.1)
Function	Management	95 (8.9)
	Coordination	151 (14.2)
	Execution	817 (76.6)

Own computation using SPSS.

were female. Descriptive statistics regarding the measures are in Table 1.

According to the report *Women, Business, and the Law of the International Bank for Reconstruction and Development* (2020), Romania, the country to which the sample belongs, is among the 86 countries out of the 196 analyzed that achieve the highest score in the labor index for the existence of anti-discrimination and anti-harassment protection measures in the workplace. These rules have been transposed into the internal rules and regulations of the police force, of which 22.3% are women (EUROSTAT, 2022).

Instruments

The questionnaire contained sociodemographic variables related to age, gender, seniority and function (hierarchical position), as illustrated in Table 1. In addition, the questionnaire analyzed three constructs: workplace aggression, job satisfaction, and wellbeing at work (see Table 2). Workplace

Aggression: This includes six items on a four-point Likert scale (never = 1, rarely = 2, often = 3, and always = 4) and indicates the degree to which individuals are exposed to harassment and discrimination, both personally and as a witness (e.g., Are your workers exposed to gossip, slanderous, and defamatory words in your team?).

Job satisfaction: This includes four items in which participants rate their job satisfaction using four options (to a very small extent = 1; to a small extent = 2; largely = 3; to a very large extent = 4). An example of these items is: Does work give you professional satisfaction?

Finally, wellbeing at work was analyzed, which included six items in which participants rated their wellbeing in relation to work in four options (to a very small extent = 1, to a small extent = 2, Largely = 3, to a very large extent = 4). An example of these items is: Do you feel tense at work? (reverted). Descriptive statistics regarding the measures are in Table 2.

Ethics statement

In accordance with local legislation and institutional requirements, ethical review and approval were not required for this study on human participants. Written informed consent for participation (regarding the purpose of the study, anonymity of data, and use of data) was obtained prior to the completion of the questionnaires.

Procedure

The questionnaire was administered by 15 psychologists to 1100 border guards from Romanian Border Police. Once informed consent was obtained, participants completed the questionnaires, which were processed using SPSS statistical software (IBM Corp, 2020) to calculate descriptive statistics, and SmartPLS (Ringle et al., 2015) to validate the relationship model between the study variables.

TABLE 2 Descriptive statistic, and reliability of measure (N=1,066).

Variables	Min.	Max.	Median	Mean	SD	Cronbach's alpha	CR	AVE
Workplace aggression	1.00	4.00	1.50	1.54	0.52	0.88	0.91	0.63
Job satisfaction	1.00	4.00	3.25	3.38	0.49	0.83	0.89	0.66
Wellbeing at work	1.67	4.00	3.83	3.60	0.43	0.88	0.90	0.61

Composite reliability (CR) and average variance extracted (AVE).

Composite reliability (CR) and average variance extracted (AVE).

Own computation using PLS.



Results

Sociodemographics and descriptive results

First, the sociodemographic characteristics of the study participants were identified. Approximately half (43.1%) of the participants were between 36 and 45 years of age, mostly male (83.3%), with extensive experience in the position (58.1% with seniority between 10 and 25 years), and occupying operational level positions (76.6% in execution). See Table 1.

To analyze the properties of the measurement scales used, Cronbach's alpha, composite reliability, and average variance extracted were estimated to obtain a reliable measure (Hair et al., 2017). Similarly, standardized root mean square and normed fit indices were estimated for the adjustment index of the model (Henseler et al., 2016). Regarding the reliability of the measures, it was found that the three questionnaires presented adequate levels of internal consistency with values above 0.70 Cronbach's, composite reliability (CR), and average variance extracted (AVE) above 0.50 (Table 2). Finally, the quality indicators for the analyzed model were SRMR = 0.06 and NFI = 0.90.

Likewise, the results of the study showed that in the sample studied, wellbeing was the variable with the highest score (3.60), followed by job satisfaction (3.38). Finally, workplace aggression was the variable with the lowest score (1.54), as described in Table 2.

Hypothesis testing

To test Hypothesis 1 regarding gender differences in the experience of workplace aggression between males and females, the mean difference statistic was run. The statistical results obtained indicate that there are no significant differences in the scores obtained by men and women in the Job Satisfaction ($F=2.58$, $p=0.11$) and Wellbeing at Work ($F=0.53$, $p=0.47$) variables, but there are significant differences in the Workplace Aggression measure ($H1$; $F=4.20$, $p=0.04$), thus $H1$ was supported (Figure 2).

To validate Hypotheses 2 and 3, a structural equation model (SEM) was used (Figure 3). The results showed that workplace aggression had a significant effect on job satisfaction ($H2$; $R^2=0.27$) and wellbeing at work ($H3$; $R^2=0.31$). Thus, $H2$ and $H3$ were supported.

Finally, the moderating effect of gender ($H4a$ and $H4b$) was examined with a multi-group analysis comparing the effect of workplace aggression on job satisfaction, and wellbeing at work separately for men and women. The results show that there are no significant gender differences in the path coefficient, so the moderating effect of gender is rejected ($H4$ was not supported). Although in both cases, workplace aggression has a higher negative weight in the case of women (-0.54 and -0.64 , respectively) as illustrated in Table 3.

Discussion

Workplace aggression has been a research topic of study in different occupational groups, and evidence suggests that law

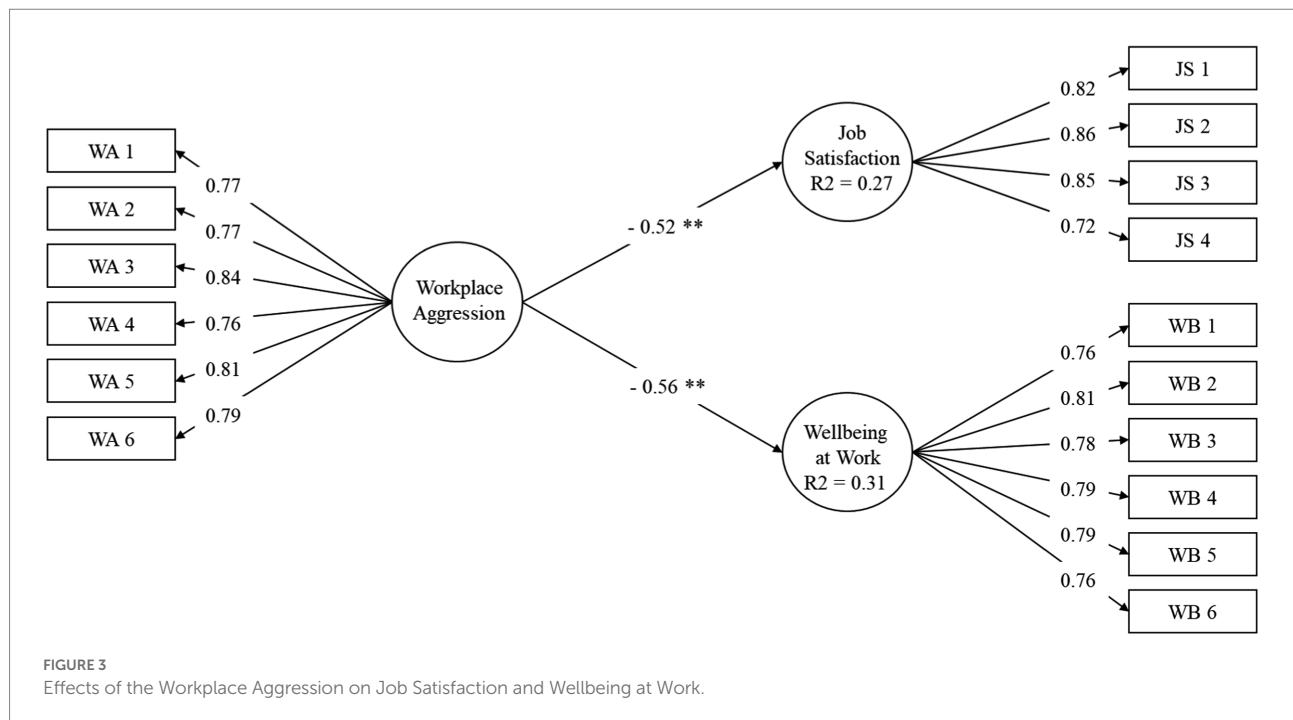


TABLE 3 Multi-group analysis (gender) in Path-coefficient.

	Path-coefficient	Diff. (men vs. female)	t-value (men vs. female)	Value of p (men vs. female)
WA → JS				
All	-0.52	0.04	0.55	0.58
Men	-0.50			
Female	-0.54			
WA → WB				
All	-0.56	0.10	1.67	0.10
Men	-0.54			
Female	-0.64			

Own computation using SPSS

enforcement officers are particularly susceptible to experiencing it (Segurado et al., 2008; Yu and Lee, 2020; Chitra and Karunanidhi, 2021). According to the above four research hypotheses were tested. The results presented in this research show that: (a) female border guards perceive more workplace aggression than male border guards, (b) the likelihood of border guards experiencing job satisfaction decreases when they experience or witness workplace aggression, (c) workplace aggression has a negative impact on wellbeing at work, so Hypotheses H1, H2, and H3 were supported in this research, and (d) contrary to our expectation, we found that the impact of workplace aggression on job satisfaction and wellbeing does not differ between male and female border guards, thus Hypotheses 4a and 4b were not supported.

Regarding exposure and perceived severity of workplace aggression, previous research has shown that there is a prevalence

among women (Björkqvist et al., 1994; Aquino and Bradfield 2000; Cortina et al., 2001; Salin, 2001, 2003; Tehrani, 2004; Escartin et al., 2013), although the magnitude of the differences is not large (Rotundo et al., 2001). The results of our research confirm that in the sample of police officers studied, women experienced greater workplace aggression than men. This evidence can be explained in light of the cultural values of police organizations, where the role of women in the police is questioned (Antón et al., 2021) and aggressive behavior toward women is tolerated (Simmons-Beauchamp and Sharpe, 2022).

Several studies have shown that women are more likely to consider certain behaviors as forms of workplace violence (Rotundo et al., 2001). Since in this research workplace aggression has been defined as an overarching construct, which includes the experiences of victimization and its perception as a witness, it is possible to affirm that our results are congruent with the hypothesis of women's greater awareness of the existence of workplace aggression. Among the reasons that could explain this greater awareness is the history of previous experiences and greater concern about workplace aggression (De Haas et al., 2009), which would not always generate neutralization or denial of such experiences (Brown et al., 2020; García, 2021).

It has been argued that in male-dominated organizations that extol traditional masculinity, such as police organizations, workplace aggression is widespread (Segurado et al., 2008) and accepted as part of the job (Loh et al., 2010; Power et al., 2013); this fact would explain why workplace aggression, in such contexts, would not have an impact on job satisfaction (Giorgi et al., 2015). However, the results showed that border guards participating in our study, regardless of whether they were male or female, developed lower job satisfaction when they perceived and experienced workplace aggression. This

result questions whether border guards normalize victimization and discrimination at work. The existence of anti-discrimination and anti-bullying norms in organizations, although not capable of eradicating workplace aggression, seems to influence the organizational cultural values shared by their members (Ragins and Cornwell, 2001).

It is possible, therefore, that the so-called police subculture is now beginning to become a cultural residue, as stated by the police leaders interviewed by Antón et al. (2021) and many of the female police participants in Yu and Lee's research (2020). It is also possible that attitudes toward workplace aggression in police organizations, as in other settings, mutate toward more ambivalent manifestations, in which discriminatory and violent behaviors are combined, while negative cognitions toward unequal treatment are maintained (Glick and Fiske, 2001; McCabe and Hardman, 2005; Feather and Boeckmann, 2007).

Additionally, previous research has shown a negative statistical relationship between workplace aggression and job satisfaction (Ertureten et al., 2013). In our research, we found that this relationship is explained by police officers' experiences related to verbal aggression, malicious jokes, discrimination, perception of inequalities, gossip, and defamatory words generating low job satisfaction in the analyzed sample.

On the other hand, this research shows that psychological wellbeing decreases when individuals experience or witness workplace aggression behaviors, results that are in line with previous evidence. For example, in their research Milliard (2020) found that workplace aggression, expressed through bullying, negatively impacts the police officer's wellbeing. In addition, Bastarache (2020) reported that discriminatory and sexual harassment has a strong negative impact on occupational health in Canadian police officers. Papazoglou et al. (2020a) found that workplace aggression has a strong impact on police officers' wellbeing.

United Nations Resolution 1,325 on Women, Peace, and Security highlights the contribution of policewomen to the wellbeing of society as a whole and to the maintenance of peace. However, their under-representation in police organizations, discrimination, and harassment within them are indicative of a lack of full integration (Natarajan, 2008; Antón et al., 2021; García, 2021; Simmons-Beauchamp and Sharpe, 2022).

Much of the research conducted in police contexts has been developed in Western countries. There is some discussion about the extent to which these findings can be extrapolated to other cultures, especially the former Soviet block nations in the east of Europe (Yu, 2002). Social, economic and political background has been considered to play an important role in the culture of police organizations (Ganapathy and Cheong, 2016). For example, an international project on police integrity that studied attitudes towards misconduct in police organizations found differences between Eastern and Western European countries (Ekenvall, 2003). Constantinou and Butorac (2019) analyse the presence of police values considered to be Anglo-American police subculture in European countries with totalitarian pasts and find that police subculture is present in all of them. The results of the research conducted with the Romanian Border Police are in line with this position.

Clearly, the results of this study show that the perception of workplace aggression has a significant negative impact on the wellbeing at work experienced by male and female border guards. Although this relationship is stronger for women than for men, the differences are not significant. Some authors have argued that women are more aware of their emotions, and this is reflected in their questionnaire scores (Mankus et al., 2016), but our results do not allow us to confirm this difference.

Conclusion

In this research, we have used an overarching approach to analyze aggression at workplaces. Although we believe that this is appropriate for the exploratory nature of the research, it prevents us from analyzing the differential impact that different forms of harassment and discrimination may have and the analysis of the concomitants that they may have on border guards.

Based on the results obtained, we can conclude that women in the study sample perceived workplace aggression more intensely than men. Likewise, the results showed that workplace aggression affects psychosocial variables at work, such as job satisfaction and wellbeing, although no differential results were found between men and women.

To reduce the adverse effects of workplace aggression on police officers, police organizations can develop actions aimed at reducing behaviors, such as verbal aggression, malicious jokes, discrimination, perception of inequalities, gossip, and defamatory words, which may be deeply entrenched in organizational cultures with masculinity-centered values. It is also necessary to generate spaces for reflection and debate on how people relate and communicate within organizations. There is sufficient evidence of the implications of civic behavior and good treatment on the wellbeing and satisfaction of workers.

Limitations and future research

The limitations of this study are as follows: In relation to experiences of workplace aggression, several studies show that the effects vary over time and that this change is especially pronounced in indirect victimization, whose effects decay more rapidly (Hoel et al., 2004; Lutgen-Sandvick et al., 2007; Dionisi and Barling, 2018; Sprigg et al., 2019). The time elapsed since the workplace aggression experience has not been taken into account in this research, and we believe this should be done in the future. On the other hand, we believe that it would be desirable to further explore the effects of workplace aggression on job satisfaction and wellbeing at work, considering the different sources and conditions of victims and witnesses. Furthermore, to avoid possible neutralization effects, it is desirable to use a checklist of situations.

The existence of a police subculture that justifies workplace aggression, particularly in the case of women, has been discussed (Keverline, 2003). It would have been interesting to know the

perception of border guards as to whether their organization is inclusive or not. This element could have helped explain the results better. In addition, it is possible that the existence of this subculture determines decisions to report abusive behavior and victims' resilience. In the future, it should be explored whether pressures to silence exist and what their impact is on reporting behaviors (Keverline, 2003; Collins, 2004; Chaivavej and Morash, 2009; Yu, 2017; Kutnjak Ivkovic et al., 2018).

The literature on female police officers emphasizes feelings of loneliness and not belonging. O'Reilly et al. (2015) found that ostracism can have even more pernicious effects than harassment, so a future line of research could include ostracism and its relationships, if any, with workplace aggression and other variables.

Finally, this study is correlational and quantitative. We believe that subsequent quantitative studies designed to increase knowledge about how female and male border guards perceive workplace aggression and its impacts on wellbeing and satisfaction should be developed in the future.

Data availability statement

The datasets presented in this article are not readily available because there is no authorization from the organization from which the data were obtained to be shared outside the research project in which they were generated. Requests to access the datasets should be directed to canton@usal.es.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local

legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Funding

This work was supported by Erasmus+ 2019-1-RO01-KA202-063815.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 07 November 2022
ACCEPTED 19 January 2023
PUBLISHED 13 February 2023

CITATION
Nisbet J, Jamshidi L, Andrews KL, Stewart SH,
Shields RE, Teckchandani TA, Maguire KQ and
Carleton RN (2023) Mental health and social
support among Royal Canadian Mounted
Police cadets.
Front. Psychol. 14:1092334.
doi: 10.3389/fpsyg.2023.1092334

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Mental health and social support among Royal Canadian Mounted Police cadets

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Introduction: Certain populations, such as public safety personnel (PSP), experience frequent exposures to potentially psychologically traumatic events and other occupational stressors, increasing their risk for mental health challenges. Social support has been evidenced as a protective factor for mental health. However, research examining perceived social support and its associations with symptoms related to mental disorders among PSP recruits is limited.

Methods: RCMP cadets ($n = 765$, 72% male) completed self-report surveys assessing: sociodemographic information, social support, and symptoms related to posttraumatic stress disorder, major depressive disorder, generalized anxiety disorder, social anxiety disorder, panic disorder, and alcohol use disorder.

Results: The results indicated statistically significant associations between higher social support and decreased odds of positive screens for generalized anxiety disorder, social anxiety disorder, and panic disorder (i.e., significant Adjusted Odds Ratios = 0.90 to 0.95).

Discussion: Cadets' perceived levels of social support are comparable to the Canadian general population and higher than serving RCMP. Social support appears to offer a protective element against anxiety-related disorders among participating cadets. Reductions in perceived levels of social support may be a function of RCMP service. Factors contributing to decreased levels of perceived social support should be considered.

KEYWORDS

mental health, social support, occupational health, public safety personnel, RCMP cadets

Introduction

Social support is a multifaceted construct, which can be conceptualized as “a social network's provision of psychological and material resources intended to benefit an individual's ability to cope with stress” (Cohen, 2004, p: 676). Notably, *intentions* to help others cope with stress may not always align with *perceptions* of the support received. Perceptions of psychological and material resources associated with social support can be categorized into three groups: (1) informational (e.g., giving advice, providing guidance); (2) instrumental (e.g., providing material or financial resources, helping with routine tasks); and (3) emotional (e.g., expressing empathy, reassuring, providing the opportunity to process emotions; House et al., 1985; Vig et al., 2020). Social support may be provided by spouses, partners, family, friends, co-workers, or professionals (Cohen and Wills, 1985). The extent of social support an individual perceives may vary depending on their depth of integration within a relationship or organization (Cohen

and Wills, 1985). High levels of perceived social support can provide direct effects in improving mental and physical health, and can buffer against the adverse effects of stress on health (Uchino et al., 1996; Cohen et al., 2000; Patterson, 2003; Southwick et al., 2005; Ozbay et al., 2007; Thoits, 2011; Santini et al., 2015; Hansson et al., 2017; Vig et al., 2020; Nero et al., 2022).

Social support appears particularly relevant for occupations involving high-stress levels, physical exertion, and exposure to distressing events. Public safety personnel (PSP) are routinely exposed to organizational stressors (e.g., staff shortages, lack of appropriate resources, inconsistent approaches to leadership), operational stressors (e.g., fatigue, shift work, job-related injuries), and diverse potentially psychologically traumatic events (PPTs; e.g., life-threatening natural disaster, sudden violent death, serious transportation accident; McCreary and Thompson, 2006; Carleton et al., 2018a). Associations between PPTs and higher prevalence of mental health disorders have been reported among a large sample of Canadian PSP (Carleton et al., 2018b), thus repeated exposure to PPTs may be, at least in part, one explanation for a higher prevalence of positive screens for mental health disorders among PSP (Carleton et al., 2018b). Conversely, increased social support among various PSP sectors, where there are high levels of stressor and trauma exposure, has been associated with the buffering of the effects of stress on mental health, such as decreased symptoms of major depressive disorder (MDD) and posttraumatic stress disorder (PTSD) among various PSP sectors (Vig et al., 2020). Nonetheless, PSP report experiencing diminishing social support as a function of their vocational service perhaps due to occupational stressors and/or PPTs (Regehr et al., 2003; Baek et al., 2022). Moreover, sociodemographic variables of gender and marital status may impact how social support is perceived. Gender appears to influence how PSP experience social support, as women PSP emphasize that social support is more reciprocal in nature than their colleagues (Kaur et al., 2021). PSP who are married or in a common-law relationship report that their partners are their first point of contact when seeking mental health support (Carleton et al., 2020).

Research on perceived social support and associations with mental health challenges *before* exposure to diverse occupational stressors and various PPTs among PSP recruits is limited (Regehr et al., 2003). Expanding research at the recruit level can provide a benchmark to analyze fluctuations in perceived social support at various career stages. The current paper begins to address these gaps by considering perceived social support among newly recruited Royal Canadian Mounted Police (RCMP) cadets at the start (i.e., pre-training stage, T1) of the Cadet Training Program (CTP; Carleton et al., 2022). The CTP is a nationwide training program in Canada and one of the largest training programs for Canadian PSP. The CTP includes a variety of stressors; consequently, high levels of perceived social support may help cadets to navigate through various challenges during the 26-week program. Notably, cadets must undergo: (1) a wide range of testing (e.g., a full medical exam, lab tests, physical stamina, psychological examinations); (2) operating in para-military conditions; (3) relocating to Depot in Regina, Saskatchewan; (4) adjusting to living conditions at Depot; (5) forming new relationships with facilitators and other cadets; and (6) balancing CTP obligations with prior relationships.

Data for the current paper are derived from the RCMP Study, a large-scale longitudinal evaluation of RCMP cadets' mental health, with details available in a published Protocol Paper (Carleton et al., 2022). The RCMP Study data collection provides an opportunity to address several gaps in the literature regarding newly recruited RCMP cadets. The current paper was designed to assess perceptions of social support among RCMP cadets starting the CTP by: (1) examining perceived social support among RCMP cadets and assessing for differences across sociodemographic

characteristics (i.e., gender, sex, age, ethnicity, marital status, province of residence, education); (2) comparing the cadets' self-reported levels of social support with those in the Canadian general population; (3) comparing the cadets' self-reported levels of social support with levels reported by serving RCMP; and (4) examining associations between social support and positive screens for several mental health disorders.

RCMP cadets starting the CTP were expected to report different levels of perceived social support based on: (1) marital status (e.g., cadets who are married or in common-law relationships were expected to report higher levels of social support than single, widowed, separated, or divorced cadets; Carleton et al., 2020; Nero et al., 2022); (2) gender and sex dynamics (e.g., female cadets were expected to report higher levels of social support than male cadets; Bellman et al., 2003); (3) comparisons with the Canadian general population. Directional predictions were not made for this hypothesis since cadets might report higher levels of perceived social support than members of the Canadian general population as a function of self-selection biases related to meeting the rigorous CTP screening criteria (Carleton et al., 2022) or might report lower levels of social support due to high levels of factors such as self-reliance; and (4) comparisons with RCMP. Cadets were expected to report higher levels of perceived social support than serving RCMP (i.e., serving members were expected to report lower levels of social support as a function of the diminishing social support associated with service; Regehr et al., 2003). Additionally, inverse relationships between perceived social support and self-reported mental health disorder symptoms associated with Panic Disorder (PD), Generalized Anxiety Disorder (GAD), Social Anxiety Disorder (SAD), PTSD, MDD, and Alcohol Use Disorder (AUD) were expected (Ozbay et al., 2007; Vig et al., 2020).

Methods

Procedure

Data for the current paper were collected as a part of the broader RCMP Study. The associated protocol paper provides full details of the RCMP longitudinal Study (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Ethics Board on April 10, 2019 (File #2019-055) and by the RCMP Research Ethics Board on April 12, 2019 (File #SKM_C30818021312580). The project is bound by the *Privacy Act*, R.S., 1985, c. P-21 and the Personal Information Protection and Electronic Documents Act, SC. 2000, c.5. The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval by the National Administrative Records Management System (NARMS; File #201611123286) and Public Services and Procurement Canada (PSPC; File #201701491/M7594174191).¹

Data and sample

The current sample consisted of RCMP cadets at the start (i.e., pre-training stage, T1) of the CTP. To qualify for participation in the CTP, an individual had to be a Canadian citizen or permanent resident, 19 to 57 years old, and able to fluently read, write, and speak English or

¹ N.B., The ethical approval and assessments of the RCMP Study precludes making de-identified data accessible.

French (Hembroff and Krätzig, 2020). Cadets also had to meet several additional CTP recruiting requirements, including security clearances, medical examinations, a polygraph test, and minimum physical standards (Hembroff and Krätzig, 2020). There were no conditions excluding participation in the RCMP Study for persons otherwise qualified for the CTP.

Upon arrival at Depot, cadets were invited to attend a recruitment session delivered by research team members. The session included: (1) video content from serving RCMP members (~10 min); (2) introductions to the research team; (3) a didactic lecture with a slide show presentation (~35 min long); and (4) an opportunity for potential participants to ask questions (~15 min). The presentation outlined the RCMP Study rationale, design, requirements, expected outcomes, and potential benefits to the RCMP, the broader PSP community, and all Canadians.

Cadets who agreed to participate were then asked to attend an on-boarding session which involved the formal consent process and the subsequent completion of a full assessment survey. Data were collected through self-report questionnaires, which included sociodemographic information, symptom measures, and a measure of perceived social support. The current data were collected at the pre-training stage of the CTP as part of the first full assessment of cadets within the RCMP Study. All Study-related activities were completed during the cadets' training time. As a precaution of the COVID-19 pandemic, RCMP Depot was closed from March 2020 to October 2020. All research-related activities (i.e., recruitment, onboarding, clinical interviews) were conducted remotely from October 2020 to June 2022. A total of ($n = 1,696$) cadets were invited to participate in the Study and a total of ($n = 890$) agreed to participate. Analyses for the current paper were limited to a sample of those cadets who completed the survey measure assessing perceived social support ($n = 765$) which represented 86% of those cadets who were recruited into the Study.

Perceived social support

The Social Provisions Scale (i.e., SPS-10) was used to assess perceived social support (Caron, 2013). Participants indicated the extent of social support they perceived receiving across 10-items. Each item was rated using a four-point Likert scale ranging from 1 (i.e., *strongly disagree*) to 4 (i.e., *strongly agree*) and scored continuously (Orpana et al., 2019). Total scores of 30 can be interpreted as a respondent indicating high levels of perceived social support (Orpana et al., 2019). Evaluation of the SPS-10 has demonstrated excellent internal consistency for the global scale ($\alpha = 0.880$), with the alphas for the six subscales (i.e., attachment, social integration, reassurance of worth, sense of reliable alliance, guidance, and the opportunity for nurturance) ranging from 0.528 to 0.900, and strong convergent validity with the original 24-item scale ($r = 0.930$; Caron, 2013).

Self-report symptom measures

All mental health symptoms were self-reported using the screening measures described below. A 'positive screen' on any of the following measures indicated that the individual has self-reported symptoms consistent with persons who have been diagnosed with a particular mental health disorder, which is not necessarily synonymous with meeting diagnostic criteria themselves. Individuals

who completed the self-report measures and screened positive would require the evaluation of a trained clinician to diagnose a specific mental health disorder.

The Panic Disorders Symptoms Severity Scale (PDSS-SR) was used to assess symptoms related to panic disorder (PD; Shear et al., 1997; Houck et al., 2002). Participants first read the definition of a panic attack, and the accompanying symptoms. From the accompanying symptoms, at least four had to be endorsed (e.g., rapid or pounding heartbeat, sweating, nausea, feeling of choking) for a panic attack to have occurred. If the participant reported having ever experienced a panic attack, or experiencing a panic attack in the past week, they were asked additional questions rated on a five-point Likert scale (i.e., 0 = *none* to 4 = *extreme*). Participants who were never administered the PDSS-SR due to never experiencing a panic attack were considered to have screened negative for PD. A positive screen for PD required the PDSS-SR total score to be seven or greater, which can be used to identify persons with clinically significant anxiety and distress (Shear et al., 2001; Houck et al., 2002). The self-report version has demonstrated excellent psychometrics with a strong internal consistency ($\alpha = 0.92$) and an intraclass correlation coefficient of 0.81 (Houck et al., 2002).

The Generalized Anxiety Disorder Scale (GAD-7) was used to assess generalized anxiety disorder (GAD) symptoms (Spitzer et al., 2006; Beard and Björgvinsson, 2014). Participants indicated the extent to which seven symptoms of anxiety bothered them in the previous 2 weeks. Ratings were made on a four-point Likert Scale (i.e., 0 = *not at all* to 3 = *nearly every day*; Spitzer et al., 2006). A positive screen for GAD required a total score of greater than nine (Swinson, 2006). The GAD-7 has shown good reliability, and construct, criterion, procedural, and factorial validity (Spitzer et al., 2006) as well as good internal consistency ($\alpha = 0.89$) and inter-item correlations 0.45–0.65 in a community sample (Löwe et al., 2008).

The Social Interaction Phobia Scale (SIPS) is a 14-item measure that was used to assess social anxiety disorder (SAD) symptoms (Carleton et al., 2009). The SIPS includes three subscales to assess social interaction anxiety, fear of overt evaluation, and fear of attracting attention, respectively. Each item is rating on a five-point Likert Scale (i.e., 0 = *not at all characteristic of me*, 4 = *entirely characteristic of me*). There is no specific time-window used. A positive screen for SAD requires a SIPS total score of 20 or greater (Carleton et al., 2009). The SIPS has demonstrated overall excellent internal consistency ($\alpha = 0.92$), convergent and discriminant validity in a large and independent sample (Reilly et al., 2012).

The PTSD Checklist for DSM-5 (PCL-5) was used to assess PTSD symptoms (Blevins et al., 2015). Participants rated how bothered they had been by 20 common symptoms of PTSD in the past month on a five-point Likert scale, from 0 (i.e., *not at all*) to 4 (i.e., *extremely*). Positive screens on the PCL-5 are determined by meeting the minimum DSM-5 criteria for each PTSD cluster (i.e., avoidance, hyperarousal, intrusions, and mood and cognitive changes) and exceeding the minimum clinical cut-off of greater than 32 on the total score (Weathers et al., 2013). Psychometric evaluation of the PCL-5 has demonstrated strong internal consistency ($\alpha = 0.94$) and good test-retest reliability ($r = 0.82$) within populations exposed to PPTEs (Blevins et al., 2015). The PCL-5 has a strong convergent validity with other trauma measures (Weathers et al., 1994).

The Patient Health Questionnaire (PHQ-9) is a 9-item self-report questionnaire that was used to assess MDD symptoms (Kroenke et al., 2001). Participants indicated how bothered they had been by depressive symptoms in the past 2 weeks by responding to each item using a four-point Likert scale (i.e., 0 = *not at all* to 3 = *nearly every day*; Manea et al.,

2015). A positive screen for MDD is indicated by a score of nine or greater (Manea et al., 2015). Psychometric support for the PHQ-9 details a sensitivity of 88% and specificity of 88% (Löwe et al., 2004a, 2004b). Psychometric evaluation of the PHQ-9 has demonstrated good internal consistency ($\alpha=0.89$) and test–retest reliability ($r=0.84$) within the general population (Kroenke et al., 2001).

The Alcohol Use Disorders Identification Test (AUDIT) is a 10-item self-report questionnaire to assess alcohol consumption and dependence over the past 12 months (Saunders et al., 1993; World Health Organisation AUDIT, 2001; Gache et al., 2005). Participants were asked questions about their drinking behaviors and negative alcohol-related consequences. Ratings were made using Likert scales that varied across items. A positive screen for AUD required the total AUDIT score to be 15 or higher (Babor et al., 2001; Gache et al., 2005). Psychometric evaluation of the AUDIT has demonstrated good internal consistency ($\alpha=0.81$), good test–retest reliability ($r=0.83$ to 0.95) within the general population, and ($\alpha=0.81$) in a police-specific population (Daepfen et al., 2000; Davey et al., 2000; Reinert and Allen, 2007). Criterion validity for correlations between AUDIT and four dimensions of alcohol consumption ranged from 0.47 to 0.66 and AUDIT questions were moderately sensitive (i.e., 54 to 79%) for criteria corresponding to heavy drinking (Bradley et al., 1998).

Statistical analyses

SPSS v.28 Premium (IBM, 2021 New York, United States) was used to conduct the quantitative analyses. Participants were grouped into sociodemographic categories for comparisons (i.e., gender, sex, age, ethnicity, marital status, former province of residence, education). First, the descriptive analyses provided information about the frequencies and percentages of participant sociodemographic variables. Means and the standard deviations of SPS-10 scores were calculated across different sociodemographic categories. A series of independent sample *t*-tests and one-way analyses of variance tests (ANOVA) were used to assess for differences in SPS-10 scores across sociodemographic categories, with Holm-Bonferroni adjustments applied to alpha levels in post-hoc analyses to control Type I errors in multiple comparisons. The item-level SPS-10 responses from cadets were compared to data from the Canadian general population (Statistics Canada, 2013; Orpana et al., 2019) and serving RCMP using a series of one-sample *t*-tests and independent sample *t*-tests.² The alpha level was set to 0.05 for all analyses. Second, a series of logistic regressions were conducted to assess the likelihood of screening positive for PD, GAD, SIPS, PTSD, MDD and AUD self-report measures based on SPS-10 scores.

Results

Participant sociodemographic details are provided in Table 1. Most participants were men (72.2%) and self-identified as male (72.0%). Most participants were between the age of 19 and 29 (60%), single (47.1%), or

married/in a common-law relationship (43%). Participants were mainly White/Caucasian (79.0%) and from Western Canada (52.9%; i.e., British Columbia, Alberta, Saskatchewan, or Manitoba). Most participants reported having some post-secondary school (43.1%).

High levels of social support (i.e., scores of 30 or greater) were reported across sociodemographic categories but no statistically significant differences were observed. Female cadets reported slightly higher scores (36.10 ± 5.60) than male cadets (35.90 ± 4.45). Cadets from 40 to 49 years of age reported the highest level of social support (36.70 ± 3.88), followed by cadets from 19 to 29 years of age (36.17 ± 4.53). Cadets who identified as Hispanic reported the highest levels of social support (37.27 ± 3.52), followed by those identifying as White/Caucasian (36.16 ± 4.45). Cadets who are married or in a common-law relationship reported the highest level of social support (36.05 ± 4.89), followed by single cadets (35.72 ± 4.81), and separated or divorced cadets (34.91 ± 4.21). Cadets from Atlantic Canada reported the highest level of social support (36.50 ± 3.92). Cadets with a university degree, 4-year College or higher level of education reported the highest level of social support (36.25 ± 4.72). Although there were no statistically significant results, the scores illustrate the high levels of perceived social support across sociodemographic categories and provide greater details on the perceived social support among cadets.

Associations between SPS-10 total scores and positive screens on self-report mental health symptom measures are provided in Table 2. The comparisons are presented as odds ratios (ORs), which measure the association between self-reported social support (i.e., SPS-10) and mental health disorder symptoms (i.e., PD, GAD, SAD, PTSD, MDD, AUD). Associations were also assessed after controlling for sociodemographic covariates (i.e., sex, age, ethnicity, marital status, province of residence, and education) as adjusted odds ratios (AORs). ORs and AORs both showed statistically significant inverse associations between SPS-10 scores and odds of screening positive for GAD, SAD, and PD (ORs ranged from 0.88 to 0.95; AORs ranged from 0.90 to 0.95). Cadets were less likely to screen positive for these mental disorders as the level of social support increases. No statistically significant associations were observed between perceived social support and symptoms of PTSD, or MDD. Odds ratios could not be calculated assessing the association between social support and AUD as no cadets screened positive for AUD-based on an AUDIT score of 15 or higher.

At the individual-item level, cadets reported statistically significant lower scores on item-four (i.e., *I have close relationships that provide me with a sense of emotional security and well-being*; $d=0.100$, $p<0.01$) and cadets reported statistically significant higher scores on item nine (i.e., *There are people who admire my talents and abilities*; $d=0.082$; $p<0.05$) when compared to the Canadian general population (See Table 3). A statistically significant large effect size ($d=0.832$, $p<0.001$) was observed when comparing cadets' total SPS-10 scores with those of serving RCMP, indicating that cadets reported statistically significant higher levels of perceived social support compared to serving RCMP. This difference is also reflected at the individual-item level, with statistically significant medium effect sizes (ds ranging from 0.561 to 0.783; all $ps<0.001$) observed on all SPS-10 items with cadets scoring higher compared to serving RCMP.

Discussion

RCMP cadets reported minimal differences in levels of perceived social support across sociodemographic categories. Perceived social support was high in each category. Extant literature suggests that spouses

² The SPS-10 data for serving RCMP is taken from the AX1 dataset, which was collected via an online survey for PSP during a five-month period from 2016 to 2017. The survey and data storage were approved by the University of Regina Institutional Research Ethics Board #2016–107. The SPS-10 specific data has not been published.

TABLE 1 Frequencies for sociodemographic variables and mean social support scores among RCMP Cadets.

Sociodemographic variables	% (n)	SPS-10 scores	Effect size
		M (SD)	
Gender			
Man	72.2 (552)	35.90 (4.45)	d ¹ = 0.049
Woman	24.5 (188)	36.13 (5.62)	
Non-binary	^	^	
Transgender	^	^	
Two-spirited	^	^	
Sex			
Male	72.0 (551)	35.90 (4.45)	d ¹ = 0.042
Female	25.1 (192)	36.10 (5.60)	
Age (years)			
19–29	60.0 (459)	36.17 (4.53)	η _p ² = 0.009
30–39	28.0 (214)	35.30 (5.40)	
40–49	6.1 (47)	36.70 (3.88)	
50–59	0.7 (5)	34.20 (3.96)	
Other/No response	5.2 (40)	–	
Ethnicity			
Asian	6.4 (45)	34.71 (5.74)	η _p ² = 0.008
Black	3.4 (24)	35.67 (4.71)	
First Nations/Inuit/Metis	3.3 (23)	35.96 (4.13)	
Hispanic	1.6 (11)	37.27 (3.52)	
South Asian	6.4 (45)	35.64 (5.83)	
White/Caucasian	79.0 (558)	36.16 (4.45)	
Marital Status			
Single	47.1 (360)	35.72 (4.81)	η _p ² = 0.002
Separated/Divorced/Widowed	1.4 (11)	34.91 (4.21)	
Married/Common-Law	43.0 (329)	36.05 (4.89)	
Other/No response	8.5 (65)	–	
Province of residence			
Western Canada (BC, AB, SK, MB)	52.9 (405)	35.77 (5.06)	η _p ² = 0.003
Eastern Canada (ON, QC)	34.5 (264)	36.21 (4.49)	
Atlantic Canada (PEI, NS, NB, NFL)	11.2 (86)	36.50 (3.92)	
Northern Territories (YK, NWT, NVT)	1.1 (8)	36.25 (4.37)	
Other/No response	^	–	
Education			
High school graduate or less	10.2 (78)	35.37 (4.98)	η _p ² = 0.004
Some post-secondary school	43.1 (330)	35.81 (4.83)	
University degree/4-year college or higher	39.7 (304)	36.25 (4.72)	
Other/No response	7.0 (53)	–	
Total sample	100 (765)	36.01 (4.74)	–

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$. There are no significant differences across demographic groups in social support scores. ^The sample size is between 1 and 4, so the exact data cannot be presented.

¹Cohen's d .

²Partial eta squared.

– No data reported.

TABLE 2 Relationship between social support scores and positive screens for mental health disorders.

	OR [95% CI]	AOR [95% CI]
Posttraumatic stress disorder (PCL-5)	0.97 [0.89, 1.07]	0.99 [0.90, 1.09]
Major depressive disorder (PHQ-9)	0.98 [0.92, 1.04]	0.99 [0.94, 1.05]
Generalized anxiety disorder (GAD-7)	0.95* [0.91, 0.99]	0.95* [0.90, 0.99]
Social anxiety disorder (SIPS)	0.93* [0.88, 0.99]	0.93* [0.87, 0.99]
Panic disorder (PDSS-SR)	0.88** [0.82, 0.95]	0.90* [0.83, 0.98]
Alcohol use disorder (AUDIT)	–	–

AOR = Odds ratio adjusted for sex, age, ethnicity, marital status, province of residence, and education; PCL-5 = PTSD Checklist for DSM-V; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = General Anxiety Disorder-7; SIPS = Social Interaction Phobia Scale; AUDIT = Alcohol Use Disorder Identification. Please note the Alcohol Use Disorder line is blank as no cadets met the criteria at the set cut point (i.e., 15). Test; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 3 Comparing mean social support scores of RCMP Cadets with the Canadian Population and serving RCMP.

SPS-10 items	General Canadian population ($n=22,486$) ³	RCMP cadets ($n=765$)	Comparing cadets with general population	Previously published serving RCMP ($n=1,214$)	Comparing cadets with serving RCMP
	Mean (SD)	Mean (SD)	Effect size (Cohen's d)	Mean (SD)	Effect size (Cohen's d)
1. There are people I can depend on to help me if I really need it	3.67 (1.50)	3.67 (0.55)	0.008	3.27 (0.69)	0.618***
2. There are people who enjoy the same social activities I do	3.54 (1.50)	3.56 (0.59)	0.026	3.16 (0.63)	0.645***
3. I feel part of a group of people who share my attitudes and beliefs	3.45 (1.50)	3.48 (0.60)	0.047	2.96 (0.70)	0.783***
4. I have close relationships that provide me with a sense of emotional security and well-being	3.59 (1.50)	3.53 (0.59)	0.100**	2.99 (0.80)	0.752***
5. There is someone I could talk to about important decisions in my life	3.65 (1.50)	3.68 (0.54)	0.062	3.24 (0.75)	0.655***
6. I have relationships where my competence and skills are recognized	3.53 (1.50)	3.51 (0.60)	0.036	3.04 (0.67)	0.725***
7. There is a trustworthy person I could turn to for advice if I were having problems	3.66 (1.50)	3.67 (0.54)	0.012	3.23 (0.69)	0.679***
8. I feel a strong emotional bond with at least one other person	3.68 (1.50)	3.68 (0.55)	0.003	3.31 (0.71)	0.561***
9. There are people who admire my talents and abilities	3.49 (1.50)	3.54 (0.59)	0.082*	3.10 (0.69)	0.665***
10. There are people I can count on in an emergency	3.70 (1.50)	3.70 (0.51)	0.004	3.34 (0.65)	0.608***
Total SPS-10 score	36.04 (7.50)	36.01 (4.74)	0.007	31.65 (5.52)	0.832***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

³The Canadian Population scores are taken from Statistics Canada (2012). The SEM was converted to SD based on the assumption that all respondents completed the questionnaire.

are most likely to provide PSP with mental health support (Carleton et al., 2020; Nero et al., 2022). Almost half of the participants (i.e., 43%) in the current paper reported being married or in a common-law relationship. The cadets who reported being married or in a common-law relationship reported the highest levels of perceived social support. However, cadets who reported other marital statuses (i.e., single, divorced or separated) also reported comparatively high levels of perceived social support with no statistically significant differences detected across marital status groups. The data collected did not include the category of 'dating' which may be an important form of social support in younger individuals (Adamczyk and Segrin, 2015) and may help to explain the relatively high levels of social support even in the 'single' cadets. The current paper indicates that regardless of marital status, cadets have cultivated

relationships that provide the perception of perceived social support as cadets begin the CTP. The findings support RCMP Depot continuing the Family Workshops, which are open to all family members and friends during the Graduation Program (RCMP, 2009). Future researchers may consider opportunities for virtual workshops or training sessions to spouses, common-law partners, family, and friends at various stages during the CTP which may provide continuity in social support as cadets progress through the CTP and enter into service as an RCMP member, where social support appears to degrade.

Existing literature suggests the possibility of gendered differences in social support (Bellman et al., 2003; Kaur et al., 2021). However, all cadets reported similarly high levels of perceived social support in the current paper. The current paper suggests that both women and men

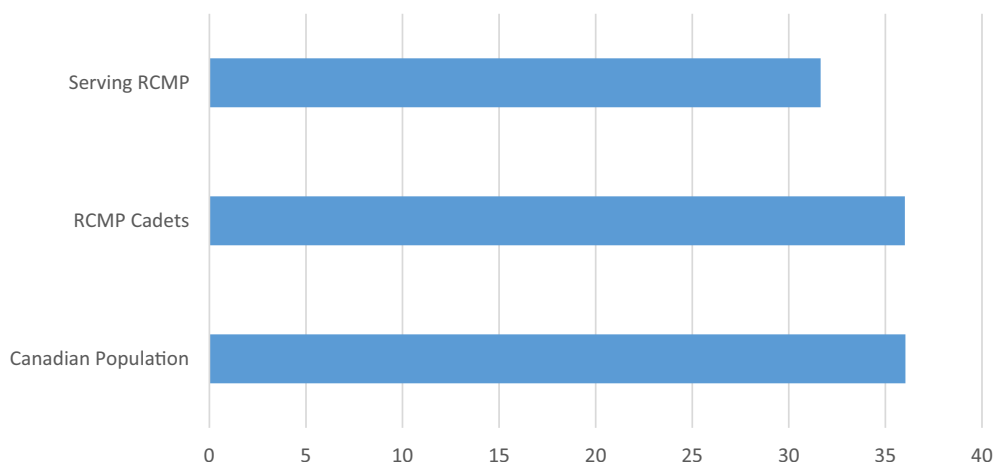


FIGURE 1
Total SPS-10 scores for the Canadian population, RCMP cadets, and serving RCMP.

start the CTP with high levels of perceived social support. Additional qualitative research may provide further nuance on the gendered perceptions of social support among cadets; for example, changing social interpretations and mores may be a factor. Male cadets may feel less stigma to lean on peers, or other support systems than in the past due to various efforts within the RCMP and wider Canadian society. Future research may consider the extent to which social support is reciprocal based on gender-dynamics, which would provide an additional layer of understanding social support among cadets.

Directional predictions were not made for the level of perceived social support reported by cadets when compared to the Canadian general population. Cadet scores were comparable to SPS-10 scores of the Canadian general population in 2012 (see Figure 1), with statistically significant lower scores reported by cadets for item four – (i.e., “I have close relationships that provide me with a sense of emotional security and well-being”) and statistically significant higher scores for item nine (i.e., “There are people who admire my talents and abilities”) in Table 3. The different collection periods may have impacted the levels of perceived social support reported. Further research is required to understand the nuances of these item-level differences.

Perceived social support was expected to be higher among cadets than among serving RCMP (Vig et al., 2020). Cadets reported statistically significantly higher perceived social support than serving RCMP based on both total SPS-10 scores and each item individually. The current results appear consistent with previous results wherein new firefighting recruits reported higher perceived social support earlier in the training process than active-duty firefighters, likely due to diminishing social support which may be related to years of service (Regehr et al., 2003) or perhaps fading public confidence and levels of trust in the organization (Adorjan et al., 2017; Government of Canada, RCMP, 2021). The longitudinal design of the RCMP Study will allow the research team to follow cadets and assess for changes in perceived social support, associations of such changes with other variables (e.g., changes in marital status, exposure to occupational stressors), and the impacts of changes in perceived social support on physical and mental health over time.

The results suggest that higher levels of perceived social support when starting the CTP are associated with lower odds of screening positive for PD, GAD, and SAD which is consistent with previous research (Dour et al., 2014). However, greater perceived levels of

perceived social support were not associated with a decreased likelihood of screening positive for symptoms associated with PTSD or MDD (Vig et al., 2020). The relationship between perceived social support and AUD could not be assessed, as none of the cadets screened positive for AUD. Within the cadet specific population an AUD cut-point of 15 may be overly high and ongoing research on PSP recruits may consider utilizing a score of 8 to increase sensitivity in order to detect hazardous drinking (British Columbia Centre on Substance Use, 2019).

Strengths and limitations

The current paper has several limitations that provide directions for future research. First, the voluntary nature of cadet participation created an unknowable influence from self-selection biases in the cadets who chose to participate. Second, the cross-sectional nature of the data preclude making any directional or causal conclusions. While these data are consistent with a potential causal or buffering role of social support on mental health challenges, it is also known that pre-existing mental health challenges may impact the extent of social support received (Thoits, 2011). Cadets who experienced a mental health challenge may have also experienced challenges with building and maintaining relationships that provide high levels of social support. Third, the most recent Canadian general population data collection on perceived social support used the SPS-5 for administrative reasons (Orpana et al., 2019); accordingly, there is a time-lapse gap and a reduction in the number of items which may preclude direct comparisons. Fourth, the Canadian general population sample is not matched with the cadets (e.g., cadets have a higher proportion of males than in the general population). A matched comparison sample might provide greater nuance in future studies. Fifth, the research team did not conduct a non-response analysis of cadets who chose not to participate in the study. Lastly, the screening measures for mental health disorders used in the current study are valid and reliable for use in clinical settings; nevertheless, diagnoses can only be made using clinical interviews. Several strengths offset the limitations of the current paper. First, the longitudinal design of the RCMP Study captures cadet data early in training, assessing pre-existing mental health and providing initial estimates of perceived levels of social support. Second, the current paper uses well-established and

well-validated measures to collect data from a large sample of a novel population. Third, the current paper focuses on the individual level (i.e., cadets' perceived social support) to provide clarity rather than the use of an institutional support measure (i.e., Institutional Support and Betrayal Questionnaire, Self-care and Mental Health Access for Public Safety) which may capture a limited understanding of social support when compared to the SPS-10. Future researchers may consider a mixed-methods study design that includes qualitative interviews or focus groups to better understand the social support construct from cadets' perspectives and incorporating the voice of people with lived experience of the transition into CTP and into RCMP service. In future, the SPS-5 could be used instead of the SPS-10 to shorten the survey length and to allow direct comparisons with the most recent general population data on social support among the Canadian general population (Orpana et al., 2019).

Conclusion

The current paper demonstrates high levels of perceived social support ubiquitous among cadets at the start of the CTP. Higher levels of perceived social support were inversely associated with positive screens for PD, GAD, and SAD suggesting that perceived social support may be a protective factor against the development of anxiety disorders, in particular. The current results are the first to evidence the stark contrast in perceived social support between new cadets and serving RCMP members, suggesting the possibility of substantial reductions in perceived social support as a function of service. The current results include initial estimates of perceived social support and the associations with mental health challenges prior to the onset of training, providing a valuable benchmark for future research with RCMP members, other police, and other PSP groups.

Data availability statement

The datasets presented in this article are not readily available because the datasets will be made available only for independent confirmation purposes and only to persons with the necessary ethical and security clearances as defined by the research ethics board at the University of Regina and the contractual obligations with the Royal Canadian Mounted Police. Requests regarding the datasets can be made to the corresponding author.

Ethics statement

Data for the current paper were collected as a part of the broader RCMP Study. The associated protocol paper provides full details of the RCMP longitudinal Study (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Ethics Board on April 10, 2019 (File #2019-055), and the RCMP Research Ethics Board followed with approval on April 12, 2019 (File #SKM_C30818021312580). The study was also approved through a Privacy Impact Assessment as part of the overall National Administrative Records Management System approval (201611123286) and Public Services and Procurement Canada approval (201701491/M7594174191). The project is bound by the Privacy Act, R.S., 1985, c. P-21 and the Personal Information Protection and Electronic Documents Act, SC. 2000, c.5 and approved by Public Services and Procurement Canada (PSPC) M7594-171491/001/SS. The

participants provided their electronically-recorded informed consent to participate in this study.

Author contributions

All authors made substantial contributions consistent with the International Committee of Medical Journal Editors. Initial design for the current article was based on the following contributors, each of whom was responsible for overseeing their area-specific domains for assessment, all of whom reviewed, revised as necessary, and approved the final design in its entirety. JN, RNC, KA, and LJ: conceptualization. JN, LJ, and RNC: methodology. LJ, RNC, SS, and JN: validation. LJ, KM, JN, RNC, and SS: formal analysis. JN, LJ, KA, TT, RS, KM, RNC, and SS: investigation. RNC: resources, supervision, project administration, and funding acquisition. JN, LJ, KA, RS, and RNC: writing-original draft preparation. JN, LJ, KA, SS, RS, TT, KM, and RNC: writing-review and editing. All authors contributed to the article and approved the submitted version.

Funding

RNC is supported by a Medavie Foundation Project Grant. SS is supported by a Tier 1 Canada Research Chair in Addictions and Mental Health. The current study was supported by the RCMP, the Government of Canada and the Ministry of Public Safety and Emergency Preparedness, and a Grant from the Medavie Foundation.

Acknowledgments

Exceptional thanks to the RCMP cadets and Krätzig. Special thanks to the following people (alphabetically by last name) who have provided tremendous support for the current study in several different ways since inception: RCMP and Government Leaders - William Sterling Blair, Jasmin Breton, Sylvie Châteauvert, Daniel Dubeau, Ralph Edward Goodale, Louise Lafrance, Brenda Lucki, Sylvie Bourassa Muise, Stephen White; Academics - Kelly J. Abrams, Billea Ahlgrim, Myles Ferguson, Jennifer Gordon, Chet Hembroff, Bridget Klest, Laurie Sykes-Tottenham, Kristi Wright; University of Regina executive, administrative, and technical team members - Taryn Acoose, Olabisi Adesina, Seerat Bassi, Chris Beckett, Brad Berezowski, Jonathan Burry, Yao Che, Murray Daku, Oluwaseun David, Krysten Forbes, Jolene Goulden, Sally Gray, Kadie Hozempa, Xiaoqian Huang, Maria Kamil, Anita Kohl, Donna King, Jordan MacNeil, David Malloy, Akiff Maredia, Kathy McNutt, Megan Milani, Sara Moradizadeh, Sajid Naseem, Obimma Onuegbu, Abimbola Ogunkoyode, Steve Palmer, Cynthia Sanders, Mikhail Shchukin, Shubham Sharma, Vianne Timmons, Preeti Tyagi, Abinyah Walker, Keyur Variya, Christopher Yost, Zhe Zhang; Clinical staff and supervised clinicians - Andreanne Angehrn, Michael Edmunds, Amelie Fournier, Lis Hansen, Stephanie Korol, Caeleigh Landry, Katherine Mazenc, Michelle Paluszek, Vanessa Peynenburg, Lloyd Robertson, Joelle Soucy, Emilie Thomas, Vivian Tran.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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SPECIALTY SECTION

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 19 September 2022

ACCEPTED 20 February 2023

PUBLISHED 15 March 2023

CITATION

Khoury JMB, Jamshidi L, Shields RE, Nisbet J,
Afifi TO, Fletcher AJ, Stewart SH,
Asmundson GJG, Sauer-Zavala S,
Krätzig GP and Carleton RN (2023) Putative risk
and resiliency factors among Royal Canadian
Mounted Police cadets.
Front. Psychol. 14:1048573.
doi: 10.3389/fpsyg.2023.1048573

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Putative risk and resiliency factors among Royal Canadian Mounted Police cadets

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Objective: Mental health disorders are prevalent among active-duty Royal Canadian Mounted Police (RCMP) officers. The current study was designed to assess whether RCMP cadets commencing the Cadet Training Program are inherently at greater risk of developing mental health challenges by statistically comparing cadet putative risk and resiliency scores to scores from young adult populations. The study was also designed to assess for sociodemographic differences in putative risk and resiliency variables among RCMP cadets in order to facilitate future comparisons.

Methods: Cadets ($n=772$; 72.2% men) completed self-report measures of several putative risk variables (i.e., anxiety sensitivity, fear of negative evaluation, pain anxiety, illness and injury sensitivity, intolerance of uncertainty, and state anger) and resiliency. Scores were statistically compared to samples from Canadian, American, Australian, and European young adult populations.

Results: Cadets had statistically significantly lower scores on all putative risk variables and statistically significantly higher resiliency scores compared to the young adult populations. In the cadet sample, there were statistically significant differences in putative risk and resiliency variables across gender and sex.

Conclusion: Cadets' significantly lower scores on putative risk variables and higher scores on resiliency suggest that they may be psychologically strong; as such, it may be that the nature of police work, as opposed to inherent individual differences in risk and resiliency, accounts for active-duty RCMP officers' comparatively higher prevalence of mental health disorders over time.

Clinical Trial Registration: [ClinicalTrials.gov](https://clinicaltrials.gov), Identifier NCT05527509.

KEYWORDS

public safety personnel, RCMP cadets, mental health, putative risk factors, resiliency factors

Introduction

Public safety personnel (PSP; e.g., border services agents, correctional workers, firefighters, paramedics, police officers, and public safety communicators) work to support the safety of citizens (Canadian Institute of Public Safety Research and Treatment, 2019; Government of Canada, 2019); accordingly, PSP are frequently exposed to diverse potentially psychologically traumatic events (PPTE; Carleton et al., 2019). PPTE have been associated with increased reports of mental health symptoms in Canadian PSP (Carleton et al., 2019). Approximately 50% of Royal Canadian Mounted Police (RCMP) officers screen positive for one or more mental health disorders (Carleton et al., 2018), which is much higher than the screening prevalence of 10.1% in the Canadian general population (Government of Canada, 2012).

Since World War II, there have been suggestions that these elevated rates of mental health challenges among uniformed service personnel are due to inherent weaknesses that could be screened for prior to service, rather than a result of the pressures of PPTE exposures on the job (Horswill and Carleton, 2021). Personality screens, such as the Woodworth Test, Army Alpha, and Army Beta, were used unsuccessfully during the World Wars to identify soldiers inclined to develop psychological problems from battle exposure (Horswill and Carleton, 2021). Shell Shock and hysteria were recognized as legitimate diagnoses resulting from exposure to war but soldiers with such conditions were considered inherently psychologically weak persons who would have still experienced mental health challenges had they remained civilians (Duguid, 1938; Horswill and Carleton, 2021). Remnants of such thinking persist today regarding PSP (Burns and Buchanan, 2020; Ricciardelli et al., 2020a), as evidenced by cultures of stoicism in policing organizations (McElheran and Stelnicki, 2021) and the use of personality screening measures with police recruits not only to assess for vocational goodness of fit, but also for the potentiality for psychological problems (Pozzulo et al., 2017). Nevertheless, the ability of personality screens to predict mental health outcomes among police appears modest at best (Detrick et al., 2001; Koepfler et al., 2012).

Research on putative risk factors for mental health disorders has increasingly focused on individual difference variables (e.g., Barlow et al., 2004; Paulus et al., 2015), including anxiety sensitivity, intolerance of uncertainty, fear of negative evaluation, illness and injury sensitivity, pain-related anxiety, state anger, and self-reported resilience. While some argue that some of these putative risk factors are personality factors (e.g., anxiety sensitivity, fear of negative evaluation), they are relatively more modifiable than more commonly agreed upon personality traits like neuroticism and extraversion (e.g., Smits et al., 2008; Keough and Schmidt, 2012). These individual difference variables are associated with diverse mental health challenges both in the general population (Schmidt and Lerew, 1998; Schmidt et al., 1999; O'Connor et al., 2002; Asmundson and Stapleton, 2008; Meffert et al., 2008; Capron et al., 2012; Carleton et al., 2012a; Van der Molen et al., 2014; Carleton, 2016; de Bles et al., 2019; Korol et al., 2019; Zegel et al., 2022) and among PSP (Feeny et al., 2000; Asmundson and Stapleton, 2008; Meffert et al., 2008; Carleton et al., 2009, 2018; Boffa et al., 2018; Stanley et al., 2018; de Bles et al., 2019; Korol et al., 2019; Rogers et al., 2020; Zegel et al., 2022). Reducing individual risk factors may necessarily increase individual resilience but there is also literature suggesting that resilience is an independent

individual difference variable broadly defined as the ability to successfully adapt to difficult situations (Luthar, 2000). Accordingly, resilience correlates negatively with mental health challenges (Smith et al., 2008; Rodríguez-Rey et al., 2016; Sánchez et al., 2021). Among PSP, higher levels of self-reported resilience are associated with lower levels of symptoms related to PTSD and other mental health disorders (e.g., Smith et al., 2008; Lee et al., 2014; Kyriazos et al., 2018; Russell et al., 2021).

The current study is the first attempt, to our knowledge, to evaluate putative risk and resiliency factors among RCMP cadets. Given that results of prior research have shown that RCMP officers have a high prevalence of mental health challenges (Carleton et al., 2018), examining pre-service data can help elucidate whether such challenges stem from inherent individual differences and/or from the nature of service. The current study was designed to assess self-reported putative risk and resiliency factors in cadets starting the RCMP Cadet Training Program. Cadets' scores were compared to published results from the Canadian, American, Australian, and European young adult population samples, as well as compared across sociodemographic variables within the cadet sample, which will provide detailed characterizations of a novel sample that facilitate future comparisons. Consistent with the pre-registered hypotheses from the RCMP Study Protocol (Carleton et al., 2022) and prior literature (Carleton et al., 2018; Korol et al., 2019; Angehrn et al., 2020), we hypothesized that RCMP cadets would report lower scores on putative risk variables and higher scores on resilience than the young adult populations, and women cadets would report higher scores on putative risk variables and lower scores on resilience than men cadets. Cadets who were married or common law, older, or who have completed higher education were expected to have lower scores on putative risk variables and higher scores on resilience (Afifi et al., 2006; Breslau et al., 2011; Carleton et al., 2018). By examining data from the Cadet Training Program, insight can be gleaned into cadets' mental health prior to serving as RCMP officers.

Materials and methods

Procedure

Data were collected via an online Qualtrics self-report survey, available in both English and French, as part of the RCMP Longitudinal Study (Carleton et al., 2022). Data collection occurred between 22 April 2019 and 9 December 2019 and between 16 November 2020 and 3 October 2021; in the intervening interval, the RCMP Training Depot was closed due to the COVID-19 pandemic. Full details regarding the RCMP Study protocol (e.g., design, recruitment) are available in a dedicated protocol paper (Carleton et al., 2022). The RCMP Study was approved by both the University of Regina Institutional Research Ethics Board (File No. 2019-055) and the RCMP Research Ethics Board (File No. SKM_C30818021312580). The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval by the National Administrative Records Management System 201611123286 and Public Services and Procurement Canada 201701491/M7594174191. The current study used data collected at the pre-training stage of the Cadet Training Program, a stage that included the initial assessment,

pre-training survey, and clinical interview (Carleton et al., 2022). Data were statistically compared, using between-group analyses, to published young adult population norms for measures assessing anxiety sensitivity (Taylor et al., 2007), intolerance of uncertainty and illness and injury sensitivity (Fetzner et al., 2016), fear of negative evaluation (Hajdúk et al., 2015), pain-related anxiety (Abrams et al., 2007), state anger (Forbes et al., 2014), and resilience (Calo et al., 2019).

Data and sample

Participation in the RCMP Study was voluntary. To enter the Cadet Training Program, recruits were required to be Canadian citizens or permanent residents, aged 19 to 57 years, and fluent in either English or French. Cadets also had to meet several recruitment requirements of the training program, including minimum physical standards, medical examinations, security clearance, a polygraph test, and some psychological testing (Hembroff and Krätzig, 2020). The current sample included 772 RCMP cadets, aged 19 to 52 years ($M = 28.96$, $SD = 6.14$), most of whom were men (72.2%) and White (70.7%). Following current best practices in the literature (Bauer et al., 2017; Lussenhop, 2018; Frohard-Dourlent et al., 2020), separate demographic questions were asked about participants' gender identity and their sex. Some participants ($n = 21$; 2.7%) chose not to identify their gender. Among those who did answer, most were cisgender (99.5%), while 0.05% were transgender, nonbinary, or Two-Spirit. Due to confidentiality concerns for small groups, this paper reports on cisgender participants only.

Young adult population norms were obtained from several samples. Young adult norms were used as our cadet participants were generally in their early twenties, single, and with limited postsecondary education. Whenever possible, samples from the Canadian young adult populations were used, with samples from American, Australian, and European young adult populations used when obtaining Canadian published norms was not possible for a given measure. The anxiety sensitivity sample (Taylor et al., 2007) comprised 4,720 Canadian and American undergraduate students (66.8% women). The fear of negative evaluation sample (Hajdúk et al., 2015) comprised 332 European undergraduate students (74.1% female; $M_{age} = 20.93$), while the resiliency sample (Calo et al., 2019) consisted of 134 Australian senior physiotherapy students (55.2% women). The state anger sample (Forbes et al., 2014) consisted of 501 American undergraduate students (62.1% female; $M_{age} = 19.58$). The illness and injury sensitivity and intolerance of uncertainty (Fetzner et al., 2016) comprised 1,477 Canadian young adults (72.0% female; $M_{age} = 25.59$). The pain-anxiety sample (Abrams et al., 2007) comprised 155 Canadian undergraduate students (69.0% women; $M_{age} = 20.41$).

Measures

Sociodemographic questions

RCMP cadets were asked to self-report their gender, sex, age, marital status, province of residence, highest education level attained, and whether they had prior PSP work experience.

Anxiety Sensitivity Index-3

Anxiety sensitivity is a dispositional fear of arousal-related sensations (e.g., increased heart rate, blushing; Taylor et al., 2007; Smits et al., 2008; Keough and Schmidt, 2012). The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007) is an 18-item self-report measure used to assess anxiety sensitivity across three dimensions: somatic concerns (6 items; e.g., "It scares me when my heart beats rapidly"); cognitive concerns (6 items; e.g., "When I cannot keep my mind on a task, I worry that I might be going crazy"); and social concerns (6 items; e.g., "It is important for me not to appear nervous"). Participants rate items on a Likert scale from 0 (*agree very little*) to 4 (*agree very much*). Higher scores indicate greater sensitivity to anxiety symptoms. The ASI-3 has demonstrated strong internal consistency (Taylor et al., 2007) and good test-retest reliability (Osman et al., 2010), as well as good convergent, discriminant, and criterion validity (Taylor et al., 2007).

Brief Fear of Negative Evaluation Scale—Straightforward items

Fear of negative evaluation is dispositional apprehension experienced during evaluative situations (Rodebaugh et al., 2004; Weeks et al., 2005; Russell et al., 2021). The Brief Fear of Negative Evaluation Scale—Straightforward items (BFNE-S; Rodebaugh et al., 2004; Weeks et al., 2005) is an 8-item self-report measure used to assess fears of negative evaluation with the straightforward items from the original Brief Fear of Negative Evaluation Scale (Leary, 1983; Carleton et al., 2011). Participants rate each item (e.g., "I am usually worried about what kind of impression I make") on a scale ranging from 0 (*not at all characteristic of me*) to 4 (*extremely characteristic of me*). Higher scores indicate greater fears of negative evaluation. The BFNE-S has demonstrated excellent internal consistency, construct validity, and factorial validity (Weeks et al., 2005; Rodebaugh et al., 2007; Carleton et al., 2007a).

Illness/Injury Sensitivity Index-Revised

Illness and injury sensitivity are dispositional tendencies to fear physical harm and injury (Carleton et al., 2005; Angehrn et al., 2020). The Illness/Injury Sensitivity Index-Revised (ISI-R; Carleton et al., 2005) is a 9-item measure revised from the original Illness/Injury Sensitivity Index (Taylor, 1993), and used to assess fear of illness (5 items; e.g., "I worry about becoming physically ill") and fear of injury (4 items; e.g., "I am frightened of being injured"). Participants rate items using a scale ranging from 0 (*agree very little*) to 4 (*agree very much*). Higher scores indicate greater worries about illness and injury. Inter-correlation between the two factors is sufficient to justify use of a single total score (Carleton et al., 2006). The ISI-R has demonstrated excellent internal consistency and convergent validity with other measures pertaining to illness and injury (anxiety sensitivity somatic concerns, fear of pain, fear of movement, and re-injury), and high correlation with the original index (Carleton et al., 2006).

Intolerance of Uncertainty Scale-Short Form

Intolerance of uncertainty describes dispositional challenges that occur after perceiving the absence of salient, key, or sufficient information" (p. 31 Schmidt and Lerew, 1998; Schmidt et al., 1999; Carleton et al., 2007b). The Intolerance of Uncertainty Scale (IUS-12; Carleton et al., 2007b) is a 12-item self-report questionnaire used to

assess difficulties tolerating uncertainty. Participants rate each item on a scale ranging from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). The IUS-12 has two factors (Carleton et al., 2007b; McEvoy and Mahoney, 2012): prospective IU (7 items; e.g., “I cannot stand being taken by surprise”) and inhibitory intolerance of uncertainty (5 items; e.g., “I must get away from all uncertain situations). Higher scores indicate less ability to tolerate uncertainty, with the two factors correlating sufficiently to justify use of a single total score (Carleton et al., 2007b). The IUS-12 is strongly correlated with the original Intolerance of Uncertainty Scale and has demonstrated excellent convergent validity and internal consistency (Carleton et al., 2007b, 2012b).

Pain Anxiety Symptoms Scale-20

Pain-related anxiety is the dispositional tendency to respond to potential or actual pain with anxiety or fear (McCracken and Dhingra, 2002; Rogers et al., 2020). The Pain Anxiety Symptoms Scale-20 (PASS-20; McCracken and Dhingra, 2002) is a 20-item short form of the original Pain Anxiety Symptoms Scale (McCracken et al., 1992), used to assess pain-related anxiety across four dimensions: cognitive (5 items; e.g., “I cannot think straight when in pain”), fear (5 items; e.g., “Pain sensations are terrifying”), escape/avoidance (5 items; e.g., “I will stop any activity as soon as I sense pain coming on”), and physiological (5 items; e.g., “Pain makes me nauseous”). Participants rate items on a scale ranging from 0 (*never*) to 5 (*always*). Higher scores indicate greater anxiety about pain symptoms. The PASS-20 has demonstrated good factorial validity, for both the total scale and subscales, in both clinical (Coons et al., 2004) and non-clinical (Abrams et al., 2007) samples; strong internal consistency; and good construct and predictive validity (McCracken and Dhingra, 2002).

Dimensions of Anger Reactions

State anger is a putative risk factor for psychological distress following exposure to PPTE (Barsky and Ahern, 2004; Smith et al., 2008). The Dimensions of Anger Reactions (DAR-5; Barsky and Ahern, 2004) is a 5-item self-report questionnaire used to assess levels of anger. Participants rate each item (e.g., “When I got angry at someone, I wanted to hit them”) on a scale from 1 (*none or almost none of the time*) to 5 (*all or almost all of the time*). Higher scores indicate greater levels of anger. The DAR-5 has demonstrated strong internal reliability (Forbes et al., 2014) and concurrent validity with the State-Trait Anger Expression Inventory-2 (Tibubos et al., 2020).

Brief Resilience Scale

The Brief Resilience Scale (BRS; Smith et al., 2008) is a 6-item self-report questionnaire used to assess individual perceptions of adaptability to difficult situations. Participants rate each item (e.g., “I tend to bounce back quickly after hard times”) on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; Smith et al., 2008). Higher scores indicate greater individual resilience. The BRS has demonstrated good internal consistency and test-retest reliability (Windle et al., 2011) and convergent and divergent validity (Sánchez et al., 2021).

Statistical analyses

Some participants completed the Cadet Training Program prior to the closure of RCMP Training Depot due to the COVID-19

pandemic, and others completed the Cadet Training Program after RCMP Training Depot reopened. Differences across putative risk and resiliency variables between participants completing the Cadet Training Program pre- and post-COVID-19 were assessed using independent samples *t*-tests. Descriptive statistics were calculated for each putative risk and resiliency factor. To test the hypothesis that cadets would report lower scores on putative risk variables and higher scores on resilience compared to young adult samples, one-sample *t*-tests were used to compare cadets' scores to published scores from samples of Canadian, American, Australian, and European young adult populations (Abrams et al., 2007; Taylor et al., 2007; Forbes et al., 2014; Hajdúk et al., 2015; Fetzner et al., 2016; Calo et al., 2019), with Cohen's *d* used to measure effect size. To test whether men and male cadets and cadets who are married or common law, older, or who have completed higher education reported lower scores on risk variables and higher scores on resilience, independent samples *t*-tests and one-way ANOVAs were conducted with the cadet data. Holm-Bonferroni adjustments were applied to alpha levels in *post hoc* analyses to control for Type I errors in multiple comparisons.

Results

Comparison of cadet scores with the young adult population norms

Table 1 provides descriptive statistics and a summary of analyses comparing putative risk and resiliency variables between cadets and the young adult populations. Cadets had statistically significantly lower scores on all putative risk variables examined [all *ps* < 0.001, *d* = 0.239 (anxiety sensitivity social concerns)—1.881 (state anger)] and statistically significantly higher BRS scores compared to the young adult population (*p* < 0.001, *d* = 0.873).

Cadet risk and resiliency scores

There were no statistically significant differences across putative risk and resiliency variables between participants who completed the Cadet Training Program pre- and post-COVID-19. Therefore, pre- and post-COVID-19 participants were amalgamated, and further analyses were conducted on the amalgamated sample.

All putative risk variables were statistically significantly positively associated with one another. Resilience was statistically significantly negatively associated with all putative risk variables, except for ISI-R and IUS-12, with which resilience was statistically significantly positively associated. Table 2 provides results from between-group analyses of putative risk and resiliency variables across sociodemographic groups. Gender and sex comparisons were made based on available sample sizes with resulting difference patterns being relatively comparable. Women, *t*(731) = 4.05, *p* < 0.001, *d* = 0.342, and female, *t*(734) = 3.74, *p* < 0.001, *d* = 0.314, cadets had significantly lower BRS scores than men and male cadets.

A one-way ANOVA evidenced a statistically significant effect of age on BFNE-S scores, *F*(3, 706) = 2.88, *p* = 0.035, η_p^2 = 0.012. A *post-hoc* Tukey test evidenced that cadets 19–29 years of age had statistically significantly higher scores on the BFNE-S than cadets 40–49 years of age (*p* = 0.037); however, the difference was no longer statistically

TABLE 1 Putative risk and resilience factor between-group differences among cadets and the general population.

Variable	Cadets				General population	Test statistics	
	Mean (SD)	α	Skew (SE=0.11)	Kurtosis (SE=0.21)	Mean (SD)	<i>t</i>	Effect size (Cohen's <i>d</i>)
Anxiety sensitivity—global	8.30 (8.22)	0.89	2.06	5.26	12.80 (10.60)	15.44***	0.548
Anxiety sensitivity—somatic	1.73 (2.88)	0.84	2.52	7.67	4.20 (4.42)	25.94***	0.937
Anxiety sensitivity—cognitive	1.59 (2.82)	0.85	2.70	8.09	2.70 (3.80)	10.95***	0.395
Anxiety sensitivity—Social	4.99 (3.81)	0.71	1.11	1.04	5.90 (4.70)	6.62***	0.239
Fear of negative evaluation	16.96 (7.52)	0.96	0.72	−0.11	21.95 (8.72)	18.22***	0.663
Illness and injury sensitivity—global	7.40 (7.61)	0.93	1.17	0.82	12.82 (9.84)	19.76***	0.711
Illness sensitivity	3.81 (4.41)	0.90	1.32	1.27	6.14 (5.32)	14.64***	0.527
Injury sensitivity	3.59 (3.70)	0.88	1.06	0.46	8.26 (6.23)	35.06***	1.263
Intolerance of uncertainty—global	21.75 (7.06)	0.88	0.83	0.69	31.23 (11.61)	37.11***	1.343
Intolerance of uncertainty—inhibitory	7.10 (2.74)	0.77	1.64	2.94	11.91 (5.54)	48.52***	1.756
Intolerance of uncertainty—prospective	14.65 (4.99)	0.81	0.48	−0.06	19.32 (6.80)	25.89***	0.937
Pain anxiety sensitivity—global	11.75 (11.91)	0.92	1.37	1.74	24.04 (13.45)	28.59***	1.032
Pain anxiety sensitivity—cognitive	4.43 (4.46)	0.91	1.12	0.81	9.04 (5.22)	28.67***	1.034
Pain anxiety sensitivity—escape/avoidance	4.14 (4.20)	0.81	1.32	1.90	6.37 (3.82)	14.70***	0.530
Pain anxiety sensitivity—fear	2.08 (3.48)	0.86	2.08	4.34	4.05 (3.67)	15.65***	0.565
Pain anxiety sensitivity—physiological arousal	1.10 (2.28)	0.83	2.51	6.52	4.59 (4.04)	42.44***	1.531
State anger	5.92 (1.69)	0.71	3.69	21.08	9.10 (4.00)	52.28***	1.881
Resilience	3.96 (0.60)	0.77	−0.17	−0.09	3.43 (0.76)	24.10***	0.873

Anxiety sensitivity—global = ASI-3 total score; Anxiety sensitivity—somatic = ASI-3 somatic concerns; Anxiety sensitivity—cognitive = ASI-3 cognitive concerns; Anxiety sensitivity—social = ASI-3 social concerns; Fear of negative evaluation = BFNES; Resilience = BRS; Anger = DAR-5; Illness and injury sensitivity—global = ISI-R total score; Illness sensitivity = ISI-R illness; Injury sensitivity = ISI-R injury; Intolerance of uncertainty—Global = IUS-12 total score; Intolerance of uncertainty—inhibitory = IUS-12 inhibitory concerns; Intolerance of uncertainty—prospective = IUS-12 prospective concerns; Pain anxiety sensitivity—Global = PASS-20 total score; Pain anxiety sensitivity—cognitive = PASS-20 cognitive dimension; Pain Anxiety sensitivity—escape/avoidance = PASS-20 escape/avoidance dimension; Pain anxiety sensitivity—fear = PASS-20 fear dimension; pain anxiety sensitivity—physical = PASS-20 physiological arousal dimension. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$ —statistically significant after Holm-Bonferroni correction.

TABLE 2 Sociodemographic characteristics and comparison of putative risk and resiliency outcomes scores among different categories.

	%(<i>n</i>) ¹	Anxiety sensitivity—global	Fear of negative evaluation	Resilience	State anger	Illness and injury sensitivity	Intolerance of uncertainty	Pain anxiety sensitivity
		Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Gender								
Man	72.2 (557)	8.22 (8.40)	16.74 (7.48)	4.00 (0.60)	5.85 (1.68)	7.30 (7.69)	21.50 (6.95)	10.67 (11.34)
Woman	24.6 (190)	8.48 (7.70)	17.49 (7.50)	3.80 (0.60)	6.01 (1.55)	7.61 (7.47)	22.16 (7.21)	14.86 (12.97)
Effect size (Cohen's <i>d</i>)		0.031	0.101	0.342***	0.097	0.041	0.095	0.356***
Sex								
Male	72.0 (556)	8.27 (8.46)	16.81 (7.53)	4.00 (0.60)	5.85 (1.68)	7.35 (7.72)	21.55 (7.03)	10.73 (11.42)
Female	25.1 (194)	8.43 (7.64)	17.43 (7.49)	3.81 (0.61)	6.03 (1.56)	7.52 (7.42)	22.14 (7.17)	14.69 (12.90)
Effect size (Cohen's <i>d</i>)		0.019	0.083	0.314***	0.110	0.022	0.083	0.335***
Age								
19–29	59.8 (462)	8.30 (8.05)	17.50 (7.55)	3.94 (0.60)	5.88 (1.68)	7.59 (7.67)	21.61 (7.11)	11.93 (11.37)
30–39	28.0 (216)	8.55 (8.65)	16.48 (7.57)	3.96 (0.60)	6.03 (1.76)	7.20 (7.33)	22.41 (7.19)	11.73 (12.64)
40–49	6.3 (49)	7.57 (8.70)	14.34 (6.51)	4.08 (0.62)	5.70 (0.86)	5.21 (7.06)	19.87 (5.36)	10.11 (12.53)
50–59	0.6 (5)	5.80 (5.97)	16.00 (7.38)	3.97 (0.49)	5.40 (0.55)	9.80 (10.26)	22.20 (5.76)	14.60 (18.49)
Effect size (η_p^2)		0.001	0.012*	0.003	0.003	0.007	0.008	0.002
Marital status								
Single	47.2 (364)	8.59 (8.65)	17.51 (7.84)	3.90 (0.61)	5.86 (1.59)	7.77 (7.92)	22.23 (7.78)	12.57 (12.12)
Separated/divorced	1.6 (12)	10.27 (6.23)	20.09 (5.75)	3.95 (0.40)	5.75 (0.75)	11.40 (8.97)	26.09 (6.92)	18.64 (12.48)
Married/common-law	42.9 (331)	8.11 (7.93)	16.16 (7.20)	4.01 (0.59)	5.93 (1.74)	6.94 (7.13)	21.21 (6.19)	10.94 (11.87)
Widowed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Effect size (η_p^2)		0.002	0.011*	0.009*	0.001	0.007	0.011*	0.009*
Province of residence								
Western Canada (BC, AB, SK, MB)	52.8 (408)	8.21 (7.67)	17.30 (7.54)	3.97 (0.59)	6.08 (1.88)	8.04 (7.72)	22.12 (6.83)	12.13 (12.43)
Eastern Canada (ON, QC)	34.6 (267)	8.37 (9.08)	16.53 (7.45)	3.96 (0.62)	5.70 (1.44)	6.61 (7.42)	21.26 (7.33)	11.44 (11.78)
Atlantic Canada (PEI, NS, NB, NFL)	11.3 (87)	8.33 (8.16)	16.59 (7.64)	3.90 (0.63)	5.86 (1.48)	7.15 (7.88)	21.51 (7.29)	11.38 (10.49)
Northern Territories (YK, NWT, NVT)	1.0 (8)	9.63 (7.67)	18.14 (8.03)	3.85 (0.57)	5.25 (0.46)	4.50 (4.31)	19.50 (7.78)	10.13 (6.36)
Effect size (η_p^2)		0.000	0.003	0.002	0.012*	0.009	0.004	0.001

(Continued)

TABLE 2 (Continued)

		% <i>(n)</i> ¹	Anxiety sensitivity—global	Fear of negative evaluation	Resilience	State anger	Illness and injury sensitivity	Intolerance of uncertainty	Pain anxiety sensitivity
			Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Education									
High school graduate or less		10.2 (79)	8.91 (7.92)	16.13 (5.72)	3.92 (0.60)	6.22 (2.56)	7.95 (7.43)	22.32 (6.82)	12.66 (12.13)
Some post-secondary school		43.4 (335)	8.16 (8.18)	17.14 (7.85)	3.98 (0.58)	5.87 (1.53)	7.28 (7.51)	21.42 (7.07)	11.31 (11.16)
University degree/4-year college or higher		39.5 (305)	8.33 (8.42)	17.02 (7.64)	3.92 (0.62)	5.84 (1.41)	7.44 (7.90)	21.89 (7.17)	12.13 (13.01)
Effect size (η^2)			0.001	0.002	0.002	0.005	0.001	0.002	0.002
Prior PSP service									
Yes		30.7 (237)	7.35 (7.35)	16.33 (7.36)	4.01 (0.56)	6.02 (1.94)	7.08 (7.51)	21.15 (6.73)	10.60 (11.27)
No		60.1 (464)	8.54 (8.43)	17.16 (7.68)	3.95 (0.63)	5.87 (1.61)	7.35 (7.69)	21.87 (7.26)	11.92 (12.18)
Effect size (Cohen's d)			0.147	0.108	0.102	0.086	0.036	0.101	0.111

Anxiety sensitivity=ASI-3 Total score; Fear of negative evaluation=BFNE-S; Resilience=BRS; Anger=DAR-5; Illness and injury sensitivity=IUS-12 Total score; Intolerance of uncertainty=PASS-20 total score. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$ —Statistically significantly different; Holm-Bonferroni adjustment applied to alpha levels to control Type I error. M (SD) represents Mean (Standard Deviation). η^2 represents partial Eta Square. Lettered superscripts within each column category indicate significant differences between category groups on respective screening measure at $p \leq 0.05$. Means followed by a common letter are not significantly different. Total percentages may not sum to 100 and ns may not sum to 772 due to non-response or responding “other.”

significant following a Holm-Bonferroni correction. Age groupings were based on previous publications (Carleton et al., 2018, 2020). Results of several one-way ANOVAs indicated statistically significant differences across marital status groups on the BFNE-S, $F(2, 682) = 3.70, p = 0.025, \eta^2_p = 0.011$; the BRS, $F(2, 691) = 3.31, p = 0.037, \eta^2_p = 0.009$; the IUS-12, $F(2, 690) = 3.82, p = 0.022, \eta^2_p = 0.011$; and the PASS-20, $F(2, 695) = 3.32, p = 0.037, \eta^2_p = 0.009$ (see Table 2). *Post-hoc* Tukey tests showed that for the BFNE-S, differences were only statistically significant ($p = 0.043$) between cadets who were single and married or common law, with those who were single having statistically significantly higher scores. Similarly, differences on resiliency scores were only statistically significant ($p = 0.03$) between cadets who were single and married or common law, with those who were single having statistically significantly lower scores. For both the BFNE-S and the BRS, however, the differences were no longer statistically significant following Holm-Bonferroni corrections. Finally, a one-way ANOVA indicated that there were statistically significant differences across the province of residence in DAR-5 reactivity, $F(3, 761) = 3.16, p = 0.024, \eta^2_p = 0.012$. A *post-hoc* Tukey test showed that only cadets from Western and Eastern Canada differed significantly ($p = 0.026$), with those from Western Canada having statistically significantly higher scores; however, the difference was no longer statistically significant following a Holm-Bonferroni correction. There were no statistically significant effects of education group or of prior PSP service.

Discussion

The results were consistent with the current pre-registered hypotheses that were also clarified in the protocol paper (Carleton et al., 2022); specifically, RCMP cadets at pre-training reported statistically significantly and substantially lower scores on all putative risk variables and higher scores on resilience than the young adult populations. The current results indicate that, as a function of the RCMP selection processes, self-selection biases among persons who apply to become RCMP, and preparation for attending the Cadet Training Program, RCMP cadets at pre-training may be at substantially reduced risk for mental health challenges (Carleton et al., 2022).

The current results directly contrast the notion that the higher prevalence of mental health challenges in RCMP officers is related to inherent psychological vulnerabilities or insufficiencies that can be screened out as part of recruitment (Horswill and Carleton, 2021) to mitigate the high prevalence of mental health disorders among serving RCMP (Carleton et al., 2018). Consistent with the extant literature, the higher prevalence of positive screening for mental health challenges among serving RCMP (i.e., 50.2%) relative to the general population (i.e., 10.1%; Government of Canada, 2012; Carleton et al., 2018) may be associated with frequent PPTE exposures (Galatzer-Levy et al., 2011; Kilpatrick et al., 2013; Carleton et al., 2019) and other occupational stressors (Pozzulo et al., 2017; Carleton et al., 2020; Ricciardelli et al., 2020b) or the interaction of individual vulnerabilities with occupational stressors (Schmidt et al., 1997). Cadets who have relatively higher scores compared to other cadets may still be at risk of experiencing mental health challenges due to interactions between innate susceptibility and environmental susceptibility (i.e., exposure to PPTE). Army recruits undergoing basic

training who had significantly lower AS scores compared to the general population, but relatively higher scores compared to fellow recruits, were more likely than other recruits to experience panic attacks during basic training (Schmidt et al., 1997). The subsequent RCMP Study data collections will allow for testing of the posited causal and interactive relationships between dispositional risk and resilience variables, diverse stressors, coping activities which may also serve as risk or resilience factors, and mental health. In the interim, the current results do not indicate a need for specific changes to recruitment screening as part of efforts to mitigate subsequent mental health challenges; instead, the current results are consistent with the extant literature and suggest that ongoing evidence-based training, assessment, and treatment, as well as pervasive organizational supports may be required to protect RCMP officers from adverse mental health outcomes during their career (Stelnicki et al., 2021; Carleton et al., 2022).

Among cadets, and consistent with the research literature (Galatzer-Levy et al., 2011; Kilpatrick et al., 2013; Carleton et al., 2020), women cadets scored lower on resilience than men cadets (Galatzer-Levy et al., 2011; Kilpatrick et al., 2013; Carleton et al., 2020). This difference may be attributable to a range of individual- and structural-level factors. Research shows that women tend to underestimate and underreport their own abilities (e.g., Vajapey et al., 2020; Reilly and Andrews et al., 2022), which could affect self-assessments of resilience. Coping strategies, which are linked to resilience, may be gendered (Ménard and Arter, 2014). Police women's resilience may also be affected by structural factors related to gender inequality, such as women's disproportionate responsibility for unwaged and caregiving work (Moyser and Burlock, 2018); different access to social supports (Violanti et al., 2016; Kaur et al., 2021); gender-based harassment, discrimination, and stereotyping of women in men-dominated fields like policing (Angehrn et al., 2021a); or relative differences in control over work (Violanti, 1992) and environmental mastery (i.e., being able to intentionally manipulate the surrounding context and events; Boardman et al., 2008). Additional qualitative research (e.g., interviews, focus groups) with women cadets is required to better understand what appears to be a gender-based difference in resilience.

The current study had several strengths and limitations. Strengths included: (1) the large sample size with inclusion of both pre- and during-COVID subsamples allowed results to be generalized to both pandemic and non-pandemic circumstances and (2) the array of established mental health risk factors assessed for the first time with RCMP cadets at pre-training. There were also several limitations. First, every effort was made to find normative results for putative risk and resiliency variables from the Canadian young adult population; however, not all results were available, so for some variables American, Australian, and European normative results were used. Most participants in the young adult samples were women, whereas most of the RCMP cadets were men; nevertheless, there were few gender differences on the putative risk and resiliency variables among cadets, suggesting effects from the uncontrolled variables would be small. Second, the cross-sectional nature of the data did not allow for causal conclusions concerning job demands and RCMP officers' mental health. Further data collection in the ongoing and longitudinal RCMP Study will allow for an examination of causal relationships with mental health variables, and interaction effects from PPTE exposures

and other occupational stressors. Third, the current study did not include serving RCMP officers or an in-depth assessment of sex or gender differences across cadets and officers. Such analyses are necessary for a more robust understanding of the putative risk and resiliency factors among RCMP officers. Fourth, there is a potential for socially desirable responding, which is likely mitigated by emphasis on the confidentiality, anonymity, and independence of the study from the RCMP.

Future researchers should assess for differences in putative risk and resiliency variables between RCMP cadets, RCMP officers, and the general population, and include a robust examination of sex and gender differences. The extant literature suggests that there are differences among male and female police officers' mental health symptom reporting (Carleton et al., 2018; Angehrn et al., 2021b). Future research using the developing RCMP dataset should also assess for changes in putative risk factors and resilience over time, as well as interactions with sociodemographic characteristics (e.g., gender, age, service location), training, occupational stressors, and mental health. Research using matched participants may also increase the robustness of the conclusions that can be drawn. The associated results may provide important information on how best to protect RCMP member mental health using a variety of tools. Future research with the developing RCMP dataset should also investigate opportunities to protect against the negative effects of service on RCMP members, such as the impact of the Emotional Resilience Skills Training, a 13-week protocol based on the Unified Protocol (Carleton et al., 2022).

Conclusion

The current study was the first to assess mental health risk and resiliency factors in a sample of RCMP cadets beginning their training. The results indicate that RCMP cadets start training with lower scores on several putative risk variables and higher scores on resiliency, relative to normative scores on these measures in the general population. This may suggest that RCMP cadets are actually *less* vulnerable to developing mental health challenges as compared to the general population. Accordingly, previously documented *elevated* prevalence of mental health disorders in RCMP officers compared to the general population is likely associated with occupational stressors associated with their service or interactions of service-related stressors with premorbid vulnerability. The current results contraindicate new screening tools and instead favor ongoing evidence-based training, assessment, and treatment, as well as pervasive organizational supports as best strategies for protecting RCMP members' mental health; however, that supposition will be tested with subsequent results from the developing RCMP Study dataset as longitudinal data come in over time.

Data availability statement

The datasets presented in this article are not readily available because the datasets will be made available only for independent confirmation purposes and only to persons with the necessary ethical and security clearances as defined by the research ethics board at the University of Regina and the contractual obligations with the Royal

Canadian Mounted Police. Requests regarding the datasets can be made to the corresponding author. Requests to access the datasets should be directed to RNC, nick.carleton@uregina.ca.

Ethics statement

Data for the current paper were collected as a part of the broader RCMP Study. The associated protocol paper provides full details of the RCMP longitudinal Study (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Ethics Board on April 10, 2019 (File #2019-055), and the RCMP Research Ethics Board followed with approval on April 12, 2019 (File #SKM_C30818021312580). The study was also approved through a Privacy Impact Assessment as part of the overall National Administrative Records Management System approval (201611123286) and Public Services and Procurement Canada approval (201701491/M7594174191). The project is bound by the Privacy Act, R.S., 1985, c. P-21 and the Personal Information Protection and Electronic Documents Act, SC. 2000, c.5 and approved by Public Services and Procurement Canada (PSPC) M7594-171491/001/SS. The participants provided their electronically-recorded informed consent to participate in this study.

Author contributions

RNC, LJ, and JK: conceptualization, methodology, and formal analysis. GA, RNC, LJ, JK, and SS: validation. RNC: investigation, resources, project administration, and funding acquisition. RNC, LJ, JK, JN, and RS: writing—original draft preparation. JK, LJ, RS, JN, TA,

AF, SS, GA, SS-Z, GK, and RNC: writing—review and editing. RNC and LJ: supervision. All authors contributed to the article and approved the submitted version.

Funding

RNC was supported by a Medavie Foundation Project Grant. TA was supported by a Tier I Canada Research Chair in Childhood Adversity and Resilience. SS was supported by a Tier 1 Canada Research Chair in Addictions and Mental Health. The current study was supported by the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 13 December 2022

ACCEPTED 27 February 2023

PUBLISHED 20 March 2023

CITATION

Colombo L, Acquadro Maran D and
Grandi A (2023) Attitudes toward organizational
change and their association with exhaustion in
a sample of Italian police workers.
Front. Psychol. 14:1122763.
doi: 10.3389/fpsyg.2023.1122763

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Attitudes toward organizational change and their association with exhaustion in a sample of Italian police workers

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Introduction: Change management is an important topic for organizations and some personal characteristics may help or hinder coping with change.

Methods: The aim of the present study was to find out whether attitudes toward organizational change can predict work-related exhaustion in a sample of police workers ($N = 532$) in northern Italy. Differences between groups in relation to role (police officers vs. other roles) and gender were also considered.

Results: The results of hierarchical regression showed that change beliefs were negatively associated to exhaustion, while resistance to change was positively related to exhaustion; role and gender were also significantly and positive associated with the dependent variable. Regarding differences between groups, police officers had lower positive change beliefs and higher levels of exhaustion compared to workers in other roles. Regarding gender, women reported higher levels of exhaustion than men.

Discussion: The results of the present study provide further insights into what aspects should be considered when promoting organizational change in the police work context.

KEYWORDS

police officers, burnout, change beliefs, resistance to change, role, gender

Introduction

For an organization's employees, change in one of its defining elements can be a source of despair. As the large body of research on organizational change demonstrates, workers may experience a period of uncertainty that affects their perceptions of what is happening in the workplace. As [Dunford et al. \(2012\)](#) have noted, change processes such as leadership transitions, mergers, downsizing, and restructuring have been shown to lead to work stress and, when prolonged, even burnout ([Hu and Schaufeli, 2011](#)). Burnout is a well known phenomenon that occurred in health care sector workers. In May 2019, burnout was included in the latest version of the International Classification of Diseases (ICD-11), which is promoted by the World Health Organization (WHO; see [Hillert et al., 2020](#)). Burnout was introduced in the previous version (ICD-10) but is expanded here. It is defined as a syndrome arising from the chronic presence of unsuccessfully managed work stress and characterized by three dimensions: (1) feelings of lack of energy or exhaustion; (2) mental disengagement from work or feelings of pessimism or cynicism related to work; and (3) decreased occupational effectiveness. Burnout refers specifically to the work context and should not be applied to describe experiences in other areas of life. However, due to the diagnostic ambiguity of burnout syndrome among mental health researchers ([Chirico, 2017](#); [Chirico et al., 2021](#)), burnout is often explained and associated with existing diagnostic categories such as stress-related disorders or a specific type of depression.

One of the motive of stress is related to resistance to change. Employees who are predisposed to be resistant to change show greater maladaptation to organizational demands during times of change, which can lead to increased stress responses such as exhaustion (Turgut et al., 2016). Exhaustion is the main component of burnout and is defined as the depletion of an individual's energies as a result of an imbalance between demands and resources at work (Demerouti et al., 2010). Exhaustion is an important outcome in the study of stress in organizations for several reasons: it is thought to occur at an early stage of burnout development, thus providing an opportunity for intervention; it is both highly affective and chronic, suggesting that it is an appropriate indicator of cumulative work stress; and it has been shown to be more applicable to a variety of different jobs than other dimensions of burnout (Schaufeli and Peeters, 2000). In addition, exhaustion has been shown to be responsive to changes in an employee's work environment, such as being new to the organization or changing jobs (Dunford et al., 2012).

Armenakis et al. (2007) identified five components that may influence the organizational belief that could cause resistance to change. The first is discrepancy, defined as the difference between the current state and an ideal or desired state. When organizational members do not know that the current state must change and that a different state is inevitable, fear of the unknown creates resistance. The second component is appropriateness: even if organizational members agree with the need for change, they may not agree with the proposed change initiative (Self and Schraeder, 2009). However, there must be agreement not only that the proposed change initiative is appropriate, but also that the initiative is consistent with the organization's culture, structure, formal systems, etc. (Shimoni, 2017). The third component is social support. When a change is announced, employees turn to their immediate supervisor to learn the importance of the change. If the immediate/principal supervisor is also unaware of the reasons for the change, the readiness of both the member and the supervisor could be affected. Colleagues are also important in making sense of a proposed change initiative. Perceived support can be a boundary condition that can influence employee responses to change. While the impact of organizational change and the level of support experienced during the gradual implementation of a change process are likely to vary from unit to unit, members of the same work unit are generally exposed to common influences and experiences (Klein and Kozlowski, 2000). Consequently, members of a work unit develop shared perceptions of the environment, creating a unique social context (Anderson and West, 1996; Tucker et al., 2013) that influences individual responses to change (Rafferty and Jimmieson, 2010). Therefore, it is plausible that general perceptions of support from a work unit are critical features of the change situation. Previous research has shown that perceived organizational support is influential at an aggregate level (Jin and Zhong, 2014). Therefore, it seems likely that it may also be important at the work unit level in the context of organizational change. If the work unit has a shared understanding that the organization cares about employees' opinions and well-being and supports them during times of change, this may reduce anxiety about change and its consequences. Consequently, resistance to change as a character trait may be eliminated, and perceived nonconformity may reduce emotional exhaustion. The fourth message component proposed by Armenakis et al. (2007) is that of efficacy, the ability to produce the desired effects (Bandura and Locke, 2003, p. 87), which provides information needed to successfully implement a

change initiative. This is important because members may lack confidence that the change can be successfully implemented. If management has failed to prepare the organization for change in the past, this may result in organizational members not only lacking confidence in themselves that they can successfully implement a change, but also lacking confidence in management's ability to lead them in implementing the change. The final component of the change message to create readiness is valence. When confronted with a change in their current situation, organizational members resist the change if they see no benefit in the change or if the pain of the change outweighs the benefits of the change. On the other hand, if it can be demonstrated that the change will be more beneficial to the member, at least in the long run, he or she will be more likely to accept the change. This evaluative judgment about the change is a key component of valence. Even if management has demonstrated that a particular change initiative is necessary and that the organization will be better off as a result, and even if the organizational member acknowledges this, he or she will focus on how the change will affect him or her.

It is important to note that employee attitudes toward change can vary greatly from person to person, as they are the result of a complex interaction of emotions and cognitive processes. While some employees perceive organizational change as a means of rejuvenation, development, improvement, and growth, others may perceive it as instability, disorder, unpredictability, and risk (Cochran et al., 2002); as a result, organizational change may elicit undesirable reactions such as stress, cynicism, and resistance (Armenakis and Bedeian, 1999). Even when employees are aware of the need for change, they may resist it. This is because employees believe that they will lose something valuable as a result of the change. For example, change may cause resistance if it threatens an employee's self-interest (van Dijk and van Dick, 2009). According to Oreg (2003), dispositional resistance to change reflects a person's tendency to resist or avoid change, to generally dislike change, and to find change unpleasant in different contexts and types of change. Oreg (2003, 2006) describes resistance to change in terms of the following: (a) Behavioral (seeking routine, i.e., the extent to which a worker seeks routine and stable environments); (b) Affective (emotional response to imposed change, reflecting the extent to which workers find change uncomfortable and stressful, and short-term focus, reflecting the extent to which workers engage with short-term challenges as opposed to the long-term benefits of change); and (c) Cognitive rigidity, which is the reluctance to consider and test new perspectives and concepts.

Police officers: Contextual characteristics and resistance to change

In the context of the police, change may be particularly difficult. Because of the nature of their work, police officers deal with many different situations involving compliance with the law, handling emergencies, cases of violence and personal injury, and so on. These situations make this a particularly vulnerable profession for chronic stress. Change can be an additional source of stress, a supplement to the complicated situations they deal with internally (e.g., bureaucracy) and externally (e.g., legislation) (Antonioniou, 2009). As noted in previous research, work-related stress is felt more by women and individuals at a low hierarchical level. This condition is a burden

because it makes the demands of the job seem particularly high. Although studies suggest that being a woman is not a risk factor *per se*, being a woman may be a risk factor for high levels of stress in certain occupations, such as police officers (Antoniou, 2009; Magnavita et al., 2018). In examining gender differences in occupational stress and burnout among police officers, McCarty et al. (2007) found that men and women did not report significantly different levels. However, their study suggests that there may be different predictive factors, with female officers being exposed to particular stressors. Burke et al. (2006) found little difference in work attitudes, satisfaction and mental health in a study of police in Norway, although female officers reported more psychosomatic symptoms. As for the lower ranks of the hierarchy, they are in charge of detecting traffic accidents, first intervention in cases of domestic violence, detecting violations, etc. Thus, it is they who are at the forefront of immediate intervention. Overall, Ahmadi and Zollikani (2022) examined the effects of cognitive flexibility on resistance to organizational change among 233 police officers in Mazandaran province. The results show that among these occupational groups, cognitive flexibility has a significant impact on resistance to organizational change.

In addition, it is interesting to note that resistance to change among police officers has been studied mainly when it comes to the introduction of technology, e.g., in the case of body-worn cameras (see Lum et al., 2020), when introducing evidence-based practices (see Koziarski and Kalyal, 2021), when reorganizing the way staff work and their tasks (see Gozzoli et al., 2018), and when improving gender equality in the career process (see van den Brink and Benschop, 2018). An interesting topic, however, is the change in leadership of a police organization. While most research has addressed the influence and role of a leader in resisting change (see Oreg and Berson, 2011; Rehman et al., 2021; Haesevoets et al., 2022), little attention has been paid to resistance to change when a leader changes (Northouse, 2021).

To address this gap in the literature, the purpose of this study was to analyze resistance to change in the municipal police organization during commander change. This police force was established in Italy more than 200 years ago. The municipal police is not included in Legislative Decree 121/181 and, according to the subsequent Law 65/1986, the local police forces contribute only in an auxiliary way to support the operations of the other forces of order (such as the State Police). The crimes typically prosecuted by the municipal police are those related to construction, ecology, environmental and landscape protection, hygiene and food, disturbance of public peace, and all crimes related to road traffic. It rarely investigates homicides and never criminal organizations, as they cannot operate outside its jurisdiction. The organization in which the research was conducted is located in a large city (more than 900 thousand inhabitants) in the northwest of Italy. As in all major Italian cities, in the municipal police, officers work in shifts, so that their services are available 24 h a day, 7 days a week. At the time of the study (2018), there were about 1800 employees in this police organization. It should be noted that during the study period, the retired commander was about to be replaced by a new commander from another police organization. It should be noted that other Italian studies have investigated work-related stress in this population in relation to stress and mental health (Garbarino et al., 2012, 2013, 2019; Setti and Argentero, 2013; Garbarino and Magnavita, 2015, 2019; Civilotti et al., 2022) and, more generally, absenteeism (Magnavita and Garbarino, 2013) and

personality traits (Garbarino et al., 2012, 2014; Chiorri et al., 2015). To our knowledge, this is the first study conducted with the goal of analyzing police officers' attitudes toward change at a time when a commander is changing.

Current work

According to job demand–resources theory (JD-R) (Bakker and Demerouti, 2014), resources and demands are key aspects of any job. Demands entail affective, psychological, or physical effort, while resources are features of the job that promote goal attainment and personal growth, and thus can mitigate the negative effects of demands. Resources can be organizational, social, or personal in nature. In work contexts where change is occurring, workers' personal attitudes toward change can be an element that, if present, can facilitate the process in a harmonious way. In contrast, the absence of a positive disposition, such as resistance to change, can create very critical working conditions.

Therefore, the objective of this study is twofold: to understand the differences in workers' attitudes toward organizational change and in work-related exhaustion, and to determine which attitudes toward organizational change predict exhaustion. Our hypotheses are:

H1: Change beliefs, resistance to change and exhaustion differ in relation to sociodemographic characteristics (gender) and job role (police officer vs. other roles).

H2: Change beliefs (discrepancy, appropriateness, efficacy, principal support and valence) are negatively related to exhaustion.

H3: Resistance to change (routine seeking, emotional reaction, short-term focus and cognitive rigidity) is positively related to exhaustion.

Materials and methods

The present study was carried out according to the guidelines of the Declaration of Helsinki (and subsequent revisions) and the ethical requirements of Italian legislation. No further ethical approval was obtained because no interventions or other medical procedures were foreseen that could cause biological, psychological, or social harm to the participants involved.

Participants and procedures

To better understand the attitudes of the workers after organizational changes (determined by the change of the police commander), an *ad hoc* questionnaire with a short socio-demographic form was created and administered in presence among Northern Italy Municipal Police workers. The paper version of the questionnaire was accompanied by a form explaining the objectives of the study and the processing of the

TABLE 1 Descriptive statistics of the sample (N=532).

	N	%
Age ($M=51.41$; $SD=7.42$)		
Job tenure ($M=23.62$; $SD=8.68$)		
Gender		
Female	225	42.3
Male	301	56.6
Missing	6	1.1
Relationship status		
Single	82	15.4
Married/cohabiting	364	68.4
Separated/divorced	79	14.8
Widow/widower	3	0.6
Missing	4	0.8
Children		
Yes	409	76.9
No	121	22.7
Missing	2	0.4
Role		
Police officers	302	56.8
Other roles	225	42.3
Missing	5	0.9

data (according to EU Regulation 2016/679). To participate in the study, workers had to read and sign the consent form. The questionnaire was anonymous, and participants did not receive any compensation or benefits. A total of 532 questionnaires were collected and used for the analyses. Most of the sample consisted of men (56.6%) and had a mean age of 51.41 years (range = 29–65, $SD=7.42$) (see Table 1). Regarding marital status, 68.4% were married or cohabiting with a partner and 76.9% reported having children. Job tenure was 23.62 years (range = 5–43, $SD=8.68$) and 56.8% of the sample were police officers. The rest of the sample were non-commissioned officers supporting the work of police officers, officers responsible for a service, unit managers responsible for implementing and monitoring outcomes within a unit and executives.

Measures

To investigate the hypotheses of the present study, validated measurement scales with good internal consistency were identified and included in the questionnaire.

Organizational change beliefs

In order to assess workers' opinions about organizational change, the *Organizational Change Recipients' Beliefs Scale-OCRBS* (Armenakis et al., 2007) was used. It consists of 24 items on a 5-point Likert scale (1 = never, 5 = always), and participants

were asked to reflect on the period of the past 12 months. The OCRBS has 5 dimensions: discrepancy (4 items; a sample item is: "We needed to change the way we did some things in this organization"; Chronbach's $\alpha=0.86$), appropriateness (5 items; a sample item is: "I believe the change will have a favorable effect on our operations"; Chronbach's $\alpha=0.86$), efficacy (5 items; a sample item is: "I have the capability to implement the change"; Chronbach's $\alpha=0.77$), principal support (6 items; a sample item is: "The top leaders support the change"; Chronbach's $\alpha=0.72$) and valence (3 items; a sample item is: "With this change in my job, I will experience more self-fulfillment"; Chronbach's $\alpha=0.88$). For the purposes of this study, also the general index was used, and Chronbach's α was 0.90. One item (No. 24) was excluded from the index because it did not fit the work context studied.

Resistance to organizational change

To assess workers' disposition to resist changes, the *Resistance to Change Scale* (Oreg, 2003) was used. The scale includes 17 items on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The *Resistance to Change Scale* has 4 dimensions: routine seeking (5 items; an example item is: "I'd rather be bored than surprised"; Chronbach's $\alpha=0.70$), emotional reaction (4 items; an example item is: "When I am informed of a change of plans, I tense up a bit"; Chronbach's $\alpha=0.80$), short-term focus (4 items; an example item is: "Changing plans seems like a real hassle to me"; Chronbach's $\alpha=0.79$), and cognitive rigidity (4 items; an example item is: "I do not change my mind easily"; Chronbach's $\alpha=0.70$). For the purposes of this study, the general index of the scale was also used. The Chronbach's α of the overall scale in this study was 0.83.

Exhaustion

To assess workers' physical, cognitive, and affective levels of work-related exhaustion, the *Exhaustion* subscale of the Oldenburg Burnout Inventory-OLBI (Demerouti et al., 2010) was used. The scale includes 8 items on a 4-point Likert scale (1 = strongly disagree, 4 = strongly agree); an example item is: "There are days when I feel tired before I arrive at work." The Chronbach's α of the entire scale in this study was 0.74. Since there are no standard cutoff values for OLBI, the values reported by Block et al. (2020), i.e., $M_{EXH} \geq 2.50$, are considered as reference values.

Data analysis

Descriptive statistical analyses (means and standard deviations of the scales, see Table 2) and reliability of the scales (Cronbach's alpha) were performed using IBM SPSS 27 (Statistical Package for Social Science). Pearson correlations between all variables were calculated. Hierarchical linear regression analyses were also conducted to determine the role of organizational change and resistance to change as predictors of exhaustion. In the regression model, multicollinearity between variables was assessed using the variance inflation factor (VIF): no multicollinearity problem was found ($VIF < 5$). The differences between groups in the means of the

TABLE 2 Means, standard deviations of the scales and observed ranges for each variable.

	Mean	SD	Range
Outcome			
Exhaustion	2.35	0.35	1–4
Organizational change beliefs			
(General index)	3.22	0.47	1–5
Discrepancy	3.66	0.14	1–5
Appropriateness	3.01	0.38	1–5
Efficacy	3.61	0.39	1–5
Principal support	2.87	0.45	1–5
Valence	3.03	0.17	1–5
Resistance to change			
(General index)	2.45	0.58	1–5
Routine seeking	2.10	0.27	1–5
Emotional reaction	2.35	0.14	1–5
Short-term focus	2.10	0.15	1–5
Cognitive rigidity	3.36	0.38	1–5

variables were analyzed using analysis of variance (*t*-tests for independent samples).

Results

Differences between groups

Organizational change beliefs

Change beliefs total score was slightly above the average scale score ($M = 3.22$, $SD = 0.47$), with lower positive belief among police officers ($M = 71.94$, $SD = 13.69$) than for all other roles ($M = 76.74$, $SD = 12.99$), $t(4.068) = 525$, $p < 0.001$, Cohen's $D = 0.36$. No significant differences were found with respect to gender.

With regard to the subscales, perceptions of *discrepancy* were above the average scale score ($M = 3.66$, $SD = 0.14$), with lower values among police officers ($M = 14.39$, $SD = 3.62$) than for all other roles ($M = 14.97$, $SD = 3.41$), $t(1.847) = 525$, $p = 0.03$, Cohen's $D = 0.16$. No significant differences were found with respect to gender.

Appropriateness score was in line with the average scale score ($M = 3.01$, $SD = 0.38$), with lower values among police officers ($M = 14.46$, $SD = 4.62$) than for all other roles ($M = 15.82$, $SD = 3.96$), $t(3.627) = 514.66$, $p < 0.001$, Cohen's $D = 0.31$. No significant differences were found with respect to gender.

Perceptions of *efficacy* were above the average scale score ($M = 3.61$, $SD = 0.39$), with lower values among police officers ($M = 17.73$, $SD = 3.58$) than for all other roles ($M = 18.40$, $SD = 3.51$), $t(2.144) = 525$, $p = 0.02$, Cohen's $D = 0.19$. No significant differences were found with respect to gender.

Principal support score was slightly below the average scale score ($M = 2.87$, $SD = 0.45$), with lower values among police officers ($M = 16.71$, $SD = 3.98$) than for all other roles ($M = 17.89$, $SD = 4.02$),

$t(3.349) = 525$, $p < 0.001$, Cohen's $D = 0.29$. No significant differences were found with respect to gender.

Valence was in line with the average scale score ($M = 3.03$, $SD = 0.17$), with lower values among police officers ($M = 8.64$, $SD = 2.81$) than for all other roles ($M = 9.65$, $SD = 2.93$), $t(4.028) = 525$, $p < 0.001$, Cohen's $D = 0.35$. No significant differences were found with respect to gender.

Resistance to change

Resistance to change total score was below the average scale score ($M = 2.45$, $SD = 0.58$), with no significant differences found with respect to role and gender.

With regard to the subscales, *routine seeking* score was below the average scale score ($M = 2.10$, $SD = 0.27$), with no significant differences found with respect to role and gender.

Emotional reaction was below the average scale score ($M = 2.35$, $SD = 0.14$), with no significant differences found with respect to role and gender.

Short-term focus was below the average scale score ($M = 2.10$, $SD = 0.15$), with no significant differences found with respect to role and gender.

Cognitive rigidity was above the average scale score ($M = 3.36$, $SD = 0.38$), with no significant differences found with respect to role and gender.

Exhaustion

Self-reported feelings of *exhaustion* were above the average scale score ($M = 2.35$, $SD = 0.35$) and slightly below the cutoff point, with higher scores for police officers ($M = 19.22$, $SD = 4.32$) than for all other roles ($M = 18.12$, $SD = 4.04$), $t(-2.962) = 525$, $p = 0.002$, Cohen's $D = 0.26$. In relation to gender, women showed higher levels of exhaustion ($M = 19.17$, $SD = 4.25$) than men ($M = 18.51$, $SD = 3.91$), $t(-1.743) = 441.41$, $p = 0.04$, Cohen's $D = 0.16$.

Correlations and regressions

In the sample, correlations were calculated between exhaustion, change beliefs and resistance to change dimensions. All significant correlations were in the expected direction. Pearson coefficients are shown in Table 3. As to organizational change beliefs, all the measures but discrepancy had strong negative correlations with exhaustion ($p < 0.01$). As to resistance to change, all the measures but cognitive rigidity had strong positive correlations with the dependent variable ($p < 0.01$). Role (1 = police officers) was also found positively correlated with exhaustion ($p < 0.01$).

Hierarchical linear regression analyses (see Table 4) were conducted to understand whether change-related attitudes could predict exhaustion at work. Exhaustion was considered the dependent variable, and gender, role and length of service were included as control variables.

Gender, role and job tenure were introduced as control variables in Step 1, and only role ($\beta = 0.17$, $p = 0.009$) showed a significant effect on exhaustion (2% explained variance). In Step 2, organizational change beliefs (appropriateness, efficacy, principal support and valence) were introduced. Among these variables, efficacy ($\beta = 0.16$, $p = 0.003$), principal support ($\beta = 0.13$, $p = 0.011$), and valence ($\beta = 0.14$, $p = 0.017$), were significantly and negatively associated with

TABLE 3 Sample correlations (N=532).

Measures	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Exhaustion	18.77 (4.23)	-												
2. Gender (1 = women)	-	0.078	-											
3. Role (1 = p. officers)	-	0.128**	0.127**	-										
4. Job tenure	23.62 (8.68)	-0.078	-0.127**	-0.754**	-									
5. Routine seeking	10.48 (3.86)	0.183**	-0.060	0.063	-0.032	-								
6. Emotional reaction	9.40 (3.72)	0.320**	-0.022	-0.008	0.028	0.531**	-							
7. Short-term focus	8.39 (3.50)	0.241**	-0.047	0.019	0.008	0.536**	0.657**	-						
8. Cognitive rigidity	13.44 (3.27)	-0.054	-0.025	0.020	0.027	0.033	0.052	0.019	-					
9. Discrepancy	14.65 (3.54)	-0.025	-0.021	-0.080	-0.022	-0.238**	-0.070	-0.121**	-0.078	-				
10. Appropriateness	15.07 (4.40)	-0.275**	0.019	-0.153**	0.114**	-0.202**	-0.174**	-0.113**	-0.064	0.367**	-			
11. Efficacy	18.04 (3.57)	-0.319**	0.059	-0.093*	0.059	-0.290**	-0.269**	-0.291**	0.008	0.199**	0.546**	-		
12. Principal support	17.21 (4.02)	-0.308**	0.031	-0.145**	0.155**	0.025	-0.088*	-0.083	0.017	0.050	0.528**	0.534**	-	
13. Valence	9.08 (2.90)	-0.327**	0.041	-0.173**	0.149**	-0.216**	-0.186**	-0.115**	-0.096*	0.220**	0.670**	0.539**	0.559**	-

SD, standard deviation. *** $p < 0.01$; ** $p < 0.05$.

exhaustion; between the former introduced variables, role ($\beta = 0.12$, $p = 0.046$) and gender ($\beta = 0.10$, $p = 0.017$) were significantly and positively associated with the dependent variable. The variables added to the model were good predictors of the dependent variable since there was a significant change in R^2 coefficient (16% explained variance). Finally, in Step 3, resistance to change dimensions (routine seeking, emotional reaction and short-term focus) were introduced. Among these variables, only emotional reaction ($\beta = 0.23$, $p < 0.001$) was significantly and positively associated with exhaustion; as to the organizational change beliefs dimensions, principal support ($\beta = -0.15$, $p = 0.004$), and valence ($\beta = -0.14$, $p = 0.019$), remained significantly and negatively associated with the dependent variable. Role ($\beta = 0.12$, $p = 0.040$), and gender ($\beta = 0.10$, $p = 0.015$), also remained significantly and positively associated with the dependent variable. The further change in R^2 coefficient (22% explained variance) showed that the new variables were also good predictors of exhaustion. The F value showed a significant R^2 change associated with each of the 3 steps.

Discussion

The purpose of this paper is to describe the role of change beliefs and resistance to change on exhaustion in a sample of Italian police organization. The opportunity for this study arose from the rotation of the commander of this organization. Therefore, to better understand how police employees accept organizational change, beliefs about change and resistance to change were examined. Overall, the results of this study showed that police officers (those employees at the lowest rank in the hierarchy) tend to have lower attitudes toward change than employees in other hierarchical positions: from an organizational perspective, police officers describe that change will not bring anything new, and they describe that the organization is not able to support changes that will not affect their work. This finding suggests that they are afraid of what change might bring. As Nilsen et al. (2020) note, it is important for each employee to be involved early in the change process and to be able to influence throughout the process to ensure the success of the change. Otherwise, there is a risk that organizational change will fail. In the context of police organization, the risk is that police officers who feel they are not included in the change process will be dissatisfied at work, resulting in lower job performance (Paoline and Gau, 2020). The lower performance affects the ability to provide an effective response to citizens, potentially harming not the individual and the organization, but the citizens to whom the service is dedicated (Gutshall et al., 2017). It is interesting to note that resistance to change was reported for the organizational variables: The results on dispositional resistance to change showed that there was no difference by hierarchical role and gender. However, there was a difference in perceptions of exhaustion, where police officers were more inclined to report a high score than police officers in other roles, and women were more inclined to report a high score than men. Thus, Hypothesis 1 (change beliefs, resistance to change, and exhaustion differ as a function of sociodemographic characteristics – gender – and job role – police officers vs. other roles) was partially confirmed. These results confirmed that resistance to change and exhaustion differ among individuals in low hierarchical positions and among women, suggesting that those who perceive low autonomy are more reluctant to change (Battistelli et al., 2013).

TABLE 4 Hierarchical multiple regression (exhaustion=dependent variable).

	β	t	p
Exhaustion			
1st step (control variables)			
Gender (1 = women)	0.070	1.589	0.113
Role (1 = police officers)	0.174	2.625	0.009
Job tenure	0.070	1.061	0.289
$R^2 = 0.02$			
2nd step (change beliefs)			
Gender (1 = women)	0.098	2.385	0.017
Role (1 = police officers)	0.124	2.001	0.046
Job tenure	0.090	1.448	0.148
Appropriateness	−0.027	−0.460	0.646
Efficacy	−0.157	−2.978	0.003
Principal support	−0.135	−2.546	0.011
Valence	−0.142	−2.395	0.017
$R^2 = 0.16$			
3rd step (resistance to change)			
Gender (1 = women)	0.097	2.442	0.015
Role (1 = police officers)	0.124	2.062	0.040
Job tenure	0.078	1.302	0.193
Appropriateness	−0.020	−0.359	0.720
Efficacy	−0.088	−1.651	0.099
Principal support	−0.153	−2.910	0.004
Valence	−0.136	−2.348	0.019
Routine seeking	−0.055	−1.102	0.271
Emotional reaction	0.226	4.116	< 0.001
Short-term focus	0.068	1.211	0.226
$R^2 = 0.22$			

Boldface was used to highlight significant values.

Regarding hypothesis 2 (change beliefs – discrepancy, appropriateness, efficacy, principled support, and valence – are negatively related to exhaustion), the results showed that change beliefs, but not discrepancy, were related to exhaustion (hypothesis 2 was thus only partially confirmed). This result is particularly interesting. As described by Rafferty and Minbashian (2019), discrepancy is a belief that change is based on legitimate reasons

and is necessary to address a deficiency in the current state compared to a desired future state. In the case of this police organization, the change in commander was indeed a necessity because the previous commander retired. It is possible that the situation of limbo (the old commander is no longer on duty and is waiting for the new commander) led to a situation of distrust in the organization in terms of its ability to cope with an anticipated change. This situation could increase feelings of uncertainty (Kern and Zapf, 2021), which could lead to negative feelings such as worries about the future, with possible consequences for perceptions of stress (Bottesi et al., 2019).

Hypothesis 3 referred to the relationship between resistance to change and exhaustion. The results show that cognitive rigidity is positively associated with exhaustion in police officers. As described below, cognitive rigidity refers to the tendency to avoid alternative ideas and different views of reality is the fear of the new way of thinking (Oreg, 2003; Mareš, 2018). Cognitive rigidity also includes the tendency to develop and persist in a particular cognitive pattern, even in situations where the pattern is no longer effective (Morris and Mansell, 2018). Moreover, in police organization, there is a tendency to assign certain roles to officers, and he/she may develop rigid thinking, which results in there being “only one” right way to accomplish a certain task (Johnson and Krawczyn, 2022). Therefore, it may be difficult to develop alternative solutions or perspectives when faced with emotional issues that involve change. The results of the hierarchical linear regression show that, of the beliefs about organizational change, efficacy, principled support, and valence are negatively associated with exhaustion. This suggests that workers who perceive support from their peers, coordinator, and management receive answers to their concerns and fears, share the effort that change entails, and receive useful feedback to address the proposed scenario. In addition, the perceived effectiveness in managing the change could be related to a previous similar situation that included the change of commander. A high position could be related to years of work experience in the police organization (Jamil et al., 2020). Thus, perceptions of effectiveness could be derived from previous experiences of success, experiences that police officers may lack. Experience within the police organization and high rank within that organization (usually achieved by men) could explain the valence and lower expression of exhaustion. Communication between higher levels of the hierarchy may facilitate the exchange of necessary information about the possible scenarios that a change may entail and foresee benefits such as making demands in favor of one’s position and/or work unit. As suggested by Yun et al. (2020), positive communication is associated with less exhaustion, while negative communication is associated with more exhaustion. On the resistance to change dimension, emotional response was significantly and positively associated with exhaustion. Emotional reaction is the affective component of resistance to change: These emotions can cause anger, frustration, and trigger stress that can lead to expressing negative feelings or opinions about the change to others (Nilsen et al., 2019). This expression could be an adaptive coping strategy for the employee and at the same time an maladaptive one for the group, as the adverse effects of the negative emotions are exacerbated by the expression (see Brown et al., 2005).

This study, of course, has some limitations. First, it was a cross-sectional study and the sample belongs to a single organization, so the results should be taken with caution and cannot be generalized. Future research could include a larger sample and comparison across organizations. This could also help to understand how change is experienced in the context of the leadership style that has shaped the organization up to this point. Leadership appears to be key to understanding the success or failure of change in organizations: in their study, Vos and Rupert (2018) found that leadership behavior can influence the increase or decrease in resistance to change. A longitudinal study could help to better understand the moment of change from one commander to another, what the expectations, doubts, and concerns are, and identify different leadership styles and their effects on police workers emotions and behaviors (Carleton et al., 2020). In addition, a longitudinal study could help understand perceived stress during the pandemic: The effort required of police officers was higher than during “normal” times, and leadership styles could affect how the emergency period was managed (Stogner et al., 2020). It should be noted that the results refer to a specific period in which the commander changes in this sample. Further research could look at organizational changes over the past 10–20 years and how societal changes have affected organizational changes. For example, migration flows have reshaped cities, as have new housing needs and the types of services provided. In addition, our study focused on participants’ general attitudes toward organizational change when contextualizing their responses. A more comprehensive survey could include a focus on their current work experiences: for example, interviews and focus groups could be used to explore in depth the meaning of organizational change, considering opportunities and potential drawbacks. It might also be useful to examine in more detail how attitudes toward change are related to the level of education (e.g., provided by the organization, such as a specific training course) or the various roles and services offered to citizens. Further research could also consider these variables to better explain attitudes toward change in this population. Additionally, due to the quantitative nature of the study, it was not possible to collect data on the organizational and subculture that characterized this police organization. As Cohen (2017) argues, there is a strong relationship between employee values, organizational culture, and the success or failure of organizational change efforts (see also Terpstra and Salet, 2019). The way police workers are selected, trained, and guided and the organizational climate influence perceptions of events and even organizational change (Alpert et al., 2012). Future research could use a qualitative or mixed methods approach to further examine organizational culture and climate and their influence on resistance to change (both in terms of beliefs about organizational change and dispositional resistance to change). Another limitation is that we did not ask about some sociodemographic variables related to race or ethnicity, variables that could help explain the relationship within the organizational context and thus attitudes toward change. Finally, there may be a bias related to socially desirable response behavior, i.e., the tendency to respond to a questionnaire while projecting a positive image of oneself. As Xavier et al. (2021) noted, police officers may tend to

reduce complex issues and align their narratives with what is considered socially acceptable or desirable for the image they portray to the public. Future research could incorporate a social desirability scale to examine how the image of the police organization and the desire to conform to social norms may have influenced police officers’ responses.

Despite these limitations, the results of this study may contribute to a better understanding of organizational and dispositional resistance to change. Specifically, the findings suggest that management must monitor the process, provide information, ensure transparency in the decision-making process, and involve police employees in every step of the change process. Following Warrick (2022), an open dialog could be helpful in managing the process by first developing a safe culture where there is an opportunity to create a space where all stakeholders can contribute equally and express fears and concerns about the change. Open dialog could first be encouraged by managers who lead by example and participate in openness. Then, it is necessary to create opportunities for open dialog, for example, by organizing meetings where employees can reflect on the change, conducting surveys, and providing feedback. In addition, sharing information can keep employees appropriately informed about change, which improves open dialog about impact in the organization. In police organizations, open dialog could be particularly useful in improving an organizational culture that focuses on expressing feelings and overcoming the stigma associated with asking for help and emotional support, as well as the social desirability associated with wearing the uniform.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

DA, AG, and LC: conceptualization, investigation, writing—review and editing, and writing—original draft preparation. LC and AG: methodology and data analysis. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 12 December 2022

ACCEPTED 06 March 2023

PUBLISHED 11 April 2023

CITATION

Thompson J and Jensen E (2023) Hostage negotiator resilience: A phenomenological study of awe.
Front. Psychol. 14:1122447.
doi: 10.3389/fpsyg.2023.1122447

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Hostage negotiator resilience: A phenomenological study of awe

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Law enforcement crisis and hostage negotiators (CHNs) are tasked with resolving incidents that are stressful, unpredictable, and often dangerous. These negotiators must work as a team and be able to successfully utilize a variety of skills in order to gain the subject's voluntary compliance and peaceful surrender. It is necessary for negotiators to continually practice these skills while also, and importantly, care for their own wellbeing. This study examines how a phenomenon, awe, when viewed as a resilience practice, can support law enforcement crisis hostage negotiators with their crisis work and personal wellness. Utilizing phenomenological methodologies, the findings demonstrate that reflecting on awe experiences had an overall positive impact on the negotiators in both their professional and personal lives. Based on the results, it is suggested that awe practices could be incorporated into future negotiator trainings in order to increase resilience and assist negotiators personally and professionally.

KEYWORDS

hostage (crisis) negotiator, awe, resilience, hostage and crisis negotiation, phenomenology

Introduction

Law enforcement can be stressful, unpredictable, and dangerous. This is especially the case for crisis and hostage negotiators (CHNs) who are involved in tense situations and often interact with people who are in a mental health crisis. In order to remain effective in saving lives, it is necessary for these elite members of law enforcement to continually train together in order to successfully work together as a team and efficiently utilize the requisite skills. Emerging research has been examining how awe can be viewed as both a resilience practice while also being supportive of other practices such as cognitive reappraisal, finding meaning and purpose in life, gratitude, optimism, self-compassion, self-efficacy, and social connectedness (Tabibnia, 2020; Thompson et al., 2022; Thompson, 2022a). Additionally, when viewing awe as a resilience practice, it has been suggested as having the potential to enhance the wellbeing of these negotiators while also contributing to their efficiency in crises (Thompson et al., 2022). This exploratory study is a phenomenological analysis of law enforcement CHNs engaging in a specific resilience practice: reflecting on awe experiences. This paper begins by providing an overview of the crisis negotiator's role and responsibilities, followed by an exploration of how awe can serve as a potential resilience practice and support negotiators. Next, the study's methodology, results, and findings are provided. Lastly, the conclusion offers suggestions for future research examining awe, resilience, and hostage negotiators.

Crisis hostage negotiator

Crisis and hostage negotiators (CHNs) are specialized, law enforcement officers who emerged in the early 1970s (McMains and Lanceley, 2003; Grubb et al., 2022), prompted by a terrorist-related hostage-taking incident at the Munich Olympics (Johnson et al., 2018). Since then, negotiators have been trained to utilize crisis intervention techniques in high-conflict and life-threatening situations in order to resolve challenging and stressful incidents (McMains and Lanceley, 2003; Johnson et al., 2018; Grubb et al., 2022; Thompson et al., 2022). CHNs interact with people who are often in some form of a crisis and as such, the CHN attempts to defuse the frustrations and tensions within the situation. According to Hoff (1989), a crisis can be defined as any event that threatens to overcome the individual's means to cope. This perceived conflict is viewed as insurmountable by the person involved in the crisis and the need to engage in unusually extreme methods becomes a viable option (Johnson et al., 2018). For instance, a person may resort to taking hostages to solve their problem, another person may stand at a bridge and threaten death by suicide, or someone else may threaten to harm another person or entity through the use of violence (Johnson et al., 2018). These crisis events typically stem from a variety of traumas, but most involve the significant loss of a relationship, rejection, termination from employment, financial loss, decreased health, or the impending loss of freedom (Johnson et al., 2018).

A major component of the CHN's strategy is to slow down the crisis incident in order to allow time for the person to vent their feelings (i.e., anger, frustration, sadness) and consider their current and future actions (Van Hasselt et al., 2008). In order to slow this process down, CHNs use skills which consists of active listening, empathy, rapport, and behavioral influence (Van Hasselt et al., 2008). Negotiators are also trained in a host of other areas to successfully navigate these highly stressful situations, such as, but not limited to stress management, mindfulness, working with victims and families, and other aspects of mental health trainings (Mullins, 2002). Research by Grubb et al. (2019) have found that certain characteristics were viewed to be important qualities for a negotiator to possess in order to be successful with negotiations (i.e., empathic, demonstrating respect for another person, flexibility, law enforcement experience, patience, resiliency, compassionate, trustworthy, mental stamina, and insightfulness). As such, the negotiators' primary goal is to obtain the person's cooperation and compliance without the additional use of the tactical/operations team (Johnson et al., 2018).¹

Awe

Various definitions of awe have been provided by researchers and generally, they involve two critical elements: vastness and a need for accommodation (Keltner and Haidt, 2003). Vastness can refer to something both physical as well as conceptual, such as time or power (Chirico and Gaggioli, 2021; Cuzzolino, 2021; Thompson, 2022a,b). As a result of this vastness, it requires a new mental schema to be constructed, which has been referred to as a need for

accommodation. This accommodation is something that challenges our mental representation, due to the vastness and poses difficulty in assimilating the novel experience into the preexisting mental schemas (Keltner and Haidt, 2003; Dong and Ni, 2020; Thompson, 2022a,b). Emerging awe research has refined the definition of awe as being a complex emotion that is experienced in response to something, or someone, extraordinary and challenges the person's current thinking (Stellar, 2021; Thompson et al., 2022). Awe is primarily a positive emotion, however, it can include negative elements such as fear or horror (Chirico and Yaden, 2018; Guan et al., 2019). When awe is considered in the context of a positive emotion, it can lead to an increase in the person's ability for attention (Chirico et al., 2017), thought formulation, and can broaden one's "physical, intellectual, and social resources" (Dong and Ni, 2020, p. 905). Furthermore, positive awe can elicit greater feelings of calmness and personal control of a situation (Guan et al., 2019). When viewed in the context of negative awe experiences, this can be associated with feelings of powerlessness, a decrease in self-control, and uncertainty (Guan et al., 2019).

Awe can be experienced in a variety of settings including nature, space, music and the arts, spiritual and religious moments, interpersonal relationships, and through one's accomplishments as well as that of others (Shiota et al., 2007; Yaden et al., 2019; Sturm et al., 2020; Graziosi and Yaden, 2019; Thompson et al., 2022). Awe can be elicited through direct, in-person experiences, while also through sharing and reading narratives, photos, video, audio, and both augmented and virtual reality (VR) (Chirico et al., 2017; Thompson, 2022a). This study focuses on the positive attributes of experiencing awe. Previous research has shown that awe can increase overall wellbeing (Graziosi and Yaden, 2019), contribute to feeling connectedness with others (Chirico et al., 2017) (and nature), critical and creative thinking, curiosity, decision making, "feeling small" (Nelson-Coffey et al., 2019, p. 2) in a positive way, focus, gratitude, humility, open-mindedness, optimism, tolerating ambiguity, and handling uncertainty (for a review, see Allen, 2018; Cuzzolino, 2021; Thompson et al., 2022).

Awe has been described as both an epistemic emotion and a self-transcendent experience (Chirico and Yaden, 2018; Thompson, 2022c). As an epistemic emotion, experiencing awe can reveal gaps in knowledge while then motivating the person experiencing awe to want to fill those knowledge gaps. When referenced as a self-transcendent experience (STE), awe can allow the person experiencing it to look beyond themselves and contribute to prosocial behaviors (Guan et al., 2019; Koh et al., 2019; Cuzzolino, 2021; Thompson, 2022c). Studies have shown examples of prosocial behaviors including generosity, donating, volunteering, and compassionate action for both others and the environment (Guan et al., 2019). Additionally, and with direct relevance to this study, reading and sharing narratives have been examined as reflective, wellness, and an enhancing resilience practice for evoking awe in others (Rudd et al., 2012; Piff et al., 2015; Walker and Gilovich, 2021; Cuzzolino, 2021; Thompson, 2022c).

Resilience

Previous research has suggested that experiencing awe and other related resilience practices can support both a CHN's wellbeing and enhance their abilities related to their work in crisis incidents (Thompson et al., 2022). Much like awe, there are various definitions

¹ For a more in-depth review of CHN skills, see Thompson et al. (2022).

of resilience. Adapting previous versions from researchers (Southwick and Charney, 2018; APA, 2020; Thompson et al., 2022), the authors define resilience as a collection of practices to support an individual's wellbeing that can be utilized proactively, in the midst of a crisis or stressful moment, and as part of their recovery. For the purpose of this study, examples of evidence-based resilience practices include cognitive reappraisal (Hanson, 2018; Southwick and Charney, 2018), connectedness (Suttie, 2017; Nitschke et al., 2021), empathy (Waddimba et al., 2021; Wu et al., 2022), gratitude (Emmons, 2010; Millstein et al., 2016), meaning and purpose in life (Aten, 2021; Ballard and Ozer, 2016) mindfulness (Kwak et al., 2019; Antonini Philippe et al., 2021), optimism and prospection (Reivich and Shatte, 2003; Bulley and Irish, 2018), and self-efficacy (Maddux, 2005; Bandura, 2008). Recent, exploratory research conducted by this author has established a relationship between these specific resilience practices with awe (Thompson, 2022a,b,c, 2023a,b). Those studies have shown that experiencing and reflecting on awe can serve as a gateway to other resilience practices and support their overall wellbeing. This study attempts to advance the findings from the aforementioned awe-resilience studies by directly engaging CHNs to discern the potential role of awe in relation to their work.

Methodology

Phenomenology, a qualitative research methodology, was determined to be the most suitable approach to conduct this study. Phenomenology explores how a phenomenon is experienced by an individual. The phenomenon being examined for this study is awe. In addition to phenomenology, interpretative phenomenological analysis (IPA) supported this study's overall methodological approach. IPA is concerned with small, homogenous sample sizes that can provide rich data with an emphasis on the quality of the data and not the quantity or necessitating a larger sample size (Smith et al., 2009; Frechette et al., 2020).

The research question guiding this study was: How do law enforcement hostage negotiators experience awe and how does it, and related resilience practices, impact them (professionally and personally)? Nine negotiators participated in the study which is a sample size consistent with both phenomenology and IPA (Polkinghorne, 1989; Groenewald, 2004; Smith and Nizza, 2021). Five negotiators were from the United States, two from New Zealand, and one from Australia, Canada, and the United Kingdom. They were invited *via* email to participate in the study through prior, established professional relationships either directly or through professional peers. A balance between gender was intended, as well as obtaining diversity *via* different geographic locations. In order to qualify for participation, each person had to be an active member of law enforcement and currently on their agency's crisis/hostage negotiator team (CHNT). Each participant had to have been involved in at least five incidents, where they served as the lead negotiator. This requirement was necessary for them to be able to reflect on multiple CHNT experiences concerning awe. As displayed in Table 1, each participant was highly experienced in crisis incidents. Table 1 details additional demographic data of the participants.

Consistent with qualitative research methodology, specifically phenomenology and IPA (Smith and Osborn, 2003; Smith and Nizza, 2021), semi-structured interviews were conducted with each

participant separately to gain their unique perspective of the phenomenon, awe. Additionally, researcher-specific questions were utilized to elicit how awe has impacted their work as a law enforcement CHN. During the interview, other related, positive emotions and resilience practices were also examined. All participants completed an electronic consent form prior to their interview. The study was approved through the first author's institutional review board.

The data analysis and theme development follow the suggested practices for conducting general phenomenological studies and specifically interpretative phenomenological analysis. Previous qualitative research conducted by the first author helped guide the development and analysis of the data (Thompson, 2022a,c, 2023a,b). This included Thompson et al. (2022) establishing the relationship between resilience skills, and specifically experiencing awe, with CHN's personal resilience and qualities of negotiator effectiveness. IPA was determined to be the most suitable methodological approach as it seeks to first, make meaning of the experiences of the individual related to the phenomenon of awe, and then shifts to the researcher's ability to determine themes derived from multiple participant's experiences (Smith and Osborn, 2003).

Each interview was conducted *via* Zoom and lasted for approximately 50 min. The questions for the semi-structured interviews were adapted from previous, similar awe research (Cuzzolino, 2021) and informed more broadly by other awe and resilience studies (for example, see Thompson et al., 2022). There were 19 questions to guide the interviews (see Appendix A), however, they were not asked in a specific order and they were not all asked to each participant.

The interviews were recorded and then the deidentified audio files were transcribed by a third-party service. The first author initially analyzed each interview separately and then again collectively in order for themes to emerge (van Manen, 1990; Smith and Osborn, 2003; Creswell, 2007; Bonner and Friedman, 2011; Smith and Nizza, 2021). Again, consistent with IPA, the first author's understanding of the phenomenon and notes contributed to the emergence of themes (Smith et al., 2009). The first author has conducted previous, similar research on the phenomenon of awe (2022) as well as with hostage negotiators. Further, he is a retired law enforcement detective having served for 20 years including in the role of a hostage negotiator and trainer.

The related research conducted by Thompson (2022a,b,c) and colleagues (2022) offered specific guidance on the establishment of themes related to awe and resilience practices. The emerging themes were compiled into a database where each participant was given a deidentified label (for example M1 for the first male interviewed and F1 for the first female interviewed). The second author's role in this process was reviewing the individual interview transcripts and notes, the group themes, and then providing edits, questions, clarifications, and overall feedback. In instances where there were questions and suggested additions or dissimilarities, the authors had further discussions to reach a consensus. The second author's background includes experience in crisis-related incidents, prior mental health training, and education in various fields of psychology (i.e., clinical, counseling, and forensic).

As previously discussed, the existing literature has demonstrated a variety of methods of eliciting awe, including through sharing narratives and reading the experiences of others. To further examine the potential that sharing a narrative can have with awe, and overall wellbeing, this study advanced the recommendations provided by

TABLE 1 Participant demographics.

	Age	Years of law enforcement experience	Years of CHNT experience	Number of CHNT incidents	Number of CHNT incidents as the lead negotiator
Female 1	44	23	12	500	240
Female 2	39	15	12	300	50
Female 3	53	28	15	200	50
Female 4	37	15	11	65	20
Male 1	44	19.5	10	50	20
Male 2	55	21	16	250	50
Male 3	49	26	12	400	200
Male 4	49	26	17	125	25
Male 5	42	11	12	66	50
Mean	48.44	23.94	12.88	215.55	74.11
SD Standard Deviation	8.88	8.21	2.47	161.69	85.88

Cuzzolino (2021) and Thompson (2022a,b). A post-interview survey was sent to the participants' emails to gauge the participants' perspectives about being interviewed.

Finally, the findings, interpretations, and themes are presented jointly and supported by excerpts from the participants. This approach is consistent with previous resilience research (Thompson, 2020; Thompson and Drew, 2020) and specifically, awe (Thompson, 2022a). IPA research has been described as purposely avoiding rigid and specific structuring across studies, as it is not a descriptive methodology (Smith and Nizza, 2021). Instead, the IPA principles are utilized based on the needs of the researchers as they explore a phenomenon (Smith and Osborn, 2003; Smith et al., 2009; Smith and Nizza, 2021).

Results and Discussion

During the interviews, participants explained how awe and related resilience skills contributed to their effectiveness in their crisis work, as well as their personal wellbeing. As discussed in the previous section, through IPA, 15 themes emerged. This number of themes is consistent with previous, similar awe research conducted by the first author including the 18 themes that emerged from the study on The Awe Project (Thompson, 2022a) which guided the theme development for this study. Importantly, the themes from The Awe Project study were not pre-selected as themes for this study, instead, through the analysis, some similar and different themes emerged.

These themes are alphabetically displayed in Table 2 and are further discussed throughout this section to demonstrate the complex nature of awe and specifically, the interconnectivity between the various attributes of awe and resilience as described by the participants. An example of this complexity and interconnectedness is the theme of "accomplishments." Reflecting on accomplishments has been previously explained as a category of evoking awe. However, it can also enhance resilience as reflecting on personal accomplishments can additionally evoke gratitude and supporting self-efficacy – both of which are also related to experiencing awe. This example demonstrates how awe can serve as a gateway to other resilience practices and support overall wellbeing.

Negotiator skills

Prior to examining the direct role awe can have in their crisis work and personal lives, the qualities of effective crisis and hostage negotiator (henceforth referred to as negotiator) were explored first. Consistent with the literature (Johnson et al., 2018; Grubb et al., 2019; Thompson et al., 2022), multiple participants reflected on how important it is to demonstrate empathy, in order to be an effective negotiator:

Empathy is number one, for sure. If you're not empathetic, you're just not going to be able to connect with somebody that's going through a crisis.

The ability to develop empathy and that emotional intelligence to pick up on not just the black and white body language, but to feel the emotion coming behind people's words.

That they have empathy and they listen. Everyone always thinks that to be a good hostage negotiator, you have to be a good talker. And it's not that at all, you have to be able to empathize with that person, with what they're going through, in that specific moment or situation.

As previously examined and demonstrated by Thompson (2022a,b) and Thompson et al. (2022), experiencing and reflecting on awe can enhance empathy. Additionally, and related to awe, open-mindedness as well as being able to efficiently handle uncertainty were described by negotiators as being necessary as well:

You have to be able to consider things in a very broad way because ultimately you don't know where the conversation is going to go, and so if you're really narrow-minded with your line of questioning for those individuals that you were reaching out to for information, that can be a problem.

TABLE 2 Awe and negotiator-related themes.

Theme	Example
Accomplishments	<i>[Being a CHNT is] just one of those things, you are really proud of it.</i>
Cognitive reappraisal	<i>It just kind of changes your outlook on life and your lifestyle.</i>
Connectedness (Teamwork) (Personal relationships) (Mentors)	<i>There's no way you can do it without partners</i> <i>It has not been easy, I'll be honest, but we have [them along with their spouse] managed to get through</i> <i>You have to find that mentor to kind of guide you</i>
Curiosity	<i>I honestly think from my experiences and talking to people that curiosity helps negotiators be genuine. Because otherwise it could turn into trickery.</i>
Empathy	<i>It's seeing the world through their eyes, which is the most important thing.</i>
Gratitude	<i>I would describe it as a privilege as well, working amongst a whole lot of people who were all striving to achieve the same goal really.</i>
Humility	<i>It is so important to have that team atmosphere and put all egos aside.</i>
Learning/filling knowledge gaps	<i>You want to know what makes them happy. What drives them? What keeps them going?</i>
Mindfulness	<i>Being able to separate yourself from whatever else is going on in your life... having the ability to be able to put that aside and just focus solely on the negotiation is quite important.</i>
Open-mindedness	<i>You have to be able to consider things in a very broad way.</i>
Prospection and optimism	<i>I think that becomes, again, overwhelming, so just keeping that spirit of hope is really important.</i>
Self-care	<i>I think finding the ability to prioritize self-care, has been a really important aspect for me personally.</i>
Self-efficacy	<i>I've found that you have to be your best advocate yourself. You need support, but it ultimately lies on your shoulders.</i>
Self-transcendent experience	<i>You were part of something that was greater than you.</i>
Uncertainty and ambiguity	<i>I think negotiators really have to be comfortable with the uncomfortable.</i>

Themes listed alphabetically.

Participants also reflected on recognizing the seriousness of their work and the pressure involved with regard to their ability in being effective:

To me, you have to be invested and you have to have the passion to do this, and really understand it and the responsibilities that come with it.

If I get it wrong, that person's going to die. That's my grounding, that's my reality. Whether there's a bit of me that thinks this is an attention seeker, this is just a grab of my time. I tell myself, 'If I get this wrong, they're going to die.' And that's how I [keep myself in check].²

We're going into high pressure. What does HNT respond to? Crisis. It's a crisis every time. So, the pressure is on. And every word that you say may determine the outcome of that.

CHNT literature and trainings have well-established the significant role active listening has in negotiators being effective.² The following two participants provided insight into why it is so important, including how it can fill a social void for the subject:

² For example, see the review provided by Thompson et al. (2022).

The reality is that it's really about listening. Listening to that person, because that's what they're lacking. They're lacking something, or someone, that understands them.

You're going out there and you're trying to be there for someone who hasn't had anyone to listen to them, or they didn't feel like they can reach out and have that support. It's an important job. It's exhausting. It takes a lot out of the individual. But it is an important task.

The above participant also explained how tiresome it can be for the negotiator when using the necessary skills properly. The following participant added to the challenges of being a negotiator and how it requires self-control, patience, and focus:

Just being able to keep calm I think, and keeping control of your voice, control your emotions as well. Being able to separate yourself from whatever else is going on in your life ... having the ability to be able to put that aside and just focus solely on the negotiation is quite important.

As part of negotiator effectiveness, the importance of operating as a team was stressed as being vital to a negotiator's success by many participants.

I think it's less about you being super smooth with your words and more about being a good team player ... there's no way you can

do it without partners that are on the same page, understanding what you need.

The following participants expanded on the value of having a cohesive team environment by explaining how an incident is too much for one person to handle. The other team members can offer the lead negotiator valuable assistance:

Oh my God, I think [the team concept is] hugely important, because I've certainly had moments in a negotiation where you can't. It's difficult to get that connection and you are like, 'Oh goodness, I'm all out. I just don't know what to do from here. So, it's so good having someone else there who can be like, 'Hey, why don't you look at this angle?' ... Someone else on my team might have this really awesome idea that I haven't even thought about. And you can miss those opportunities if you don't work as a team."

You have to be ready for anything and that's why you need a good team around you. Negotiation is a team sport because the guy might throw something out there. You have no idea what he's talking about but you don't have time to go research it or go look it up. That's when you need your teammates.

This participant further demonstrated the importance of working as a team by relating it to humility and being goal-centered:

It is so important to have that team atmosphere and put all egos aside and really work as one. Yes, you are a team, the mission is the same.

Previous research has investigated the benefits of a person possessing curiosity and suggests that those who experience awe are "highly curious and motivated to learn about the world in which we live" (Anderson et al., 2020, p. 762). Further, Anderson et al. (2020) surmise that awe "directs attention away from the self, outwards to one's physical and social environment, a precursor to curiosity" (p. 764). It has also been suggested that curiosity can support police leaders in addressing modern issues they are facing and how experiencing awe can contribute to developing meaningful strategies to address those concerns and issues (Thompson, 2022b). Studies have demonstrated that experiencing awe can result in an increased curiosity for participants (McPhetres, 2019; Anderson et al., 2020; Thompson et al., 2022; Thompson, 2022a) and therefore curiosity was discussed with participants to examine its value for negotiators. This participant explained the significance of curiosity with respect to the work of negotiators:

I'm real curious. I'm real curious to know about that person. What makes them tick? I think that for a successful negotiation you want to know what makes them happy. What drives them? What keeps them going? So, curiosity is huge. I'm real curious.

The following negotiator established a connection between curiosity, handling uncertainty, being uncomfortable, and how it is something negotiators can enhance:

I think negotiators really have to be comfortable with the uncomfortable ... I think if you're curious, you just might have some ability to connect with people that you typically wouldn't maybe interact with ... I think if active listening is a trainable thing, I think being curious is probably equally so.

The following participant clarified what makes a negotiator effective while connecting curiosity with empathy:

Curiosity starts by you just listening. Oftentimes, people think to be a good negotiator you have to be a good talker. And I say, no, you have to really listen because they haven't had anybody listening to them for many years ... Stay quiet, listen. Take those moments and be curious. And that's when you realize, oh, this is what's going on. Now, utilizing the information you got and really trying to connect with that individual by seeing the world through their eyes. And I always say it doesn't mean that you have to agree with them, but it's seeing the world through their eyes, which is the most important thing.

Another participant further contributed to emphasizing the necessity of curiosity, as it allows a negotiator to gain a more accurate perspective of the subject's situation:

... wanting to be curious enough to find out what their real story, because what they tell you first, probably isn't going to be the real story, and you've got to be curious and gentle enough to get the story out rather than be a cop and try and force the story out ... the curiosity is about unpicking their story gently so that they don't feel as though they're under any pressure. They don't feel as though they are being interrogated by a cop. They are in a position where they actually want to talk to you, and we have to give them that position where they feel comfortable that they want to talk to us."

The above quote importantly shows how the negotiator uses curiosity to create a trusting and rapport-building environment that is not adversarial but instead, one where the subject will want to willingly share information. In order to build rapport and trust with the subject, and create an environment for them to share more information, a negotiator must be genuine when using their skills:

I honestly think from my experiences and talking to people that curiosity helps negotiators be genuine. Because otherwise it could turn into trickery.

The following participant shared how their curiosity is part of their overall personality and not limited to their negotiation work:

I'm very curious about people and I'll strike up a conversation with a stranger just because I think it's interesting to see how different people live life and what they're all about.

In addition to curiosity, creativity is another important skill for negotiators to possess, due to the constant uncertainty they are faced with (Zhang et al., 2021):

Not every negotiation is the same. We do teach the negotiation course and we give you procedures. And procedures are

guidelines... but that doesn't mean that you box yourself. You always have to be creative... I'm not saying you have to be a trickster. You have to be able to think outside the box. There're always gray areas. You can't say, "Oh, never say no." And being humble, it's just you can't have an ego. You can't. This job, you're going into a situation when someone is going to kill themselves. They are at the end of their rope, and there's no hope. And you're standing there, and you cannot put your needs, your ego, first. You have to be very humble. You have to be very understanding. And again, being empathetic.

Self-efficacy, or believing in one's own abilities, has been described as an important quality for negotiators (Thompson et al., 2022). In part, as the following participants explained, it helps develop confidence and avoids second-guessing oneself.

I've found that you have to be your best advocate for yourself. You need support, but it ultimately lies on your shoulders.

I think it's super cool that you have this opportunity to be on the phone potentially with somebody who has other plans or other ideas, and maybe you're going to persuade them otherwise, and that is very, very neat.

Nobody wants you around till they need you and then when they need you, they need you bad. When you walk in and a lot of it's just having confidence in your own abilities. ... It feels pretty cool.

The above comments also revealed an element of self-efficacy that included reflecting on what they do for a living and enjoying it. Participants were asked what impact reflecting on their role as a law enforcement crisis hostage negotiator have:

And I've worked a lot of different assignments with the [police agency], from narcotics, to internal affairs, to patrol, to training. And the hostage negotiation part of it is my favorite part of my profession.

It's good. I love it. And you mentioned curiosity before, and I think that's really what keeps me going, is I like to know what's going on, and I like to be involved and stuff like that.

It's just one of those things, you're really proud of it.

Finally, and previously mentioned, the above reflection shows the interconnection between many of the negotiator skills with each other and with the attributes of awe. In this case, it is curiosity, accomplishments, and gratitude.

Defining and understanding awe

Guided by the existing research that has already established the relationship between awe, wellness, and resilience (Tabibnia, 2020;

Thompson, 2022a), the focus of the interviews shifted more directly to the research question and specifically, the phenomenon of awe. The participants were asked to define awe in their own words, and this negotiator related it to beauty:

Awe is something that is a beautiful thing, it's something that brings you to say "wow" or to feel amazed by some of these things that you're experiencing. I think that awe can sometimes also be uncertainty.

Importantly, previous research has demonstrated handling uncertainty as being necessary for negotiators' effectiveness (Thompson et al., 2022). Further research has shown experiencing awe can support an individual's ability to handle ambiguity and uncertainty (Thompson et al., 2022).

According to this participant, awe can be experienced in the company of others and felt when admiring someone else's accomplishments in a positive manner:

I'm impressed ... I think it's the opposite of jealousy.

The above negotiator's statement demonstrates that when experiencing awe, it can contribute to humility (Stellar et al., 2018) and negotiator effectiveness. The following participant's definition details the complexity of awe which involves additional emotions as well:

That almost step back of whoa, in a positive sense. Not in a, 'Oh my God,' but a, 'Oh wow.' Yeah, that would be my definition of awe ... other emotions associated directly with awe: happiness, euphoria, surprise, respect, adulation, generally those positive kind of emotions.

Finally, numerous participants explained the intensity related to awe experiences which can also result in them not being able to fully describe it. This is consistent with Keltner and Haidt's (2003) seminal work on awe and how when it is experienced, it elicits awe as a need for accommodation. This refers to the person experiencing awe not initially being able to comprehend or grasp what is occurring and therefore has to develop a new mental schema to generate an understanding:

Almost like overwhelming, or disbelief, or something that blows your mind. It can cause you to get a bit emotional ... overwhelming joy.

It's great. And you're in awe of that, in shock ... happiness. Sometimes, you're in awe that you can't figure this out because it's confusion. [The emotions are] intense ... It's obviously something that's out of the norm.

It's one of those things that you almost literally don't have words to describe it.

The definitions provided by these negotiators are consistent with existing literature that has defined awe as being: complex, intense, not

easy to explain, and mainly a positive experience (Dong and Ni, 2020; Thompson, 2022a).

Awe stories

Participants shared moments related to their negotiation work where they experienced awe. This included reflection on the seriousness of these crisis incidents, including the life-or-death consequences that are part of it. Much like general experiences of awe, the following participant shared how this can lead to intense emotions:

The first negotiation that I went to where I actually thought this person was going to jump. And it really struck me like, 'Wow, I could be looking at this person and then not looking at this person.' There was this huge sense of overwhelming emotions.

The participant's reflection continued by realizing how important it is to manage one's emotions. If emotional responses are not managed properly, they could be detrimentally contagious for the other person:

It's really just about taking a breath. If I become rushed, I come across as stressed or panicky, then that is almost certainly going to have an effect on that person.

The participant continued by explaining how goal-setting and controlled breathing restored them to feeling calm, focused, and able to remain present and in the moment:

So, it's really just about knowing what my goals are, knowing what I'm there to do, what I'm there to achieve, and then how I'm going to do that. So just taking that minute to just breathe and think, 'What is it that I need to do now? What's important right now? What's...' And then working towards achieving an end goal.

Finally, the participant concluded how a vital practice in resilience and positive psychology is having a sense of gratitude and savoring the moment when it ends well:

When it's a happy ending you get all those happy, good vibes and you're like, 'I just saved a life.'

This type of profound reflection that the negotiator had with regard to saving another person's life and savoring the moment was expressed with greater intensity by this participant:

This guy's going to live now. He wants to live. He wants to get help. And possibly something I've said has helped him unravel 44 years of shit and he's prepared to try and do something about it now. And that was my awe – that, 'Christ, wow.'

Not all of the work-related awe stories shared by participants were positive experiences. The literature has shown that although awe is often related to positive moments, it can also be associated with negative emotions and non-pleasant situations (Gordon et al., 2017; Guan et al., 2019):

I did have a bit of awe when I dealt with a guy who had his two daughters as hostages in his house, but it wasn't awe in a good way

He had his two daughters at knife point and held them for over 12 hours in a room upstairs in his house. He refused to come out. I tried as much as I could to negotiate, to get him to come out.

I tried a number of different techniques and although he did speak with me and yell at me, which I took as a positive thing. He refused to come out and the tactical team ended up having to go in to get them out once they worked out what their tactics would be. So, I guess I was in awe of that really. It was a big day.

I would describe it as a privilege as well, working amongst a whole lot of people who were all striving to achieve the same goal really. And I had an opportunity to be able to use my skills in order to try and get him to come out. Unfortunately, it didn't work.

Although the above story was described as a negative experience, it can also be viewed in terms of cognitive reappraisal that contained positive elements as well. Although the negotiation did not gain voluntary compliance from the subject, the overall incident was peacefully resolved. The negotiator's actions contributed to the tactical team's success by "stalling for time" (Noesner, 2010; Thompson, 2014), which refers to a well-established negotiation tactic of using the concept of time and patience within the negotiation strategy. In this case, the negotiator's patience allowed time for the tactical team to develop, and subsequently, implement their plan.

Furthermore, self-compassion was evident. As described in the literature (Neff, 2011), self-compassion involves acknowledging things will not always go as planned and be positive despite our best efforts. This is further linked to another resilience attribute, possessing self-efficacy, or believing in one's abilities. Both self-efficacy and self-compassion allows the resilient person to "bounce back" when a situation does not go well or as planned.

Additionally, another positive attribute the participant reflected on from this experience was the sense of connectedness and gratitude. All of the police personnel on the scene, from various units, were working together in one unified goal – saving people's lives. This reflection allowed the participant to sense awe, as well as other related resilience attributes such as gratitude, connectedness, self-compassion, and self-efficacy.

Personal awe moments

In addition to sharing work-related moments of awe, participants were asked to share personal, non-work related stories where they experienced awe. This question was purposely asked in relation to finding meaning and purpose in life (M/PiL). Meaning in life can be described as the extent to which a person believes their life has a purpose and is significant (Rivera et al., 2020). As such, being a CHN and involved in crisis incidents can contribute to an overall M/PiL, however it is also important for law enforcement members (as well as the general public) to not be enmeshed in their work and develop an unhealthy attachment.

Consistent with previous research involving awe stories being shared (Thompson, 2022), participants in this study reflected on moments involving those close to them. This included profound moments of giving birth:

“You think, ‘This is going to be awesome. I can’t wait to have a child.’ And then the minute they’re here, you’re like, ‘Oh my gosh, I am so responsible right now for the outcome of this little tiny being.’

And then all these things that looking back came up the minute they were born that you have to decide for this little tiny being is very scary. And if you don’t have hope that things are going to be okay and that you’re going to do the best you can, I think that becomes, again, overwhelming, so just keeping that spirit of hope is really important.”

The above participant details another important element related to awe and resilience in general: hope and optimism (Thompson et al., 2022). Having hope and optimism refers to an individual believing positive change is possible and they can achieve realistic goals they have created for themselves (Reivich and Shatte, 2003; Southwick and Charney, 2018).

Personal accomplishments, as well as sensing awe in those close to them (Graziosi and Yaden, 2019), were both previously established elicitors of awe (Walker and Gilovich, 2021; Thompson, 2022c). The following participant reflected on not just their own financial success but how it is intensified because it was achieved along with their spouse:

That we are doing quite well now financially with properties that we bought ... and I’m in awe of the fact that we’ve managed to achieve a goal that we had set years ago, which is pretty cool. I’m pretty happy about that”

Finally, another common elicitor of awe is nature. This participant reflected on a recent walk in nature and how it captivated them:

Walking the dog about two days ago. It was a Spring morning and it was cold. The sun was shining beautifully; the mist was rising off the lake. The birds were singing the morning chorus. There was no one about, and I was walking with the dog and that was an awe moment. That was a real, ‘Wow. Yeah. Bloody hell.’ That feeling of just peace and calm, just for that second or two when I was just able to realize what wasn’t around me. That was definitely [awe].

The above story showed that in addition to nature being able to elicit awe, it is also those ordinary, everyday moments that can also elicit awe when approached with an open-minded perspective (Schneider, 2009; Graziosi and Yaden, 2019). This demonstrates how in terms of well-being, enhancing resilience is not necessarily about changing the conditions around us, but instead, it involves possessing a resilient perspective of what is occurring in our environment.

Consistent with the literature, participants reflected on how awe can invoke feelings that they are a part of something larger than themselves, especially in relation to their crisis work:

It doesn’t take one person to resolve a crisis. And when you are able to take someone’s hand and walk them over to the other side, the good side of the bridge, and you look around you, all the people that were there, and the support that they gave you, most of the time in very, very, bad elements, cold, hot, hungry, and you’re doing your best to save a life, and they hold you up. They’re there for you. You know that if something happens, they will step

in. When you look around you and you realize that there’s so many good people that are doing a great job, it’s very hard to explain, but it’s like, you know what? Everything else is just a speck. It’s just dust. You built those bonds with people that are never broken... you were part of something that was greater than you.

This sense of connectedness to something larger than themselves is a positive result of experiencing awe, as it can motivate people to support others. This is a prime reason awe has been described as a self-transcendent emotion:

You become, to some extent, connected, or emotionally you feel a sense of responsibility for your role as a negotiator. You can’t just be like, ‘Oh my God, okay. It’s an hour, I’ve got to go home.’ It’s not like that. You become part of something bigger than yourself.

Experiencing awe has also been described as creating a perspective shift in those who experience it:

[Awe] just kind of changes your outlook on life and your lifestyle. Just appreciate things more.

The above negotiator reflection shows how a perspective shift can also evoke gratitude.

Additional awe themes

Although part of a negotiator’s success lies in their ability to believe in their abilities, participants were also prompted to reflect on who, besides themselves, were responsible for their successes in life. Having a sense of gratitude and connectedness with others is critical to enhancing a person’s resilience and developing their wellbeing (Nelson-Coffey et al., 2019; Thompson, 2022). Two themes emerged: loved ones and having mentors.

It hasn’t been easy, I’ll be honest, but we’ve [them along with their spouse] managed to get through.

I have a bunch of mentors ... she’s been a huge support. You choose your mentors based on the fact that you respect that person, and that they’re extremely knowledgeable.

The following participant explained how mentors can especially help in moments when the incident does not end well:

You have to find someone, especially nowadays, you have to find that mentor to kind of guide you through some of the stuff you’re going through. He was really good because he even told me right up, ‘Hey, man, you’re not going to win them all. You need to really be prepared for that.’ That’s kind of the thing that really helped me when we had a couple ones that didn’t go like we thought they’d go.

Previous awe literature has explained how awe experiences can be monumental, or once in a life time moments, such as the birth of a child or a visit to the Great Barrier Reef. Yet, awe experiences can also

be found in moments we perceive as ordinary, everyday events and interactions (Schneider, 2009; Graziosi and Yaden, 2019; Shiota, 2021; Thompson, 2022a). Graziosi and Yaden (2019) and later Thompson (2022a), refer to this experience of awe as an expected and ordinary response to something extraordinary, or it can be an extraordinary response to something ordinary. A participant reflected on this notion of how awe can be experienced by a change in perspective:

I think it's more about taking the focus off of yourself and then experiencing everything that was there, but you just didn't see it. So, it's almost like the glasses were off, things were out of focus and then, all of a sudden things become crystal clear ... all of it.

And then you just start to impact different things around you differently ...

If you can live that way, you're far better off finding joy in the simplest things. Because you're always going to find those simple things.

Self-care is an important element to further developing one's mental health and personal resilience and was explored with the participants. Self-care is a multifaceted construct which, according to Martinez et al. (2021) involves the ability to care for oneself through "awareness, self-control, and self-reliance in order to achieve, maintain, or promote optimal health and well-being" (p. 423). Participants shared various practices they engage in and many explained how they purposely make time for self-care, which includes daily moments of awe:

Nature is my awe. As things get green and fill out here... I thrive on that, and we've had a long, long, cold winter, so when we can get back outside and feel the dirt and be in our yards, I think that's my awe.

I think finding the ability to prioritize self-care, has been a really important aspect for me personally.

Having a diverse collection of self-care and resilience practices is important (Bonanno, 2013; Thompson et al., 2022) as the above participant continued:

I definitely exercise... I think the other thing that I find enjoyment is in social connectedness... I think [self-care] comes in different forms for different people, but I enjoy reading and listening to podcasts.

This participant further supported how valuable, social connectedness and personal relationships are with respect to self-care:

I have hobbies. I'm a world-traveler. Relationships are key, good friends and if you marry the right person, it's going to help a lot.

Multiple participants expressed the importance of work-life separation being a valuable part of their self-care:

You have to separate from the job and you hopefully spend time with people other than those in your profession.

The following negotiator reflected on how their self-care has evolved over time, and it purposely includes having plants in their office:

Ten years ago, I'm not having plants in here. I'm just, I'm not having any plants in here ... They're not coming in here.

[Now] it just makes me feel good. And I have people come in here and I ask, 'Do you feel relaxed?' And they say, 'Yeah. How come?'

I said, "Plants ... They take the edge off."

Additionally, the above negotiator's comment shows how their self-care, and resilience practice is also related to nature, which is a common category known for eliciting awe.

Reflecting on awe as a resilience practice

In addition to collecting qualitative data to understand the role awe can have on the work of law enforcement hostage negotiators, the semi-structured interviews were also designed to be a resilience practice and intervention to enhance personal wellbeing. Broadly, sharing narratives can be supportive of an individual's wellbeing (Frattaroli, 2006; Adler et al., 2016; Rutledge, 2016). Further, previous awe studies collected narratives from participants (Shiota et al., 2007; Campos et al., 2013; Piff et al., 2015; Cuzzolino, 2021) while other work suggests that sharing awe narratives as well as reflecting on moments of awe both in a person's personal life and with work can enhance resilience in part, due to its relation to other practices (Thompson, 2022c). Thompson et al. (2022) explore the relationship between awe and other resilience practices such as cognitive reappraisal, gratitude, connectedness (with nature and others), prospection and optimism, and finding meaning and purpose in life and argue that these practices can support negotiators with their work as well as in their personal lives.

As previously mentioned, this exploratory study was designed in part to be a resilience practice for the participants. Based on the structuring of the interview questions, reflecting on awe moments can be related to other resilience practices such as cognitive reappraisal, social connectedness, gratitude, and others. Previous research has explored how awe-reflecting interviews can be supportive of one's mental health while suggesting future research should follow up with interviewees to see if their participation impacted them in any way (Cuzzolino, 2021). The current study embraced that suggestion by asking during the initial interview if they had thought about awe in relation to their work prior to the interview, and regardless of their answer, what their thoughts are now that the interview was nearly over.

Multiple participants expressed that although they never connected the concept of awe with their work, they found it to be beneficial, especially in terms of reflecting:

No, I hadn't. I hadn't thought about awe, and I think it's a term that I don't... Yeah. I didn't use quite frequently, but now I will find myself probably paying attention to those moments that I have, just an internal reflection on, I think that's awe. Yeah, so thank you for that.

I haven't thought about it too much other than what this morning's conversation was with you ... I'll definitely reflect on this and think about it and maybe it'll make me more positive and try and find something positive every day.

Continuing with the self-transcendent theme, the following participant wondered how it could be further shared with other negotiators:

It's a really, really interesting concept, because I would never have put awe in negotiating... I just wonder if this could be incorporated into training more or a recognition amongst us.

This participant expanded on the above comments by also relating the self-transcendent impact awe can have by wanting to use future negotiator-related awe moments to be part of the team's debriefing because now those incidents have a label, awe, to describe them:

No, not at all [having previously associated awe with law enforcement negotiation work]. You know what? I will share it with the rest of my guys, I will say, 'Hey, remember those calls that I kept saying, the out of the ordinary ones? Now, we have a name for them. If you guys have an awe call, come and see me, and I'll explain it.'

... Am I going to remember my awe moments? Yes. I'm going to put that name to it now.

Finally, this participant reflected on how associating awe with their work can enable a negotiator to discern the significance and impact of their work.

No. No, I haven't. It's when you really think about it, and you're forced to reflect on specific incidents, then you're like, 'Wow, there really were a lot.' But before this, it's just, 'Oh, they were a bunch of jobs I answered.'

This type of reflection can also be considered part of another resilience practice, finding meaning and purpose in life (Southwick and Charney, 2018; Thompson et al., 2022).

Post-interview survey

This study further advanced the recommendations made by Cuzzolino (2021) by sending a brief, post-interview survey to each participant approximately five days after their interview was conducted. The purpose was to solicit their feedback on having participated in the study, and the impact it may or may not have had on them.

This study also utilized the suggestions of Thompson (2022c) that sharing awe narratives can be viewed as a resilience enhancing and wellness practice. Among the eight-question survey, participants were asked to briefly describe what it was like to be part of the study on awe to further examine the guiding research question:

I think it was helpful to talk about my experience as a negotiator, because it's not something I have really allowed myself to do.

I enjoyed thinking about awe. It's not a word I use very often, so I think taking the time to be very thoughtful about this particular question was enjoyable.

It was great having real discussions about awe in the world of negotiation.

This participant explained how cognitive reappraisal emerged from participating and enabling them to take time to reflect on their positive experiences:

By the end of the interview, I reflected on more positive jobs I have had in my career. Previously I would focus on the negative or heavy jobs. Thinking about awe and the positive is changing my outlook on things.

A subsequent question asked if there was anything specific they enjoyed about participating in the interview and many answers were similar to the previous question, especially with how the interview was conducted:

I enjoy being part of a discussion like this to open up my mind to different ideas.

It was an easy process and an open conversation.

Really enjoyable. Good conversation and very thoughtful.

Additionally, these participants explained how the interview allowed them to be pushed out of their comfort zone. Previous awe research has shown that experiencing awe can help people handle uncertainty (Shiota et al., 2006; Bonner and Friedman, 2011) and support law enforcement negotiators with their work (Thompson et al., 2022):

Questions were asked in a way that gave me the freedom to answer in a way that I thought was best. [The questions] also forced me to think of things that I hadn't considered before.

The ability to think about an aspect of it that I had not really considered before.

After some time had passed, participants were asked if they had thought about awe. Awe has been described as a self-transcendent experience which motivates the person experiencing awe to want to help other. This participant explained how they have shared their experience of awe with others:

I have [thought about awe]. On more than one occasion I have chosen to verbalize my awe with a person. I think I have typically considered this a compliment, but in reality, awe is deeper than that. For my good friend it was related to her determination while attending school with two very young children. And secondly my

oldest son who has received a few compliments lately from friends and I've also seen firsthand just how sensitive, loving and understanding he is with young children. The reason I believe this is an awe moment is that I have not observed many young boys with that type of demeanor.

The above quote can also demonstrate how experiences of awe are related to other resilience practices and attributes of experiencing awe: connectedness, and appreciating the accomplishments of others.

Participants also demonstrated the self-transcendent element of awe, as well as connectedness, by discussing their experiences from this study with other people and specifically, the concept of awe in relation to law enforcement negotiation:

Yes, I will be discussing it with my learner groups.

I mentioned this study to a few co-workers. No one had ever heard of the awe concept so it made for some interesting conversations.

Participants also linked the study and their participation directly with their negotiation work going forward:

After reflecting on it I can see how [awe] will be a valuable study for negotiators and preparing them for incidents that they may encounter.

How to recognize [awe] and deal with it in other negotiators.

Yes, how I can implement it into my next training session.

Yes! After the interview I attended a negotiators training day and shared the content of the interview with the team so we discussed awe. Also discussed it with a work colleague.

The final question asked participants if their perception of awe has changed since being interviewed for the study. This question is significant, as previous awe research has explained experiencing awe can identify gaps in one's knowledge and importantly, motivate their curiosity to learn:

I think once I had an opportunity to think about awe, my perception surrounding recognition changed. I will notice my "awe" moments more now.

I do think it has in regards to being more recognizable. The concept was there but I had not really thought about it as far as how we discussed it. After doing this study I think it brought light on the importance of recognizing how awe plays into the majority of callouts we respond to.

As previously stated in other sections of this paper and consistent with previous research, the above comments suggest that the interviews contributed to a positive shift in participants' perspectives going forward.

Conclusion

Given the critical work law enforcement crisis and hostage negotiators are involved in, empirical research is necessary to continually examine their effectiveness, their ability to properly use the requisite skills, and their personal wellbeing. The relationship between the personal wellbeing of a negotiator and their ability to effectively engage in their work is closely intertwined. This exploratory study examined that relationship through a specific element of resilience – awe – and demonstrated how it can both support their wellbeing as well as their specialized police work. Through an analysis utilizing qualitative research, and the direct experiences of the participating negotiators, multiple themes emerged. These themes advance the previous awe research and uniquely identified how CHNs perceived awe and enhanced their role as negotiators.

This study offered a unique exploration into the phenomenon of awe and its relationship with CHNs. Importantly, the qualitative approach of this study was necessary when exploring a phenomenon such as awe, in order to understand the first-hand perspective of the CHNs. This is an exploratory study and while it is important to gain this first-hand perspective, a limitation of this study is that it focuses on a single methodological approach to examine awe and negotiators. Future research can advance this study in numerous ways. Additional studies can include utilizing quantitative methodologies with larger samples to increase the diversity of responses and conducting longitudinal studies to examine how awe can potentially support negotiators' skills, practice, and personal wellbeing over a period of time. Considering this study is the first to explore CHN's experiences and awe, there is significant room for future research that embraces diverse methodologies. By exploring the positive effect of awe reflection and providing an overview of various themes, this study has established the groundwork for additional analyses related to awe and CHNs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Lipscomb University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix

Guiding questions for hostage negotiators (Thompson and Jensen, 2023)

1. I'd like to start by learning a little about the path that led you to become a hostage negotiator. What drew you to this field and your current position?
2. What's the most important part of your job? What makes someone good at being a negotiator (including team concept)?
3. How much did you want to be a negotiator?
4. What is the most meaningful thing that has happened to you so far while working as a hostage negotiator?
Who else was part of it?
5. Who else has been responsible for your life's successes?
6. What is your definition of awe?
7. How would you describe what it is like to experience an awe moment? Be descriptive as possible (not giving an example though). What level of intensity were those emotions?
8. Have you ever experienced awe in the context of your hostage negotiation work? Can you tell me about it? Did this experience change your thinking in any way? How about your behavior?
9. Can you recall any other awe experiences in the context of your work?
10. Can you share a non-work-related awe experience?
11. Would you describe those awe experiences you shared as isolated or unusual incidents, or the feeling of awe is something you experience with some regularity at work or outside of it?
12. What role, if any, does experiencing awe have with respect to your work as a hostage negotiator?
13. Some people describe awe as an experience of feeling part of something larger than yourself. Does that resonate with you, and with your experiences?
14. Sometimes when someone experiences awe, it creates what is described as a perspective shift or change. What are your thoughts on this, based on your experiences?
15. What are some daily moments that you try to enjoy and possibly find awe in?
16. Have you ever thought about awe before in the context of your work? What is it like now?
17. Now that this interview is nearly over, has it raised any other thoughts or ideas that you'd like to share?
18. Do you have any questions for me?
19. What self-care practices do you do that can be related to awe?



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RECEIVED 13 December 2022

ACCEPTED 06 April 2023

PUBLISHED 02 May 2023

CITATION

Andrews KL, Jamshidi L, Shields RE,
Teckchandani TA, Afifi TO, Fletcher AJ,
Sauer-Zavala S, Brunet A, Krätzig GP and
Carleton RN (2023) Examining mental health
knowledge, stigma, and service use intentions
among Royal Canadian Mounted Police cadets.
Front. Psychol. 14:1123361.
doi: 10.3389/fpsyg.2023.1123361

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Examining mental health knowledge, stigma, and service use intentions among Royal Canadian Mounted Police cadets

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Background: Royal Canadian Mounted Police (RCMP) officers experience an elevated risk for mental health disorders due to inherent work-related exposures to potentially psychologically traumatic events and occupational stressors. RCMP officers also report high levels of stigma and low levels of intentions to seek mental health services. In contrast, very little is known about the levels of mental health knowledge and stigma of RCMP cadets starting the Cadet Training Program (CTP). The current study was designed to: (1) obtain baseline levels of mental health knowledge, stigma against peers in the workplace, and service use intentions in RCMP cadets; (2) determine the relationship among mental health knowledge, stigma against peers in the workplace, and service use intentions among RCMP cadets; (3) examine differences across sociodemographic characteristics; and (4) compare cadets to a sample of previously surveyed serving RCMP.

Methods: Participants were RCMP cadets ($n=772$) starting the 26-week CTP. Cadets completed questionnaires assessing mental health knowledge, stigma against coworkers with mental health challenges, and mental health service use intentions.

Results: RCMP cadets reported statistically significantly lower levels of mental health knowledge ($d=0.233$) and stigma ($d=0.127$), and higher service use intentions ($d=0.148$) than serving RCMP (all $ps<0.001$). Female cadets reported statistically significantly higher scores on mental health knowledge and service use and lower scores on stigma compared to male cadets. Mental health knowledge and service use intentions were statistically significantly positively associated. For the total sample, stigma was inversely statistically significantly associated with mental health knowledge and service use intentions.

Conclusion: The current results indicate that higher levels of mental health knowledge were associated with lower stigma and higher intention to use professional mental health services. Differences between cadets and serving RCMP highlight the need for regular ongoing training starting from the CTP, designed to reduce stigma and increase mental health knowledge. Differences between male and female cadets suggest differential barriers to help-seeking

behaviors. The current results provide a baseline to monitor cadet mental health knowledge and service use intentions and stigma as they progress throughout their careers.

KEYWORDS

mental health training, public safety personnel, police, mental health services, help-seeking behavior, mental health stigma, cadets

1. Introduction

Public safety personnel [PSP; [Canadian Institute for Public Safety Research and Treatment \(CIPSRT\), 2019](#)] include diverse professionals (e.g., border services personnel, correctional workers, firefighters, operational and intelligence personnel, paramedics, police, public safety communicators, search, and rescue personnel) regularly engaged in maintaining public safety [[Canadian Institute for Public Safety Research and Treatment \(CIPSRT\), 2019](#); [Public Safety Canada, 2019](#)]. PSP are frequently exposed to potentially psychologically traumatic events (PPTs; [Carleton et al., 2019](#)) and other occupational stressors ([Carleton et al., 2020a](#)), collectively increasing their risk for developing posttraumatic stress injuries [PTSI; [Canadian Institute for Public Safety Research and Treatment \(CIPSRT\), 2019](#); [Public Safety Canada, 2019](#)]. In Canada, Royal Canadian Mounted Police (RCMP) report very frequent exposures to diverse PPTs ([Carleton et al., 2019](#)), which can compromise the physical ([Violanti, 2006](#); [Levy-Gigi et al., 2014](#); [Violanti, 2015](#)), psychological ([Skogstad et al., 2013](#); [Klimley et al., 2018](#); [Sherwood et al., 2019](#)), and relational ([Paton et al., 1999](#); [Woody, 2006](#); [Kirschman et al., 2015](#)) health of police officers. Initial evidence indicates serving RCMP report high proportions of positive screenings for mental health disorders with 50.2% screening positive for one or more mental health disorders ([Carleton et al., 2018a](#)). This is much higher than the diagnostic prevalence of the general population (10.1%; [Statistics Canada, 2014](#)). The reported high prevalence of mental disorder symptoms by serving RCMP is coupled with reported high levels of stigma and low levels of intentions to seek mental health services ([Krakauer et al., 2020](#)), suggesting a problematic confluence of serious mental health challenges for serving RCMP.

The frequent PPT exposures and associated high levels of reported mental health symptoms among PSP have led to substantial efforts designed to increase mental health education and treatment. Several strategies and programs have been developed among PSP to minimize and manage the impact of PPTs. Mental health training has included programs such as the Road to Mental Readiness (R2MR; [Carleton et al., 2018b](#); [Szeto et al., 2019](#)), critical incident stress management/debriefing (CISM/CISD), mental health first aid (MHFA; [Hadlaczky et al., 2014](#)), Before Operational Stress (BOS; [WGM Psychological Services, 2018](#)), and peer support. The mental health training is intended to reduce mental disorder prevalence by increasing knowledge, reducing stigma, and therein promoting early interventions. The available cross-sectional evidence suggests that participation in any of the listed mental health training programs can be associated with greater willingness to access support and reduction in the likeliness of screening positive for a mental disorder ([Carleton et al., 2019](#)). Interventions appear to yield statistically significant

short-term benefits in terms of formal help-seeking, self-help, mental health literacy, and personal stigma, as well as positive long-term effects on formal help-seeking behaviors ([Xu et al., 2018](#)). Higher levels of mental health knowledge have also been associated with lower levels of stigma and higher levels of service use intentions in both in the general public ([Hadlaczky et al., 2014](#); [Schnyder et al., 2017](#); [Xu et al., 2018](#)) and among PSP ([Krakauer et al., 2020](#)).

The high levels of stigma and low levels of reported intentions to seek mental health services among RCMP suggest mental health training and resources may help to increase individual abilities to identify and manage mental health challenges, recognize when a disorder may be developing, and identify evidence-based options for help-seeking or treatment ([Reavley and Jorm, 2011](#); [Jorm, 2012](#)). Increased mental health knowledge can also reduce levels of associated stigma and negative attitudes, which have been inversely associated with symptom recognition and help-seeking behaviors ([Corrigan, 2004](#); [Conner et al., 2010](#); [Clement et al., 2015](#); [Cheng et al., 2018](#)). RCMP may avoid accessing services for fear of retribution by peers or administration ([Blum, 2000](#); [Karaffa and Koch, 2016](#); [White et al., 2016](#); [Wheeler et al., 2021](#)). RCMP may also feel uncomfortable disclosing mental health challenges for fear of being perceived as unfit for duty or weak ([Newell et al., 2022](#)), which could further reduce their social supports and treatment-seeking behaviors ([Violanti, 2010](#); [Wilmoth, 2014](#)). Lower levels of mental health knowledge and increased stigma appear to be current barriers for reducing mental health challenges among serving RCMP.

The RCMP has prioritized deploying diverse solutions to mitigate mental health challenges facing RCMP members ([Public Safety Canada, 2019](#)); however, the many proffered programs to support PSP mental health have very little research evidence regarding their effectiveness. There have been few evaluations of mental health training programs for PSP ([Beshai and Carleton, 2016](#); [Maslowski et al., 2019](#); [Szeto et al., 2019](#); [Anderson et al., 2020](#); [Di Nota et al., 2021](#); [Price et al., 2022](#)). A recent systematic review of the available literature observed high variability in study design, target audience, duration of training, time or interventions, outcomes measured, and timing of follow-up across the programs and associated evaluation ([Anderson et al., 2020](#)); accordingly, comparing the effectiveness of the programs is extremely difficult and quality assessments of the impact of such program on the mental health of PSP is rarely available ([Anderson et al., 2020](#)).

The extant programs associated with research have produced positive effects. For example, Canadian firefighters and paramedics perceived critical incident stress management (CISM) as a beneficial and valuable tool for providing skills and coping strategies and offered some mental health benefits for symptoms of AUD and GAD when delivered with high fidelity ([Price et al., 2022](#)). Mental Health First Aid

(MHFA) was observed to produce moderate improvements in mental health knowledge and confidence of trainees to help those in need (Maslowski et al., 2019). Road to Mental Readiness (R2MR) produced favorable results for a group of PSP (Szeto et al., 2019; Anderson et al., 2020) and paramedic students (Vaughan et al., 2020), including improvements in mental health outcomes and stigma and increasing resiliency skills, although effects were time-limited with rapid skill decay. Before Operational Stress (BOS) produced small improvements in PTSD symptoms, quality of life, perceived social support, and stigma from baseline to 6 months later. The available evidence suggests that mental health training programs may be effective at improving mental health knowledge and reducing stigma; however, a great deal of heterogeneity was observed across the evaluation methods in the studies leading to substantial difficulties when determining which mental health training program as most effective.

The RCMP is working to address the existing limitations through the RCMP Study (Carleton et al., 2022) by developing, deploying, and longitudinally assessing a multi-modal mental health solution that includes evidence-based biopsychosocial assessments and evidence-informed integrated cadet mental health training. The RCMP Study can also help to address the limited research evidence regarding the mental health knowledge, stigma, and service use intentions of RCMP cadets starting their careers. The high prevalence of mental health disorder symptoms, high levels of stigma, and low levels of intentions to seek mental health services may be related to years of service or to limited mental health training.

The current study examines mental health knowledge, stigma against peers in the workplace with mental health challenges, and mental health service use intentions of RCMP cadets prior to starting the Cadet Training Program (CTP). The current study was designed to: (1) obtain baseline levels of mental health knowledge, stigma against peers in the workplace, and service use intentions of RCMP cadets; (2) determine the relationship among mental health knowledge, stigma against peers in the workplace, and service use intentions among RCMP cadets; and (3) examine differences across sociodemographic characteristics; and (4) compare cadets to a sample of previously surveyed serving RCMP. Mental health knowledge was expected to be positively associated with service use intentions and inversely associated with stigma. Based on previous research, it was hypothesized that male cadets would report greater mental health stigma than their female counterparts (Soomro and Yanos, 2019) and female cadets would report higher mental health knowledge and service use intentions than male cadets (Krakauer et al., 2020).

2. Materials and methods

2.1. Procedure

Data were collected using a web-based self-report survey in English or French as part of the RCMP study. Full details on the RCMP Study have been published in a dedicated protocol paper (Carleton et al., 2022). The study was approved by the University of Regina Institutional Research Ethics Board (file No. 2019-055) and the RCMP Research Ethics Board (file No. SKM_C30818021312580). The study was also approved through a Privacy Impact Assessment as part of the overall approval NARMS 201611123286 and PSPC 201701491/

M7594174191. The current study focused on cross-sectional data collected from the Full Assessment administered when participants started the CTP (i.e., pre-training) between May 2019 and October 2021. During the Full Assessment, cadets self-reported outcomes on mental health knowledge, stigma in the workplace, and mental health service use intentions.

2.2. Data and sample

Participants were RCMP cadets ($n = 772$) starting the 26-week CTP. To qualify for CTP, cadets must be Canadian citizens or permanent residents, 19–57 years old, who can fluently read, write, and speak either English or French (Hembroff and Krätzig, 2020). Cadets must also meet several recruiting requirements, including security clearances, medical examinations, a polygraph test, and minimum physical standards. There were no conditions excluding persons otherwise qualified for the CTP. A total of 1,696 cadets were invited to participate in the RCMP Study as part of the standard training condition (Carleton et al., 2022). The final sample was a total of 772 cadets. Most participants (98%; $n = 759$) completed all of the survey questions associated with the current analyses. Cadets were predominantly male (72.3%), aged 19–29 years old (60.1%). Considerable proportions of participants were single (46.9%) or married or in common-law relationships (i.e., living with a person in a conjugal relationship for 12 continuous months) (43.1%), residing in Western Canada (52.8%) or Eastern Canada (34.5%), with no previous PSP or Canadian Armed Forces (CAF) experience (56.8%).

2.3. Self-report measures

2.3.1. Mental Health Knowledge Scale

The Mental Health Knowledge Scale (MAKS; Evans-Lacko et al., 2010) is a 12-item self-report questionnaire. The first six items assess beliefs about mental health (e.g., “People with severe mental health problems can fully recover”) proceeded by nine items designed to assess participants’ level of recognition and familiarity with various mental health conditions (e.g., stress; posttraumatic stress disorder). All items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Data support the test–retest reliability (Evans-Lacko et al., 2010) and the Cronbach’s α was $\alpha = 0.39$ for the current sample.

2.3.2. Open Minds Survey for Workplace Attitudes

The Open Minds Survey for Workplace Attitudes-Short Form (OMS-WA-SF; Boehme et al., 2022) is a self-report questionnaire that includes 9 items designed to measure Attitudes Predicting Avoidance and Beliefs about Danger/Unpredictability toward people with mental health challenges. Items such as “I would try to avoid a co-worker with a mental illness” were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher mental health stigma in the workplace. The Mental Health Commission of Canada employs the OMS-WA as a standard metric for stigma. The OMS-WA had a Cronbach’s $\alpha = 0.87$ in the total sample.

2.3.3. Mental Health Service Use Questionnaire

Mental Health Service Use Questionnaire (MHSUQ) is a 4-item self-report questionnaire designed to measure willingness to seek professional help for mental health challenges. Items (e.g., “If I developed mental health problems, I would want to seek mental health treatment from a professional”) are rated on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The MHSUQ is derived from the 76-item CAF-R-MHSUQ (Fikretoglu et al., 2019) and is consistent with questions regularly used in Statistics Canada surveys to assess mental health service use. The Cronbach's α for the MHSUQ was $\alpha = 0.95$ in the current sample.

2.4. Statistical analyses

Frequencies and percentages of sociodemographic information including sex, age, marital status, province of residence, education, and previous PSP or CAF experience were described. The means and standard deviations of mental health knowledge, stigma, and service use intention scores were calculated across different sociodemographic groups. A series of independent sample *t*-tests and one-way analyses of variances (ANOVA) were conducted to assess differences in means of mental health knowledge, stigma, and service use intention scores across different sociodemographic categories, as well as the entire sample and previously published serving RCMP (Krakauer et al., 2020) collected using similar methods as the current study. Statistically significant differences between sociodemographic categories were evaluated through post-hoc analyses using Holm-Bonferroni adjustments for multiple comparisons to control Type I errors. Zero-order correlations were performed between mental health knowledge, stigma, and service use intention scores within the entire sample to evaluate the variable interrelationships. Multivariate analysis of variance (MANOVA) was performed to assess whether there were significant differences on a linear combination of mental health knowledge, stigma, and service use intention scores across sociodemographic categories. Statistical significance level was set at $p \leq 0.05$. All data were analyzed using SPSS v.28 Premium (IBM, 2021 New York, United States).

3. Results

The sociodemographic variables and mean scores of mental health knowledge, stigma, and service use intention across demographic categories are provided in Table 1. Some sociodemographic and sex differences were observed. Females reported statistically significantly higher mental health knowledge ($p < 0.05$) and service use intention scores ($p < 0.05$) and lower stigma scores ($p < 0.001$). A statistically significant effect of age ($p < 0.05$), ethnicity ($p < 0.05$), and province of residence ($p < 0.05$) on mental health knowledge scores were observed; however, follow-up multiple pairwise comparisons were not statistically significant due to application of Holm-Bonferroni adjustment to control familywise error rates. Individuals from Atlantic Canada reported statistically significantly lower stigma scores ($p < 0.01$)

TABLE 1 Sociodemographic characteristics and comparison of MAKS, OMS-WA, and MHSUQ scores across different categories.

	% (n) ¹	MAKS	OMS-WA	MHSUQ
		Mean (SD)	Mean (SD)	Mean (SD)
Sex				
Male	72.3 (549)	46.01 (4.32)	16.40 (5.53)	23.48 (5.22)
Female	24.8 (188)	46.81 (4.02)	14.48 (5.22)	24.35 (4.68)
Effect Size (Cohen's <i>d</i>)	–	0.188*	0.351***	0.171*
Age				
19–29	60.1 (456)	46.58 (4.14)	15.73 (5.62)	23.45 (5.00)
30–39	27.9 (212)	45.50 (4.36)	15.96 (5.07)	23.84 (5.32)
40–49	6.2 (47)	46.00 (4.89)	17.13 (5.98)	24.57 (5.28)
50–59	0.7 (5)	47.40 (2.97)	19.60 (5.59)	26.80 (2.68)
60 and older	–	–	–	–
Effect size (η^2_p)	–	0.014*	0.007	0.006
Marital status				
Single	46.9 (356)	46.27 (4.22)	15.97 (5.67)	23.42 (5.19)
Separated/ Divorced	1.4 (11)	47.82 (2.36)	14.18 (5.21)	26.36 (2.20)
Married/ Common-Law	43.1 (327)	45.98 (4.41)	15.98 (5.44)	23.87 (5.04)
Widowed	–	–	–	–
Effect size (η^2_p)	–	0.004	0.002	0.006
Ethnicity				
Asian	5.8 (44)	45.02 (3.36)	18.80 (6.32) ^b	24.25 (4.56)
Black	3.2 (24)	45.58 (3.28)	15.33 (6.38) ^{ab}	23.92 (4.95)
First Nation/ Inuit/Metis	3.0 (23)	46.96 (4.43)	14.00 (4.60) ^a	24.35 (5.01)
Hispanic	1.4 (11)	43.27 (4.08)	17.55 (6.93) ^{ab}	27.36 (1.57)
South Asian	5.8 (44)	46.02 (4.92)	15.77 (5.27) ^{ab}	24.18 (5.77)
White/Caucasian	73.1 (555)	46.44 (4.30)	15.81 (5.40) ^a	23.47 (5.18)
Effect size (η^2_p)	–	0.016*	0.023**	0.011
Province of residence				
Western Canada (BC, AB, SK, MB)	52.8 (401)	46.04 (4.40)	16.37 (5.54) ^a	23.77 (5.14)
Eastern Canada (ON, QC)	34.5 (262)	46.11 (4.04)	15.84 (5.40) ^{ab}	23.79 (4.85)
Atlantic Canada (PEI, NS, NB, NFL)	11.3 (86)	47.43 (4.31)	14.06 (5.35) ^b	23.35 (5.56)
Northern Territories (YK, NWT, NVT)	1.1 (8)	45.25 (1.91)	16.25 (5.57) ^{ab}	25.25 (3.24)

(Continued)

TABLE 1 (Continued)

	% (n) ¹	MAKS	OMS-WA	MHSUQ
		Mean (SD)	Mean (SD)	Mean (SD)
Effect size (η_p^2)	–	0.011*	0.017**	0.002
Education				
High school graduate or less	10.3 (78)	45.72 (4.50)	17.58 (5.40) ^a	23.05 (5.55)
Some post-secondary school	43.2 (328)	46.01 (4.21)	15.96 (5.39) ^{ab}	23.62 (5.12)
University degree/4-year college or higher	39.5 (300)	46.61 (4.21)	15.36 (5.39) ^b	24.10 (4.91)
Effect size (η_p^2)	–	0.006	0.015**	0.004
Previous PSP or military experience				
Yes	30.4 (231)	46.05 (4.61)	16.14 (5.66)	24.06 (4.78)
No	56.8 (431)	46.36 (4.21)	15.74 (5.47)	23.54 (4.78)
Effect size (Cohen's <i>d</i>)	–	0.073	0.072	0.102
Total sample	100 (759)	46.2 (4.28)	15.94 (5.51)	23.73 (5.07)

MAKS, Mental Health Knowledge Schedule; OMS-WA, Open Minds Survey for Workplace Attitudes; MHSUQ, Mental Health Service Use Questionnaire.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Statistically significantly different; Holm-Bonferroni adjustment was applied to alpha level to control type I error in multiple comparisons. *M* (SD) represents Mean (Standard Deviation). η_p^2 represents partial Eta Square. Lettered superscripts within each column category indicate significant differences between category groups on respective measure at $p \leq 0.05$. Means followed by a common letter are not significantly different.

¹Total percentages may not sum to 100 and ns may not sum to 759 due to non-response or responding "other."

than cadets from Western Canada. Asian cadets reported statistically significantly higher stigma scores ($p < 0.01$) than First Nation/Inuit/Metis and White/Caucasian cadets. Cadets with high school education or less reported statistically significantly higher stigma scores ($p < 0.01$) than those with university degree education.

Mental health knowledge and service use intentions scores were statistically significantly correlated ($r = 0.119$, $p < 0.01$). The MANOVA indicated statistically significant differences between sex categories ($F(3, 733) = 6.70$, $p < 0.001$, Wilks' Lambda = 0.973), age categories ($F(9, 1738) = 2.49$, $p < 0.01$, Wilks' Lambda = 0.969), ethnicity categories ($F(15, 1913) = 2.39$, $p < 0.01$, Wilks' Lambda = 0.950), province of residence ($F(9, 1828) = 2.25$, $p < 0.05$, Wilks' Lambda = 0.974), and education levels ($F(6, 1,402) = 2.36$, $p < 0.05$, Wilks' Lambda = 0.980) on a linear combination of mental health knowledge, stigma, and service use intention scores. For the cadets, stigma was inversely statistically significantly correlated with mental health knowledge ($r = -0.268$, $p < 0.001$) and service use intentions ($r = -0.177$, $p < 0.001$).

Comparisons between cadets and previously published data from serving RCMP on mental health knowledge, stigma, and service use intention scores are presented in Table 2. Current RCMP cadets reported statistically significantly lower mental health knowledge ($d = 0.233$, $p < 0.001$) and stigma scores ($d = 0.127$, $p < 0.01$), and higher services use intention scores ($d = 0.148$, $p < 0.001$) compared to serving RCMP.

4. Discussion

The current results help to fill important gaps in the literature on RCMP cadets' mental health challenges by offering the first known empirical evidence of mental health knowledge, stigma, and service use intentions in RCMP cadets starting the CTP. Consistent with the current study hypotheses and previous research (Hadlaczky et al., 2014; Schnyder et al., 2017; Xu et al., 2018; Krakauer et al., 2020), mental health knowledge and service use intentions were statistically significantly associated, and stigma was inversely statistically significantly associated with mental health knowledge and service use intentions. The results suggest that higher levels of mental health knowledge are associated with lower stigma and higher intention to use professional mental health services. The current results are novel and highlight the importance of research involving mental health training to increase mental health knowledge and service use intentions by reducing stigma around mental health disorders and help-seeking behaviors.

As hypothesized, cadets reported lower stigma and higher service use intentions than serving RCMP. However, unexpectedly cadets reported lower mental health knowledge compared to serving RCMP. The lower mental health knowledge and stigma observed among cadets as compared to serving members may be related to experience. Police officers are more likely than the general population to encounter people with a mental health disorder as first responders (Desmarais et al., 2014). Frequently attending to mental health emergencies while on-duty could likely increase perceived mental health knowledge. Additionally, experience dealing with people with mental health disorders may also increase an officer's level of stigma toward those with mental health disorders. Compared to the general population, police officers have previously endorsed significantly more stigma, negative stereotypes, and perceptions of dangerousness and unpredictability toward those with mental health disorders (Soomro and Yanos, 2019). The current findings suggest that stigma may increase through experience. Mental health knowledge may also increase; however, the nature of the knowledge gained based on experiences is not clear. This knowledge could be biased if the experience was perceived as stressful and traumatic (Soomro and Yanos, 2019). Further research is needed to understand the associations between on-duty experience dealing with people with mental health disorders, perceived mental health knowledge based on these experiences and stigma.

Professional experience with mental health disorders may have also contributed to serving RCMP reporting lower service use intentions compared to cadets. Research with police suggests that police avoid using services in spaces where they bring civilians for mental health support (Newell et al., 2022). Given the rural nature of most RCMP postings, the only available mental health services in the area are likely to be places where officers have previously brought civilians for mental health services. Officers may not be aware of online resources available to them such as Internet-delivered cognitive behavioral therapy (McCall et al., 2021).

Overall, the differences in mental health knowledge, stigma, and service use intentions between cadets starting the CTP and serving RCMP suggest a need for initial (i.e., during the CTP) and ongoing (i.e., throughout an officer's career) psychoeducation or evidence-informed training. Mental health training is likely to increase mental health knowledge, decrease stigma, and increase service use intentions

TABLE 2 MAKs, OMS-WA and MHSUQ scores and descriptive statistics based on current and previously published self-report measures.

	Current RCMP cadets	Serving RCMP ¹	Comparing current RCMP cadets and serving RCMP
	Mean (SD)	Mean (SD)	Effect size (<i>d</i>)
MAKS	46.20 (4.28)	47.20 (4.33)	0.233***
OMSWA	15.94 (5.51)	16.67 (5.91)	0.127**
MHSUQ	23.73 (5.07)	22.88 (6.21)	0.148***
Total sample	759	1,070	–

MAKS, Mental Health Knowledge Schedule; OMS-WA, Open Minds Survey for Workplace Attitudes; MHSUQ, Mental Health Service Use Questionnaire; SD, standard deviation; RCMP, Royal Canadian Mounted Police.

** $p < 0.01$, *** $p < 0.001$. Statistically significantly different.

¹Krakauer et al. (2020); OMSWA scores was calculated based on 9-item scale used in the current study, other than 11-item version used in Krakauer et al. (2020).

in RCMP cadets and serving members, thereby protecting the mental health of RCMP members. There are now numerous options for such training (i.e., CISM, CISD, Peer support, BOS, R2MR, MHFA; Di Nota et al., 2021). The RCMP has been including R2MR training in the CTP since 2012. In addition, the Emotional Resilience Skills Training (ERST) currently being evaluated by the RCMP Study underscores education about mental health, which should implicitly reduce stigma (Carleton et al., 2022). Mental health knowledge has been associated with decreases in stigma and increases in service use intentions both in the general public (Hadlaczky et al., 2014; Schnyder et al., 2017; Xu et al., 2018) and in PSP (Krakauer et al., 2020). Future research is needed to determine if such mental health training is related to increased mental health knowledge, decreased stigma, increased service use intentions, and overall improved mental health.

Some differences between sociodemographic characteristics were also observed. As expected, female cadets reported statistically significantly higher mental health knowledge as well as statistically significantly higher service use intentions scores and statistically significantly lower stigma scores compared to male cadets. Greater mental health knowledge among females is consistent with previous PSP research (Krakauer et al., 2020). Also consistent with female PSP, female cadets have previously self-reported higher scores than males on symptom measures for PTSD, MDD, GAD, and SAD and were more likely to screen positive (Angehrn et al., 2022; Carleton et al., in press). As with female PSP, female cadets may be more likely to be aware of their mental health and more able to report their symptoms on a self-report questionnaire due to how females are socialized in respect to mental health over the course of their lifetime (Merritt et al., 2014; Gibbons et al., 2015). Females are often socialized to express emotions and seek support when needed, which may develop their mental health knowledge more so than their male counterparts (Mankus et al., 2016). Increased mental health knowledge may increase the likelihood that a person can and will report difficulties (Krakauer et al., 2020). Additionally, males appear to be more likely to underreport symptoms of mental disorders (Berger et al., 2012) and may experience more stigma around reporting mental health difficulties and seeking support due to hypermasculine attitudes that are embedded in police culture (Berg et al., 2006). Further research is needed to understand how gender

influences the relationship between mental health knowledge and mental health disorder symptom reporting among RCMP officers and cadets.

The differences in mental health knowledge and service use intentions observed between male and female cadets are further supported by male cadets reporting statistically significantly higher stigma. This was expected and is consistent with previous research reporting higher mental health stigma among male police officers (Soomro and Yanos, 2019). Stigma is a well-documented barrier to seeking support for mental health among PSP (Oliphant, 2016; Ricciardelli et al., 2018a,b; Krakauer et al., 2020; Carleton et al., 2020b; Newell et al., 2022). Stigma has been reported to deter officers from seeking help and from discussing distressing issues with other officers, out of fear of being deemed unfit for duty (Ricciardelli et al., 2018a). Police and communicators reported they felt stigma more oriented toward seeking support and less about experiencing mental health struggles (Newell et al., 2022). Both statistically significantly lower service use intentions and higher stigma were observed among male cadets compared to female cadets in the current results, further supporting stigma as a barrier to seeking support among male officers. Higher stigma, lower service use intentions, and lower mental health knowledge observed among male cadets in the current results suggest that male cadets may be less aware or able to recognize mental health difficulties and less likely to seek support when experiencing mental health challenges.

Increasing mental health knowledge and service use intentions and reducing stigma should begin at cadet training (Papazoglou and Andersen, 2014). Mental health training programs during the CTP are needed to inform cadets how to identify early signs associated with mental health challenges, occupational risk factors, barriers to seeking care including stigma, and provide cadets with self-care practices and information on mental health resources available to them (Carleton et al., 2019, 2022). Additionally, understanding how stigma might impact male and female officers can help to inform strategies and training that target these underlying factors. Overall, the current results suggest that cadets starting the CTP evidence levels of stigma lower than serving RCMP and service use intentions higher than serving RCMP and suggest that the differences arise from service experiences rather than individual factors present at recruitment. The current results also highlight the need for mental health training starting at the CTP and continuing throughout the career to increase awareness and normalization of mental health disorders and the benefits of officers having a working knowledge of mental health and mental health disorders while engaging with the public on-duty.

4.1. Strengths and limitations

The RCMP Study overall has several strengths and limitations (for details see Carleton et al., 2022). Strengths of the current study include the first empirical evidence on the mental health knowledge, stigma, and service use intentions of a large sample of RCMP cadets starting the CTP. The current study also highlights the magnitude of current mental health challenges of serving RCMP and a large representative sample of RCMP cadets. Limitations of the current study include: (1) data collection interruptions due to COVID-19, which resulted in data collection including participants from pre- and post-COVID-19 onset; (2) voluntary participation creating an unknowable influence

from self-selection biases; (3) potential for socially desirable responding based on assessments occurring within the context of the CTP; (4) assessment of stigma toward others with mental disorders, but not self-stigma, which may influence an individual's own service use intentions (Corrigan, 2004); and (5) a lower Cronbach's Alpha observed for MAKs for the current sample compared to previously reported alphas for a diverse sample of PSP (Krakauer et al., 2020). The limitations may be offset by the sample size, the analyses, the participants' ability to complete RCMP study tasks as part of paid time, the pre-registration of hypotheses, third party assessors, and participant anonymity. The sample size and the methods used to maintain confidentiality and anonymity of participants, also reduces the likelihood of socially desirable responding from participants.

5. Conclusion

RCMP Cadets starting CTP reported lower mental health knowledge and stigma, and higher mental health services use intentions compared to serving RCMP. The results indicate that higher levels of mental health knowledge were associated with lower stigma and higher intention to use professional mental health services. The findings highlight the importance of mental health training which may be useful for improving mental health knowledge and, in turn, decreasing stigma and increasing mental health service use intentions. Future research is needed to determine if such mental health training is related to increased mental health knowledge, decreased stigma, increased service use intentions, and overall improved mental health.

Differences in mental health knowledge, stigma, and service use intentions were observed between male and female cadets. Stigma may be a barrier to seeking support among male cadets. To better understand the underlying sex differences, further research involving both qualitative and quantitative methods should be conducted to assess how sex may influence mental health in the RCMP. The results provide a baseline to improve cadet mental health knowledge and service use intentions and reduce stigma with further mental health training.

Data availability statement

The datasets presented in this article are not readily available due to the sensitive nature of the content and to protect anonymity of participants. Requests to access the datasets should be directed to katie.andrews@uregina.ca.

Ethics statement

The studies involving human participants were reviewed and approved by University of Regina Institutional Research Ethics Board. The participants provided their written informed consent to participate in this study.

Author contributions

KA, RC, TA, AF, RS, and AB: conceptualization. KA, RC, TA, LJ, and RS: methodology. KA, RC, LJ, AF, TA, and AB: validation. KA, RC, LJ, TT,

and TA: formal analyses. KA, LJ, RC, AB, GK, and SS-Z: investigation. RC, AB, GK, and TA: resources. KA, RC, TT, LJ, RS, and AB: data curation. KA, RC, AF, LJ, TT, TA, and RS: writing—original draft preparation. KA, LJ, RS, TT, TA, AF, SS-Z, AB, GK, and RC: writing—review and editing. RC and GK: supervision. KA, RC, GK, and TA: project administration. NC, AF, GK, and SS-Z: funding acquisition. All authors viewed and approved the submitted version of the manuscript.

Funding

The RCMP Study is supported by the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness. TA is supported by a Tier I Canada Research Chair in Childhood Adversity and Resilience. The development, analyses, and distribution of the current article were supported by a generous grant from the Medavie Foundation.

Acknowledgments

The authors express their special thanks to the following people (alphabetically by last name) who have provided tremendous support for the current study in several different ways since inception: RCMP and Government Leaders—William Sterling Blair, Jasmin Breton, Sylvie Châteauvert, Daniel Dubeau, Ralph Edward Goodale, Louise Lafrance, Brenda Lucki, Sylvie Bourassa Muise, and Stephen White; Academics—Kelly J. Abrams, Billea Ahlgrim, Myles Ferguson, Jennifer Gordon, Chet Hembroff, Bridget Klest, Laurie Sykes-Tottenham, and Kristi Wright; University of Regina executive, administrative, and technical team members—Olabisi Adesina, Seerat Bassi, Chris Beckett, Brad Berezowski, Jonathan Burry, Murray Daku, Krysten Forbes, Jolene Goulden, Sally Gray, Kadie Hozempa, Xiaoqian Huang, Maria Kamil, Anita Kohl, Donna King, Jordan MacNeil, David Malloy, Akiff Maredia, Kathy McNutt, Megan Milani, Sara Moradizadeh, Sajid Naseem, Obimma Onuegbu, Abimbola Ogunkoyode, Steve Palmer, Cynthia Sanders, Mikhail Shchukin, Shubham Sharma, Vianne Timmons, Preeti Tyagi, Abinyah Walker, Keyur Variya, Christopher Yost, and Zhe Zhang; Clinical staff and supervised clinicians—Andreanne Angehrn, Michael Edmunds, Amelie Fournier, Lis Hansen, Stephanie Korol, Caeleigh Landry, Katherine Mazenc, Michelle Paluszek, Vanessa Peynenburg, Lloyd Robertson, Joelle Soucy, Emilie Thomas, and Vivian Tran.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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RECEIVED 15 January 2023

ACCEPTED 24 April 2023

PUBLISHED 16 May 2023

CITATION

Teckchandani T, Krakauer RL, Andrews KL,
Neary JP, Nisbet J, Shields RE, Maguire KQ,
Jamshidi L, Afifi TO, Lix LM, Sauer-Zavala S,
Asmundson GJG, Krätzig GP and
Carleton RN (2023) Prophylactic relationship
between mental health disorder symptoms and
physical activity of Royal Canadian Mounted
Police Cadets during the cadet training
program.

Front. Psychol. 14:1145184.

doi: 10.3389/fpsyg.2023.1145184

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Prophylactic relationship between mental health disorder symptoms and physical activity of Royal Canadian Mounted Police Cadets during the cadet training program

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Objective: Royal Canadian Mounted Police report experiencing extremely frequent potentially psychologically traumatic events (PPTe). In a recent study, approximately half of participating RCMP screened positive for one or more mental disorders, which is approximately five times the diagnostic proportion for the general Canadian population. Increased reporting of mental health symptoms been linked to PPTe exposures. Programs promoting physical activity may be useful interventions to supplement or pair with mental health interventions, providing anxiolytic, antidepressant, and stress-buffering effects. The current study was designed to assess the relationship between physical activity behaviors and reported mental health disorder symptoms of cadets during the Royal Mounted Canadian Police (RCMP) Cadet Training Program (CTP). The current study also examined the relationship between exercise and mental health disorder symptoms of cadets during the CTP.

Methods: The study included data from 394 cadets (76.1% male). An analysis of variance (ANOVA) and a series of *t*-tests were used to assess several differences across sociodemographic groups. Bivariate Spearman's Rank correlations were performed between the average number of active calories burned per day, as recorded by Apple Watches, and changes in self-reported mental health disorder symptoms (i.e., Generalized Anxiety Disorder [GAD], Major Depressive Disorder [MDD], Posttraumatic Stress Disorder [PTSD], Social Anxiety Disorder [SAD], Alcohol Use Disorders [AUD], Panic Disorder [PD]) from pre-training (starting the CTP) to pre-deployment (completing the CTP) 26 weeks later.

Results: There were statistically significant correlations between physical activity and self-reported mental health disorder symptom scores during CTP. Cadets who performed more physical activity from pre-training to pre-deployment had statistically significantly greater decreases in symptoms of GAD ($\rho = -0.472$,

$p < 0.001$), MDD ($\rho = -0.307$, $p < 0.001$), PTSD ($\rho = -0.343$, $p < 0.001$), and AUD ($\rho = -0.085$, $p < 0.05$). There was no statistically significant relationship between physical activity and changes in PD symptoms ($\rho = -0.037$, $p > 0.05$). There were also no statistically significant relationships between pre-CTP mental health disorder symptom scores and the volume of physical activity performed during CTP.

Conclusion: There was evidence of a significant relationship between reductions in mental health disorder symptom scores and physical activity during the 26-week CTP. The results highlight the role that exercise can play as an important tool for reducing mental health disorder symptoms, considering there was no relationship between pre-CTP baseline mental health scores and physical activity performed during CTP. Further research is needed to understand differences in physical activity behaviours among cadets and serving RCMP.

KEYWORDS

posttraumatic stress injuries, exercise, protective factors, Royal Canadian Mounted Police, apple watch

1. Introduction

Public safety personnel (PSP), such as firefighters, paramedics, municipal police, and the Royal Canadian Mounted Police (RCMP), work to ensure the safety of the public in Canada (Canadian Institute for Public Safety Research and Treatment (CIPSRT), 2019). PSP frequently experience potentially psychologically traumatic events (PSTE) as a result of their professional responsibilities (Carleton et al., 2019). PSTEs involve either direct or indirect exposure to serious injury, sexual assault, or actual or imminent death (Canadian Institute for Public Safety Research and Treatment (CIPSRT), 2019). Higher prevalence of mental health disorder symptoms, such as posttraumatic stress disorder (PTSD) and generalized anxiety disorder (GAD), has frequently been reported to be associated to PSTE exposures in PSP (Carleton et al., 2019). RCMP Officers have previously reported high prevalence of exposures to PSTEs (Carleton et al., 2019), with 23% screening positive for GAD, a rate three times that of the general Canadian population (8.7%) (Pelletier et al., 2017).

Longitudinal (Carleton et al., 2018) and cross-sectional (Leppin et al., 2014; Robertson et al., 2015; Carleton et al., 2020) research results suggest current programs to support PSP mental health typically concentrate on raising awareness, reducing stigma, and encouraging help-seeking behaviors (Papazoglou and Andersen, 2014); however, the programs seem to produce effects that are small to moderate, time limited, often not statistically significant, and variable based on the many individual characteristics and program delivery fidelity (Carleton et al., 2018; Fikretoglu et al., 2019; Szeto et al., 2019). There is also limited data supporting the usefulness of the several interventions suggested to promote PSP mental health, in part because control conditions have been absent from evaluations of effectiveness (Zylberberg et al., 2011; Anderson et al., 2020; Di Nota et al., 2021). The interventions are also often focused on increasing individual PSP knowledge or promoting individual help-seeking, rather than providing specific and tailored skills (Anderson et al., 2020). Most of the current intervention programs also do not outline or measure changes in the individual differences being

targeted (e.g., symptoms; biopsychosocial risk and resiliency factors), the methods being used to change those individual differences, or the mechanisms of action underlying the intervention (Anderson et al., 2020; Wild et al., 2020).

Physical activity has been reported to moderately decrease symptoms of mood-, anxiety- (Grasdalsmoen et al., 2020), and trauma-related (Rosenbaum et al., 2015; Whitworth and Ciccolo, 2016; Whitworth et al., 2019) disorders, and minimize symptoms of stress, panic, and negative affect (Asmundson and Katz, 2009; Fetzner and Asmundson, 2014; Powers et al., 2015; Abdollahi et al., 2017; Mason et al., 2019). Physical activity has anxiolytic effects due to repeated exposure to anxiety-related somatic sensations (Stubbs et al., 2017a,b). Increased physical activity can also decrease symptoms of hyper-arousal related to PTSD (Vancampfort et al., 2016a,b). Based on the current evidence, programs promoting physical activity may be a useful, accessible, and acceptable intervention or adjuvant for mental health training, providing PSP with anxiolytic, antidepressant, and stress-buffering effects.

Despite the substantial body of literature available, there is limited research evaluating the role of physical activity on symptoms of mental health disorders among police and other PSP. There is very limited evidence regarding physical activity and mental health of police recruits starting their careers. Assessing the role of physical activity may be particularly critical for police officers who engage in high levels of unstructured movement as part of their occupational duties. Results from examining physical activity among police have been mixed, with some studies reporting associations between higher physical activity and lower psychological stress (Craun et al., 2014; Ramey et al., 2014), and other studies finding no associations (Meckes et al., 2021).

The current study examined the relationship between levels of physical activity and changes in self-report mental health disorder symptoms from the start of the RCMP Cadet Training Program (CTP) to graduation from the program 26 weeks later. Based on previous research, physical activity was expected to be inversely associated with changes in mental health disorder symptoms of mood-, anxiety-, and trauma-related disorders.

2. Materials and methods

2.1. Procedure

The RCMP Study (Carleton et al., 2022) provides an opportunity to address several gaps regarding physical activity and mental health among a sample of cadets completing the CTP. The RCMP Study (Carleton et al., 2022) is a multi-modal mental health solution that incorporates evidence-based biopsychosocial evaluations and evidence-based integrated cadet mental health training. Participating cadets completed self-report and biometric assessments. The biometric assessments provided a relative assessment of health based on data collected from Apple Watches provided to participants. The collected data allow for assessing associations between individual differences in psychological and physiological variables, such as physical activity and mental health disorder symptoms. Full details on the RCMP Study can be found in the associated protocol paper (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Institutional Research Ethics Board (file No. 2019–055) and the RCMP Research Ethics Board (file No. SKM_C30818021312580). The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval National Administration Records Management System (NARMS) (file No. 201611123286) and Public Services and Procurement Canada (PSPC) (file No. 201701491/M7594174191).

2.2. Data and sample

Participants were RCMP cadets ($n=394$; 76.1% male) who completed the 26-week CTP. The current paper focuses on cadets who completed the CTP and provided Apple Watch data as part of the larger RCMP Study. To qualify for the CTP, cadets must be between the ages of 19 and 57 years, Canadian citizens or permanent residents, and fluent in either English or French (Royal Canadian Mounted Police, 2022). In addition, cadets must pass screening procedures, such as security checks, physical exams, polygraph tests, and minimum physical requirements. There were no restrictions requiring those who were otherwise eligible for the CTP to be excluded.

2.3. Self-report measures

Mental health disorder symptoms were assessed using web-delivery of the Full Assessment at pre-training and pre-deployment (see protocol paper for design details; (Carleton et al., 2022), which included the PTSD Check List 5 [PCL-5 (Weathers et al., 2013)]; the 9-item Patient Health Questionnaire [PHQ-9 (Kroenke et al., 2001)]; the Panic Disorders Symptoms Severity Scale, Self-Report [PDSS-SR (Shear et al., 1997)]; the 7-item Generalized Anxiety Disorder scale [GAD-7 (Spitzer et al., 2006)]; and the Alcohol Use Disorders Identification Test [AUDIT (Saunders et al., 1993)]. Participant reported symptoms per instructions for each scale: PHQ-9 symptoms were reported for the previous 14 days, PDSS-SR symptoms for the previous 7 days, GAD-7 symptoms for the previous 14 days, and AUDIT symptoms for the last year. Pre-CTP baseline mental health symptom scores were calculated along with

within participant change scores for each of the PCL-5, PHQ-9, PDSS-SR, GAD-7, and AUDIT by subtracting the pre-deployment (i.e., Time 2) scores from the pre-training (i.e., Time 1) scores. Pre-training and post-training mental health symptom scores for this sample can be found in the associated mental health monitoring paper (Shields et al., 2023).

2.4. Sociodemographic variables

Sociodemographic characteristics, including sex (i.e., male and female), age (i.e., 19 to 29 years, 30 to 39 years, 40 to 49 years, and 50 to 59 years), marital status (i.e., single, separated/divorced, and married/common-law), province of residence [i.e., Western Canada (British Columbia, Alberta, Saskatchewan, Manitoba), Eastern Canada (Ontario, Quebec), Atlantic Canada (Newfoundland & Labrador, Prince Edward Island, Nova Scotia, New Brunswick), or Northern Territories (Yukon, Northwest Territories, Nunavut)], and education (i.e., high school graduate or less, some post-secondary school, and university degree/4-year college or higher) were used for detailed descriptions of groupwise comparisons and covariates (Carleton et al., 2022).

2.5. Physical activity measures

Cadets were equipped with Apple Watch devices (series 4 and series 5) to observe biophysiological measures (i.e., heart rate, heart rate variability, step count, sleep patterns) and physical activity measured by active calories burned, supported by a dedicated Apple iPhone. Cadets used the iPhones with wi-fi at no cost, and could use the iPhones as personal phones, but were not provided voice or data plans. Apple Watch recordings were downloaded via an encrypted process to the secured University of Regina server for off-line processing and analyses.

The explicit choice to use active calories burned as a single marker of physical activity is based on the existing literature highlighting the reliability of active calories burned when observed within participants in a longitudinal framework (Dooley et al., 2017; Shcherbina et al., 2017; Bai et al., 2018, 2021; Murakami et al., 2019; Düking et al., 2020). The Apple Watch's proprietary algorithm produced caloric expenditure estimates in both clinical and free-living environments that appeared superior to those of six other commercial devices (Shcherbina et al., 2017). The Apple Watch achieved the lowest overall error in both estimates of heart rate and caloric expenditure at rest, low intensity, and moderate to vigorous physical activity, but all wearable devices appear inferior to gold standard methods, such as the metabolic chamber and doubly labeled water methods (Dooley et al., 2017; Shcherbina et al., 2017; Bai et al., 2018, 2021; Murakami et al., 2019; Düking et al., 2020). Despite the degree of error from gold standard methods of analyzing caloric expenditure, said error is stable within participants and thus provides the basis for a trend analysis. Accelerometer based metrics such as step count or estimated flights climbed have often been reported with greater within and between participant error than active calories burned (Dooley et al., 2017; Bai et al., 2018, 2021; Düking et al., 2020).

2.6. Statistical analyses

Sociodemographic characteristics for study participants, such as sex, age, marital status, province of residence, and education, were included for descriptive statistics during pre-training and comparisons between sociodemographic groups. An analysis of variance (ANOVA) and a series of *t*-tests were used to check for differences across sociodemographic groups. Holm-Bonferroni adjustments were made to alpha values to take into consideration the familywise error rate in multiple comparisons from *post hoc* testing. Cohen's *d* values are presented as standardized effect sizes for *t*-tests to display the standardized differences between two means, interpreting effect sizes as small ($d=0.20$), medium ($d=0.50$), and large ($d=0.80$) (Cohen, 2013). After taking into account the variance explained by other factors in the model, partial eta squared (η_p^2) is presented for interpreting ANOVA test effect sizes as small ($\eta_p^2=0.01$), medium ($\eta_p^2=0.06$), and large ($\eta_p^2=0.14$) (Cohen, 2013). Spearman's Rank correlations were performed between pre-CTP baseline scores as well as change scores for the GAD-7, PHQ-9, AUDIT, PDSS-SR, and PCL-5, and the Apple Health variable of Active Calories Burned during CTP. Spearman's rank correlation was chosen due to the non-normally distributed data and the observably monotonic relationship between the variables.

3. Results

Results of ANOVA groupwise comparisons and details of self-reported participant sociodemographics and self-reported symptom change scores are provided in Table 1. Participants were mostly male (76.1%), between the age of 19 to 29 years (59.8%), and single (47.7%) or married/common-law (50.5%). Participants were mainly from Western Canada (77.9%; i.e., British Columbia, Alberta, Saskatchewan, Manitoba) and reported having either some post-secondary school (48.5%) or a university degree, 4-year College or higher level of education (44.6%).

Analyses indicated statistically significant inverse relationships between self-reported mental health disorder symptom scores and the average number of active calories burned per day during CTP (Table 2). Cadets who burned more active calories per day on average during CTP had greater decreases in their GAD-7 score from pre-CTP to pre-deployment at the end of CTP ($\rho=-0.472$, $p<0.001$), greater decreases in their PHQ-9 scores ($\rho=-0.307$, $p<0.001$), greater decreases in their PCL-5 scores ($\rho=-0.343$, $p<0.001$), and greater decreases in their AUDIT scores ($\rho=-0.085$, $p<0.05$). There was no statistically significant relationship between PDSS-SR symptom scores and physical activity ($\rho=-0.037$, $p>0.05$). There was no statistically significant relationship between pre-CTP baseline scores and the number of active calories burned per day (Table 2).

4. Discussion

The current study examined associations between levels of physical activity and self-reported mental health disorder symptoms of RCMP cadets completing the CTP. The current study provides novel results regarding physical activity and mental health among cadets, which may be relevant for other PSP,

especially when considering there was no relationship between physical activity performed during CTP and baseline mental health symptom scores. Demonstrably associating physical activity and mental health for cadets may support retention during the CTP and subsequent individual RCMP career resilience with physical activity as a readily accessible intervention. The current results evidence programs promoting physical activity as potentially useful, accessible, and acceptable interventions or adjuvants for cadets, RCMP officers, and other PSP to supplement other beneficial mental health activities with anxiolytic, antidepressant, and stress-buffering effects.

Consistent with extant literature, the current study highlighted the inverse relationship between self-reported mental health symptom change scores and the average quantity of active calories burned per day as measured by Apple Watches during CTP. There was a statistically significant inverse relationship between active calories burned per day and generalized anxiety disorder symptom scores ($p<0.001$). There was no relationship between pre-CTP baseline mental health scores and the subsequent physical activity performed; accordingly, the results highlight the anxiolytic component of physical activity irrespective of activity type or clinical screening category (Wipfli et al., 2008, 2011; Wegner et al., 2014).

The second strongest relationship was between self-reported posttraumatic stress disorder symptom change scores and the average number of active calories burned per day ($p<0.001$), highlighting the anxiolytic and potential distraction mechanisms that underpin proposed mechanisms in the extant literature (Fetzner and Asmundson, 2014; Powers et al., 2015). The third strongest relationship was between self-reported major depressive disorder symptom change scores and the average number of active calories burned ($p<0.001$), highlighting the potential SSRI-like relationship with exercise described in the extant literature (Larun et al., 2006; Wipfli et al., 2011; Wegner et al., 2014). There was also a statistically significant relationship between self-reported alcohol use disorder change scores and the average number of active calories burned per day ($p<0.05$), highlighting another the potentially therapeutic effect of exercise (Paffenbarger et al., 1994; Paluska and Schwenk, 2000; Wipfli et al., 2008; Mason et al., 2019).

4.1. Strengths and limitations

The current paper strengths include: (1) a longitudinal design in the CTP environment which promotes consistency and transparency in participation, facilitating reliable serial data collection; (2) a relatively large sample size; (3) multimodal data collection including self-report and physiological monitoring; and (4) the exceptional non-invasive ambulatory monitoring capability of Apple Watches. The current paper also has several limitations including: (1) voluntary participation creating an unknowable influence from self-selection biases; (2) symptom measurement tools that use different durations for symptom reporting periods; (3) uncommonly detailed assessments and large datasets that may increase Type I error risks from spurious correlations; (4) potential for socially desirable responding; and (5) the particularly good mental health of cadets starting the CTP (Carleton et al., 2023) may mean the current results under-represent the potential benefits of exercise for mental health.

TABLE 1 Sociodemographic characteristics and comparison of mental health symptom screening change scores among different categories.

	%(n) ¹	AUDIT Mean (SD)	PCL5 Mean (SD)	PDSS Mean (SD)	GAD7 Mean (SD)	PHQ9 Mean (SD)
Sex						
Male	76.1 (300)	−2.21 (2.54)	−4.23 (8.27)	−0.18 (1.10)	−3.22 (4.00)	−2.41 (3.31)
Female	23.9 (94)	−2.34 (2.69)	−6.03 (12.32)	−0.76 (2.28)	−3.51 (4.82)	−2.26 (4.43)
Effect size (Cohen's <i>d</i>)		0.001	0.006	0.017**	0.001	0.000
Age						
19–29	56.3 (222)	−2.40 (2.71)	−4.46 (9.31)	−0.31 (1.45)	−3.17 (4.24)	−2.34 (3.87)
30–39	35.0(138)	−1.89 (2.34)	−5.19 (9.99)	−0.42 (1.74)	−3.64 (4.32)	−2.57 (3.41)
40–49	7.9(31)	−2.54 (2.26)	−4.62 (8.71)	^	−3.00 (3.57)	−1.67 (1.76)
50–59	^	−2.50 (3.53)	^	^	−1.00 (1.41)	−1.50 (0.71)
Effect size (η_p^2)		0.008	0.002	0.003	0.004	0.003
Marital status						
Single	47.7 (188)	−2.46 (2.85)	−5.53 (10.24)	−0.40 (1.56)	−3.44 (4.01)	−2.57 (3.96)
Separated/divorced	1.8 (7)	−3.00 (3.58)	−7.37 (9.30)	^	−6.37 (4.8)	−2.87 (2.17)
Married/common-law	50.5 (199)	−2.01 (2.21)	−3.73 (8.59)	−0.26(1.48)	−3.02 (4.34)	−2.14 (3.29)
Widowed	^	^	^	^	^	^
Effect Size (η_p^2)		0.009	0.013	0.004	0.015	0.006
Province of residence						
Western Canada (BC, AB, SK, MB)	77.9 (307)	−2.24 (2.46)	−5.47 (10.24)	−0.42 (1.72)	−3.67 (4.53)	−2.69 (3.64)
Eastern Canada (ON, QC)	16.5 (65)	−2.18 (2.71)	−3.34 (8.57)	−0.21 (1.05)	−2.78 (3.95)	−1.89 (3.83)
Atlantic Canada (PEI, NS, NB, NFL)	5.1 (20)	−2.50 (2.88)	−5.00 (7.62)	−0.26 (1.75)	−3.39 (3.44)	−2.52 (2.67)
Northern Territories (YK, NWT, NVT)	^	−2.00 (1.23)	−6.20 (11.15)	^	−2.69 (1.51)	−1.00 (0.70)
Effect size (η_p^2)		0.003	0.009	0.001	0.012	0.009
Education						
High school graduate or less	6.9 (27)	−2.20 (2.25)	−4.62 (8.81)	−0.64 (2.11)	−3.62 (4.31)	−2.68 (2.91)
Some post-secondary school	48.5 (191)	−2.45 (2.88)	−5.20 (9.32)	−0.11 (1.08)	−3.74 (4.38)	−2.61 (3.70)
University degree/4- year college or higher	44.6 (176)	−2.04 (2.32)	−3.73 (9.39)	−0.42 (1.59)	−2.65 (3.94)	−1.97 (3.72)
Effect size (η_p^2)		0.004	0.010	0.010	0.014	0.008
Total sample						

Alcohol Use Disorder Identification Test = AUDIT; Posttraumatic Stress Disorder Checklist = PCL5; Panic Disorder Symptom Scale = PDSS; Generalized Anxiety Disorder 7 = GAD7; Patient Health Questionnaire = PHQ9.

¹Total percentages may not sum to 100 and ns may not sum to 394 due to non-response or responding “other.”

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

M (SD) represents Mean (Standard Deviation).

η_p^2 represents partial Eta Square.

Lettered superscripts within each column category indicate significant differences between category groups on respective screening measure at $p \leq 0.05$. Means followed by a common letter are not significantly different.

^Sample size between 1 and 5, so data are not presented to protect participant anonymity.

TABLE 2 Correlation coefficient comparison of mental health symptom screening change scores and active calories burned.

	%(n) ¹	AUDIT	PCL5	PDSS	GAD7	PHQ9
		(ρ)	(ρ)	(ρ)	(ρ)	(ρ)
Total sample						
Pre-CTP score	100 (394)	0.069	−0.053	−0.118	−0.098	−0.048
Change score	100(394)	−0.085*	−0.343***	−0.037	−0.472***	−0.307***

Alcohol Use Disorder Identification Test = AUDIT; Posttraumatic Stress Disorder Checklist = PCL5; Panic Disorder Symptom Scale = PDSS; Generalized Anxiety Disorder 7 = GAD7; Patient Health Questionnaire = PHQ9.

¹Total percentages may not sum to 100 and ns may not sum to 394 due to non-response or responding “other.”

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

M (SD) represents Mean (Standard Deviation).

(ρ) represents Spearman's Rho.

Lettered superscripts within each column category indicate significant differences between category groups on respective screening measure at $p \leq 0.05$. Means followed by a common letter are not significantly different.

4.2. Future directions

Future research should assess dose–response minimums and diminishing returns for exercise among cadets and serving RCMP. There may be important interactions between exercise and PPTE exposures among serving RCMP that can inform the potential utility of exercise as an early intervention or mitigation strategy for PTSI. Researchers could also examine interactions between exercise and numerous other variables (e.g., sleep, mental health training, mental health treatment, other biometric variables) to help nuance the application of exercise. There may also be important differences between or interactions with exercise activity types (e.g., resistance training, cardio) and mental health that necessitate additional time-series and fine-grained assessment of physical activity data made possible by ongoing data collection as part of the larger RCMP study. Survival analyses based on mental health screening variables may help to examine attrition from CTP and from the RCMP to assess the impact of exercise on vocational retention and provide guidelines for early interventions to support member health.

5. Conclusion

The RCMP has made the implementation of evidence-based solutions a priority to reduce the mental health challenges experienced by members (Public Safety Canada, 2019). Very little evidence exists to support the effectiveness of various interventions proposed to improve PSP mental health (Zylberberg et al., 2011; Anderson et al., 2020; Di Nota et al., 2021). The current study is the first longitudinal investigation of the relationship between physical activity and mental health symptoms for RCMP cadets in training. The results indicate that cadets who recorded more physical activity during CTP also self-reported greater reductions in mental health symptoms from pre-training to pre-deployment. The evidence highlights the need to research whether continued engagement in physical activity mitigates impacts from occupational stressors, including but not limited to PPTE, during RCMP careers. Additional groupwise and longitudinal analyses may provide unique insights about the relationships between mental health symptoms and physical activity, which may further evidence exercise as a tool for

maintaining and improving mental health during the CTP and thereafter during service. Further data collection is required to understand the differences in physical activity behaviors among cadets and serving RCMP. In the interim, exercise appears to be an accessible, acceptable, and effective tool for supporting cadet mental health.

Data availability statement

The datasets presented in this article are not readily available because data access will not be provided due to the sensitive nature of the content. Requests to access the datasets should be directed to nick.carleton@uregina.ca.

Ethics statement

The RCMP Study was approved by the University of Regina Institutional Research Ethics Board (file No. 2019–055) and the RCMP Research Ethics Board (file No. SKM_C30818021312580). The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval National Administration Records Management System (NARMS) (file No. 201611123286) and Public Services and Procurement Canada (PSPC) (file No. 201701491/M7594174191). The patients/participants provided their written informed consent to participate in this study.

Author contributions

RNC, TT, JPN, RK, and KA: conceptualization. RNC, TT, RK, JPN, GA, GK, and LL: methodology. RNC, TT, RK, GK, JPN, and KA: validation. RNC, TT, RK, and JPN: formal analysis. RNC, GK, JPN, and SS-Z: investigation. RNC, GK, and SS-Z: resources. RNC, TT, GK, JPN, RK, LJ, and KM: data curation. TT, RK, RNC, KA, and JN: writing – original draft preparation. TT, RK, KA, JPN, JN, RS, KM, LJ, TA, LL, SS-Z, GA, GK, and RNC: writing – review and editing. All authors viewed and approved the submitted version of the manuscript and made substantial contributions consistent with the International Committee of Medical Journal Editors.

Funding

The RCMP Study is funded by support from the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness. LL is supported by a Tier I Canada Research Chair in Methods for Electronic Health Data Quality. TA is supported by a Tier I Canada Research Chair in Childhood Adversity and Resilience. The development, analyses, and distribution of the current article was made possible by a generous and much-appreciated grant from the Medavie Foundation.

Acknowledgments

The RCMP Study is made possible by a large and diverse team, with detailed acknowledgements available online (www.rcmpstudy.ca).

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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OPEN ACCESS

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SPECIALTY SECTION

This article was submitted to
Psychology for Clinical Settings,
a section of the journal
Frontiers in Psychology

RECEIVED 15 January 2023

ACCEPTED 24 February 2023

PUBLISHED 04 August 2023

CITATION

Shields RE, Teckchandani TA, Asmundson GJG,
Nisbet J, Krakauer RL, Andrews KL, Maguire KQ,
Jamshidi L, Afifi TO, Lix LM, Brunet A,
Sauer-Zavala S, Krätzig GP, Neary JP,
Sareen J and Carleton RN (2023) Daily survey
participation and positive changes in mental
health symptom scores among Royal Canadian
Mounted Police Cadets.
Front. Psychol. 14:1145194.
doi: 10.3389/fpsyg.2023.1145194

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Nisbet, Krakauer, Andrews, Maguire, Jamshidi,
Afifi, Lix, Brunet, Sauer-Zavala, Krätzig, Neary,
Sareen and Carleton. This is an open-access
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Daily survey participation and positive changes in mental health symptom scores among Royal Canadian Mounted Police Cadets

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Jitender Sareen⁸ and R. Nicholas Carleton^{1,2}¹Canadian Institute for Public Safety Research and Treatment (CIPSRT), University of Regina, Regina, SK, Canada, ²Anxiety and Illness Behaviours Lab, Department of Psychology, University of Regina, Regina, SK, Canada, ³Department of Community Health Sciences, University of Manitoba, Winnipeg, MB, Canada, ⁴McGill's Psychiatry Department and Douglas Institute Research Center, Montréal, QC, Canada, ⁵Department of Psychology, University of Kentucky, Lexington, KY, United States, ⁶Department of Psychology, University of Regina, Regina, SK, Canada, ⁷Faculty of Kinesiology and Health Studies, University of Regina, Regina, SK, Canada, ⁸Department of Psychiatry, Department of Community Health Sciences, University of Manitoba, Winnipeg, MB, Canada**Introduction:** Royal Canadian Mounted Police (RCMP) officers self-report high levels of mental health disorder symptoms, such as alcohol use disorder, generalized anxiety disorder, major depressive disorder, panic disorder, and posttraumatic stress disorder. Participation in regular mental health monitoring has been associated with improved mental health disorder symptom reporting and may provide an accessible tool to support RCMP mental health. The current study assessed relationships between self-reported mental health disorder symptoms and the completion of daily surveys (i.e., daily mental health disorder symptom monitoring) by RCMP cadets during the Cadet Training Program (CTP).**Methods:** Participants were RCMP cadets ($n=394$; 76.1% men) in the Standard Training Program who completed the 26-week CTP and daily self-monitoring surveys, as well as full mental health assessments at pre-training (i.e., starting the CTP) and pre-deployment (i.e., ~2 weeks prior to deployment to the field). Symptoms of alcohol use disorder, generalized anxiety disorder, major depressive disorder, panic disorder, and posttraumatic stress disorder were assessed. Changes in mental health disorder symptom reporting from pre-training to pre-deployment were calculated. Spearman's rank correlations were estimated for number of daily surveys completed and change in mental health disorder symptom scores between pre-training and pre-deployment.**Results:** There were statistically significant inverse relationships between number of daily surveys completed and number of mental health disorder symptoms reported; specifically, cadets who completed more daily surveys during CTP reported fewer symptoms of alcohol use disorder, generalized anxiety disorder, major depressive disorder, panic disorder, and posttraumatic stress disorder.**Conclusion:** An inverse correlation between number of daily surveys completed and mental health disorder symptom scores indicated that participation in daily mental health monitoring was associated with improvements in self-reported

mental health disorder symptoms between pre-training and pre-deployment. Regular self-monitoring of mental health disorder symptoms may help to mitigate mental health challenges among RCMP cadets and officers.

KEYWORDS

mental health monitoring, self-report, mental health disorder symptoms, Royal Canadian Mounted Police, cadets

1. Introduction

Public safety personnel [PSP; e.g., correctional workers, firefighters, police officers, paramedics, Royal Canadian Mounted Police (RCMP)] work to protect the safety and security of Canadians (Canadian Institute for Public Safety Research and Treatment, 2020). As a result of their occupational duties, PSP are regularly exposed to potentially psychologically traumatic events (PPTE). PPTE include, but are not limited to, actual or threatened death, serious injury, sexual violence, and military combat (APA, 2022). Frequent exposures to PPTE are associated with an increased risk for symptoms of mental health disorders, collectively referred to in Canada as posttraumatic stress injuries (PTSI; Canadian Institute for Public Safety Research and Treatment, 2020). PTSIs, such as alcohol use disorder (AUD), generalized anxiety disorder (GAD), major depressive disorder (MDD), panic disorder (PD), and posttraumatic stress disorder (PTSD) are more prevalent in PSP than the general population (Carleton et al., 2018), with 44.5% of PSP in Canada screening positively for one or more PTSD. RCMP officers screen positively (50.2%) more frequently than the average for PSP occupational groups (Carleton et al., 2018).

The high prevalence of positive screens for PTSD among active duty RCMP members is likely due, in part, to frequent and diverse PPTE exposures. More than 95% of RCMP officers report at least one PPTE exposure, though, on average, they endorse exposure to more than 11 different types of PPTE (Carleton et al., 2019). Indeed, more than half of RCMP officers report exposure to sudden accidental death (59.7%), sudden violent death (56.5%), physical assault (54.9%), and serious transportation accident (73.5%; Carleton et al., 2019). Accordingly, many active duty RCMP members report symptoms of mental health disorders, such as AUD (3.9%), GAD (23.3%), MDD (31.7%), PD (12%), and PTSD (30%; Carleton et al., 2018). RCMP cadets also self-report mental health disorder symptoms (Carleton et al., in press) and PPTE exposure histories (Andrews et al., 2023), but less frequently than serving RCMP, likely due to less occupational experience. Given the occupational reality of frequent PPTE exposures for RCMP, identifying accessible tools to mitigate PTSD is imperative for protecting their mental health.

Self-monitoring of mental health disorder symptoms has been associated with decreasing such symptoms (Kauer et al., 2012). Health-focused self-monitoring in areas such as weight loss (Burke et al., 2011), alcohol use (Kavanagh et al., 1999), and sleep hygiene (Todd and Mullan, 2014) improves self-reflection and encourages healthy habits. Self-monitoring of mood is a common technique used as a part of different therapy modalities, including cognitive behavioral therapy (CBT; Cohen et al., 2013), dialectical behavioral therapy (DBT; Feldman et al., 2009), and acceptance and

commitment therapy (ACT; Hayes et al., 2012). Clients who keep track of their thoughts, feelings, and behaviors are more likely to actively notice and acknowledge their emotions, thereby practicing emotional self-awareness (Cohen et al., 2013). Increased emotional awareness and knowledge about one's symptoms can facilitate restructuring of maladaptive anxiety responses, challenging of depression perpetuating behaviors (Jarrett and Nelson, 1987), and treating PTSD (Tarrier et al., 1999; Ehlers et al., 2003). Accordingly, daily mental health disorder symptom monitoring can take as little as 60 s and can be a quick and easy way for RCMP cadets and officers to monitor their mental health and encourage proactive help-seeking if needed.

As a part of the larger RCMP Study (Carleton et al., 2022), participants were invited to complete brief daily self-assessments to monitor their physical and mental health, and reflect on the associated changes over time. Participants were encouraged to consider and record their mood, physical wellness, emotional state, sleep hours, sleep quality, physical activity, and substance use (i.e., alcohol, tobacco, illicit substances). The current study was designed to examine the relationship between the frequency of daily mental health monitoring and changes in mental health disorder symptom reporting of participating cadets between pre-training [i.e., the start of the Cadet Training Program (CTP)] and pre-deployment (i.e., ~24 weeks later, which is ~2 weeks prior to deployment to the field). Based on the extant literature (e.g., Ehlers et al., 2003; Kauer et al., 2012; Murnane et al., 2016; Eisenstadt et al., 2021; Gatto et al., 2022), cadets who completed more daily surveys were expected to report fewer mental health disorder symptoms.

2. Materials and methods

2.1. Procedure

The current study is a part of the longitudinal RCMP Study, with full procedural details available in a published protocol paper (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Institutional Research Ethics Board (file No. 2019-055) and the RCMP Research Ethics Board (file No. SKM_C30818021312580). The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval including the National Administrative Records Management System (NARMS) file No. 201611123286 and Public Services and Procurement Canada (PSPC) file No. 201701491/M7594174191. Mental health disorder symptom measures and daily survey data were collected via online surveys. Individual participants were provided with automated feedback through a secured web portal.

2.2. Sample and data

Participants for the current study were a sub-sample of RCMP Study cadet participants ($n=394$) who completed the 26-week CTP as part of the Standard Training Program and completed at least one daily survey during the CTP, as well as Full Surveys at pre-training (i.e., starting the CTP) and pre-deployment (i.e., ~2 weeks prior to deployment to the field). Cadets were Canadian citizens or permanent residents, 19 to 57 years old, who can fluently read, write, and speak either English or French (Hembroff and Krätzig, 2020). Cadets must meet several recruiting requirements, including security clearances, medical examinations, a polygraph test, and minimum physical standards. There were no other conditions requiring exclusion of cadets otherwise qualified for the CTP and participating in the RCMP Study as part of the Standard Training Program (Carleton et al., 2022).

2.3. Self-report measures

2.3.1. Daily Surveys

The Daily Surveys were created for the RCMP Study (Carleton et al., 2022). Daily Surveys are brief self-report questionnaires that ask cadets to report on the previous 24-h period, recording scores in the domains of mood, attitude, performance, physical wellness, emotional state, hours worked, hours slept, quality of sleep, eating patterns, social activity, physical activity, and substance use. Details on response options for each area queried can be found in the published protocol paper (Carleton et al., 2022). The current work assesses associations with self-monitoring as a function of completing the Daily Surveys (i.e., participation), rather than associations with the specific content of the Daily Survey responses. The Daily Surveys are a new measure; specific psychometric details and analyses will be available as soon as possible in a dedicated psychometric paper. In the interim, further details can be found in the associated protocol paper (Carleton et al., 2022). Daily Surveys take approximately 1 min to complete via smart phone.

2.3.2. Alcohol Use Disorder Identification Test

The Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993) is a 10-item self-report questionnaire assessing alcohol intake, alcohol dependence, and adverse consequences of alcohol use over the past 12 months. Respondents rate items such as “How many drinks containing alcohol do you have on a typical day?” on a 5-point Likert-like scale (i.e., 0 = *never* to 4 = *daily or almost daily*). Psychometric evaluation of the AUDIT has demonstrated good internal consistency ($\alpha=0.85$) in the general population (Daepfen et al., 2000; Reinert and Allen, 2007) and in police populations ($\alpha=0.81$; Davey et al., 2000).

2.3.3. Generalized Anxiety Disorder Scale-7

The Generalized Anxiety Disorder Scale-7 (GAD-7; Spitzer et al., 2006) is a 7-item self-report measure assessing symptoms of anxiety and worry. Participants are asked to rate their experiences of symptoms over the last 2 weeks (e.g., “Not being able to stop or control worrying”) on a Likert-like scale (i.e., 0 = *not at all* to 3 = *nearly every day*). The GAD-7 has demonstrated good internal consistency ($\alpha=0.89$) in a community sample (Löwe et al., 2008) and in a police sample ($\alpha=0.93$; Korol et al., 2021).

2.3.4. Panic Disorder Severity Scale-Self-Report

The Panic Disorder Severity Scale-Self-Report (PDSS-SR; Shear et al., 1997) is a 7-item self-report measure designed to assess symptoms of panic disorder. Respondents rate items (e.g., “How many panic and limited symptom attacks did you have during the past 7 days?”) on a 5-point Likert scale (i.e., 0 = *none* to 4 = *extreme*). The self-report version of the PDSS-SR has displayed excellent internal validity in a clinical population ($\alpha=0.92$; Houck et al., 2002) and with a police population ($\alpha=0.93$; Korol et al., 2021).

2.3.5. Patient Health Questionnaire-9

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) is a 9-item self-report questionnaire that assesses symptoms of MDD. Items (e.g., “Little interest or pleasure in doing things”) are rated on a 4-point Likert scale (i.e., 0 = *not at all* to 3 = *nearly every day*). Psychometric evaluation found the PHQ-9 to be a valid measure of depression symptoms and severity, with good internal consistency ($\alpha=0.89$) in the general population (Kroenke et al., 2001) and police populations ($\alpha=0.91$; Korol et al., 2021).

2.3.6. PTSD Checklist for DSM-5

The PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015) is a 20-item self-report measure used to assess symptoms of PTSD. Participants use a Likert scale (i.e., 0 = *not at all* to 4 = *extremely*) to rate how bothered they had been by PTSD symptoms (e.g., “Repeated, disturbing dreams of the stressful experience”) over the past month. Psychometric evaluation has found the PCL-5 to be a reliable and valid measure of PTSD, with strong internal consistency ($\alpha=0.94$) in PPTE-exposed populations (Blevins et al., 2015).

2.4. Sociodemographic variables

Sociodemographic characteristics, including sex (i.e., male and female), gender (i.e., man, woman), age (i.e., 19 to 29 years, 30 to 39 years, 40 to 49 years, and 50 to 59 years), marital status (i.e., single, separated/divorced, and married/common-law), province of residence [i.e., Western Canada (British Columbia, Alberta, Saskatchewan, Manitoba), Eastern Canada (Ontario, Quebec), Atlantic Canada (Newfoundland & Labrador, Prince Edward Island, Nova Scotia, New Brunswick) or Northern Territories (Yukon, Northwest Territories, Nunavut)], and highest level of education completed (i.e., high school graduate or less, some post-secondary school, and university degree/4-year college or higher), were used to characterize the current study sample.

2.5. Statistical analyses

Participant sociodemographic variables were described using frequencies and percentages. Mean, standard deviation, skew, and kurtosis for the number of daily surveys completed for the total sample were calculated. A series of *t*-tests and analysis of variance (ANOVA) tests were used to assess differences in symptoms reported and daily survey completion across sociodemographic groups. Cohen's *d* statistics, standardized effect sizes, were calculated for two-group differences and η_p^2 statistics, standardized effect sizes, were calculated for multi-group

differences (Cohen, 1988). Cohen (1988) guidelines for small ($d=0.2$), medium ($d=0.5$), and large ($d=0.8$) effect sizes were used. Holm-Bonferroni adjustments were applied to control for familywise error rate in multiple comparisons from *post hoc* testing. Changes in mental health disorder symptom scores (i.e., AUDIT, GAD-7, PHQ-9, PDSS-SR, and PCL-5) between the start of CTP and pre-deployment were calculated by subtracting pre-training scores from pre-deployment scores. The distribution of the data was better suited to a Spearman's Rank correlation due to the monotonic relationship rather than the assumption of linearity; therefore, Spearman's rank correlations were estimated between number of daily surveys completed and changes in self-reported mental health disorder symptom scores based on the AUDIT, GAD-7, PHQ-9, PDSS-SR, and PCL-5.

3. Results

Table 1 includes details of self-reported participant sociodemographic characteristics and symptom scores. Participants were mostly men (76.1%), between the ages of 19 to 29 years (56.3%), and married/common-law (50.5%) or single (47.7%). No participants reported being widowed. Biological sex and gender were both queried at pre-training. All participants who identified as male also identified as a man and all participants who identified as female also identified as a woman; therefore, only gender is reported in Table 1. No participants identified with a non-binary gender. Participants were mainly from Western Canada (77.9%; i.e., British Columbia, Alberta, Saskatchewan, Manitoba) and reported having either completed some post-secondary school (48.5%) or a university degree, 4-year college, or higher level of education (44.6%). Most participants (58.1%) did not have prior PSP experience.

There were no statistically significant differences between men and women in the AUDIT, GAD-7, PHQ-9, or PCL-5 change scores. Women reported statistically significantly greater change scores on the PDSS-SR ($p<0.01$), but the effect size was small ($d=0.02$). There were no statistically significant differences across age group, marital status, province of residence, or education level with respect to self-report symptom measure change scores (all $ps>0.05$). There were also no statistically significant differences across all sociodemographic characteristics with respect to number of daily surveys completed (all $ps>0.05$).

A total of 15,400 daily surveys were completed by cadets, with a median of 24 surveys and an interquartile range of 44 surveys. The data were positively skewed, 2.35(0.12), with heavy tails, 9.63(0.25). Results evidenced statistically significant inverse relationships between self-reported mental health disorder symptom change scores and daily survey completion, such that cadets who completed more daily surveys during CTP reported decreases in all measured self-reported mental health disorder symptom scores ($ps<0.01$). Cadets who completed more daily surveys during CTP had greater decreases in their AUDIT scores ($\rho=-0.196$, $p<0.001$), GAD-7 scores ($\rho=-0.522$, $p<0.001$), PHQ-9 scores ($\rho=-0.488$, $p<0.001$), PDSS-SR scores ($\rho=-0.108$, $p<0.01$), and PCL-5 scores ($\rho=-0.383$, $p<0.001$).

4. Discussion

The current study results indicated that RCMP cadets who completed more daily surveys self-monitoring their mental health also had greater

decreases in their self-reported symptoms of several mental health disorders (i.e., AUD, MDD, GAD, PD, and PTSD) from pre-training (i.e., starting the CTP) to pre-deployment (i.e., ~2 weeks prior to deployment to the field). The absolute causality of the relationship in the current study is unknowable without a randomized controlled trial. Participants with fewer mental health disorder symptoms may participate more in self-monitoring, leading to increased self-awareness and decreased mental health disorder symptoms. The differences in mental health disorder symptom scores from pre-training to pre-deployment were not clinically significant; however, this is to be expected, as participating RCMP cadets report overall low levels of mental health disorder symptoms (Carleton et al., in press). While not clinically significant in RCMP cadets, the relationship between daily mental health monitoring and positive changes in mental health disorder symptoms provides a potential avenue for active duty RCMP officers to mitigate high levels of mental health disorder symptoms. As mental health disorder symptoms occur along a spectrum, mechanisms for change at one end of the spectrum (i.e., lower levels of mental health disorder symptoms) can reasonably be assumed to be mechanisms for change at the other end of the spectrum (i.e., higher levels of mental health disorder symptoms).

Participants in the study were instructed to complete one daily survey per day; however, surveys were not completed with regularity during training. Instead, participants tended to complete more daily surveys at certain time points throughout their training, speculatively at times when training demands were lower. To our knowledge, extant literature does not provide a minimum threshold for daily survey completion that would produce positive changes in mental health disorder symptoms. Identifying a threshold number of daily surveys needed to see improvements in mental health disorder symptoms is outside the scope of the current study; however, the inverse association between daily survey participation and number of self-reported mental health disorder symptoms is consistent with the pre-registered hypotheses for the RCMP Study (Carleton et al., 2022) and with previous research that suggests self-monitoring mental health disorder symptoms may help improve mental health (Ehlers et al., 2003; Kauer et al., 2012; Murnane et al., 2016; Eisenstadt et al., 2021; Gatto et al., 2022). A nuanced temporal analysis of survey completion was also outside the scope of the current study but is available in a related study (Teckchandani et al., n.d.).

There were no differences across sociodemographic groups (i.e., gender, age group, marital status, province of residence, education level, or prior PSP service) with respect to changes in mental health disorder symptom scores, except for changes in scores on the PDSS-SR. Women had greater improvements in their PD symptoms than did men; however, the effect size was small and there may have been a floor effect, as very few RCMP cadets report symptoms of PD (Carleton et al., in press). There were also no differences across sociodemographic characteristics with respect to number of daily surveys completed. Although not statistically significant, women in the current study completed more daily surveys than did men. Research on regular mental health monitoring has frequently reported biased samples (i.e., mostly women) and as such, gender comparisons have often been left out (Eisenstadt et al., 2021). Women PSP appear more willing to report mental health disorder symptoms than men (Carleton et al., 2018; Krakauer et al., 2020), which may be associated with being more willing to complete regular mental health monitoring. Regardless of sociodemographic differences, all participants in the current study who engaged in daily monitoring of their mental health disorder symptoms

TABLE 1 Sociodemographic characteristics and comparisons of mental health disorder symptom measure change scores.

	% (n) ¹	Number of daily surveys completed	AUDIT	GAD-7	PHQ-9	PDSS-SR ²	PCL-5
		<i>Mdn</i> (IQR)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)
Mean mental health disorder symptom total scores							
Total sample							
Pre-training	100 (394)		2.83 (2.61)	4.02 (4.09)	3.01 (3.42)	0.39 (1.71)	5.34 (9.05)
Pre-deployment	100 (394)		0.55 (1.48)	0.69 (2.03)	0.60 (1.82)	0.01 (0.20)	0.67 (3.40)
Comparisons of mental health disorder symptom change scores							
Total sample							
	100 (394)	24.00 (44.00)	−0.27 (1.97)	−1.03 (3.73)	−0.54 (3.29)	−2.80 (5.63)	−2.13 (7.67)
Gender							
Men	76.1 (300)	23.00 (49.00)	−2.21 (2.54)	−3.22 (4.00)	−2.41 (3.31)	−0.18 (1.10)	−4.23 (8.27)
Women	23.9 (94)	24.00 (39.75)	−2.34 (2.69)	−3.51 (4.82)	−2.26 (4.43)	−0.76 (2.28)	−6.03 (12.32)
Effect Size (Cohen's <i>d</i>)		0.002	0.001	0.001	0.000	0.017*	0.006
Age group (years)							
19–29	56.3 (222)	25.00 (45.00)	−2.40 (2.71)	−3.17 (4.24)	−2.34 (3.87)	−0.31 (1.45)	−4.46 (9.31)
30–39	35.0 (138)	22.00 (45.00)	−1.89 (2.34)	−3.64 (4.32)	−2.57 (3.41)	−0.42 (1.74)	−5.19 (9.99)
40–49	7.9 (31)	22.00 (48.50)	−2.54 (2.26)	−3.00 (3.57)	−1.67 (1.76)	0	−4.62 (8.71)
50–59	^	49.50 (55.00)	−2.50 (3.53)	−1.00 (1.41)	−1.50 (0.71)	0	0
Effect size (η_p^2)		0.001	0.008	0.004	0.003	0.003	0.002
Marital status							
Single	47.7 (188)	21.50 (42.25)	−2.46 (2.85)	−3.44 (4.01)	−2.57 (3.96)	−0.40 (1.56)	−5.53 (10.24)
Separated/divorced	1.8 (7)	10.00 (31.75)	−3.00 (3.58)	−6.37 (4.8)	−2.87 (2.17)	-	−7.37 (9.30)
Married/Common-Law	50.5 (199)	28.00 (54.00)	−2.01 (2.21)	−3.02 (4.34)	−2.14 (3.29)	−0.26 (1.48)	−3.73 (8.59)
Effect size (η_p^2)		0.005	0.009	0.015	0.006	0.004	0.013
Province of residence							
Western Canada (BC, AB, SK, MB)	77.9 (307)	27.50 (43.75)	−2.24 (2.46)	−3.67 (4.53)	−2.69 (3.64)	−0.42 (1.72)	−5.47 (10.24)
Eastern Canada (ON, QC)	16.5 (65)	18.50 (40.00)	−2.18 (2.71)	−2.78 (3.95)	−1.89 (3.83)	−0.21 (1.05)	−3.34 (8.57)
Atlantic Canada (PEI, NS, NB, NFL)	5.1 (20)	32.00 (59.50)	−2.50 (2.88)	−3.39 (3.44)	−2.52 (2.67)	−0.26 (1.75)	−5.00 (7.62)
Northern Territories (YK, NWT, NVT)	^	11.00 (23.00)	−2.00 (1.23)	−2.69 (1.51)	−1.00 (0.70)	0	−6.20 (11.15)
Effect size (η_p^2)		0.002	0.003	0.012	0.009	0.001	0.009
Education							
High school graduate or less	6.9 (27)	16.00 (50.00)	−2.20 (2.25)	−3.62 (4.31)	−2.68 (2.91)	−0.64 (2.11)	−4.62 (8.81)
Some post-secondary school	48.5 (191)	24.00 (44.00)	−2.45 (2.88)	−3.74 (4.38)	−2.61 (3.70)	−0.11 (1.08)	−5.20 (9.32)
University degree/4-year college or higher	44.6 (176)	26.00 (45.00)	−2.04 (2.32)	−2.65 (3.94)	−1.97 (3.72)	−0.42 (1.59)	−3.73 (9.39)
Effect size (η_p^2)		0.001	0.004	0.014	0.008	0.010	0.010
Prior PSP service							
Yes	31.9 (126)	24.00 (43.50)	−2.16 (3.18)	−2.76 (4.48)	−2.38 (3.76)	−0.31 (1.55)	−5.11 (10.33)

TABLE 1 (Continued)

	% (n) ¹	Number of daily surveys completed	AUDIT	GAD-7	PHQ-9	PDSS-SR ²	PCL-5
		<i>Mdn</i> (IQR)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)
No	58.1 (229)	21.00 (49.00)	−2.37 (2.21)	−3.49 (4.03)	−2.34 (3.57)	−0.36 (1.57)	−4.36 (9.12)
Effect size (Cohen's <i>d</i>)		0.001	0.008	0.012	0.007	0.002	0.002

AUDIT, Alcohol Use Disorder Identification Test; GAD-7, Generalized Anxiety Disorder Scale-7; *M* (SD), mean (standard deviation); η^2_p , partial Eta squared; PDSS-SR, Panic Disorder Symptoms Scale - Self-Report; PHQ-9, Patient Health Questionnaire-9; PCL-5, Posttraumatic Stress Disorder Checklist for DSM-5.
¹Total percentages may not sum to 100 and ns may not sum to 394 due to non-response or responding “other.”
²A limited number of participants reported values for panic disorder (PDSS-SR) because selecting “No” for “ever having experience with panic attacks” or “having a panic attack in the last 7 days,” meant participants were not presented the rest of the PDSS-SR questions.
[^] $n < 5$, data not presented. * $p \leq 0.01$.

had improvements in such symptoms, suggesting that the improvements seen in mental health disorder symptoms from daily monitoring are beneficial to all RCMP cadets who engage in daily monitoring.

4.1. Strengths and limitations

The overall RCMP Study has several strengths, which can be found in the published protocol paper (Carleton et al., 2022). Specific to the current study, strengths included: 1) cadets were given internet capable devices with which to complete daily surveys, removing any financial barriers to participation and 2) the collection of baseline data allows researchers to monitor participation and identify changes in participation patterns that could signal early development of PTSIs.

Limitations of the overall RCMP Study can be found in the published protocol paper (Carleton et al., 2022). Limitations specific to the current study include: 1) voluntary participation in the study and for completing the daily self-monitoring surveys, leading to self-selection biases potentiating unknowable influences (e.g., participants with better mental health may have self-selected into the study and been better able to complete the surveys); 2) participants were not provided with a daily reminder to complete their daily survey, which may have limited the results and created an unknowable bias based on volitional participation (e.g., participants with better mental health may have been better able to remember to participate); 3) the sample was mostly men, limiting the ability to do gender comparisons or stratification; 4) data on mental health treatment were not collected; therefore, there is no way of knowing whether or not the cadets sought treatment for their mental health and, in turn, experienced decreases in reported symptoms as a result; 5) floor effects limited the detectability of clinically significant changes in mental health disorder symptoms scores; and 6) attritional data were not collected; therefore, participants with more mental health disorder symptoms may have left the study, which may have contributed to the floor effects.

4.2. Future directions

Future researchers should analyze attrition throughout CTP and RCMP officers’ careers by using survival analysis based on mental health disorder symptoms measures. The effects of underlying

mental health disorder symptoms and availability of mental health supports on an RCMP officer’s disposition to sustain a mental health injury in the line of duty can be learned from analyses comparing how cadets who screen positively for mental health disorder symptoms attrition from CTP or the RCMP Study. Multifactorial models could be used to explore the latent variables underpinning the relationships between participation in self-monitoring and self-report mental health disorder symptom changes during CTP. Further investigations could assess the moderating effects of variables such as social support (Takagi et al., 2013), suicidal ideation (Hoge et al., 2002), mental health history (Hoge et al., 2002), and engagement in physical activity (Garcia et al., 2015), informing targeted mental health supports for RCMP cadets and officers.

5. Conclusion

The data indicated an inverse relationship between mental health symptom scores and the number of daily surveys completed by cadets during CTP, when comparing cadet scores reported pre-training (i.e., starting the CTP) and pre-deployment (i.e., ~2 weeks prior to deployment to the field). The results were consistent with extant evidence that daily self-monitoring of mental health disorder symptom can improve mental health disorder symptoms through increased emotional awareness (Kauer et al., 2012), knowledge of mood patterns, and self-management of mental health disorder symptoms (Caldeira et al., 2017). Due to low self-reported mental health disorder symptoms in RCMP cadets, clinically significant changes in mental health disorder symptoms scores were not seen in the current study, likely due to statistical floor effects. Mental health disorder symptoms occur along a continuum and mechanisms for change seen at the lower end of the spectrum (i.e., results from the current study) can reasonably be assumed to be mechanisms for change at higher ends of the spectrum. Accordingly, daily mental health disorder symptoms monitoring may help to mitigate high levels of mental health disorder symptoms reported by serving RCMP members. More nuanced group-wise and longitudinal analyses may provide unique insights about the relationships between mental health disorder symptom scores and participation. Additional analyses may critically support the recommendation to include self-reflection as a prophylactic component during the CTP to potentially reduce the impact of PPTE throughout the cadets’ careers.

Data availability statement

The datasets presented in this article are not readily available because the datasets will be made available only for independent confirmation purposes and only to persons with the necessary ethical and security clearances as defined by the research ethics board at the University of Regina and the contractual obligations with the Royal Canadian Mounted Police. Requests regarding the datasets can be made to nick.carleton@uregina.ca.

Ethics statement

Data for the current paper were collected as a part of the broader RCMP Study. The associated protocol paper provides full details of the RCMP longitudinal Study (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Ethics Board on April 10, 2019 (File #2019-055), and the RCMP Research Ethics Board followed with approval on April 12, 2019 (File #SKM_C30818021312580). The study was also approved through a Privacy Impact Assessment as part of the overall National Administrative Records Management System approval (201611123286) and Public Services and Procurement Canada approval (201701491/M7594174191). The project is bound by the Privacy Act, R.S., 1985, c. P-21 and the Personal Information Protection and Electronic Documents Act, SC. 2000, c.5 and approved by Public Services and Procurement Canada (PSPC) M7594-171491/001/SS. The participants provided their electronically recorded informed consent to participate in this study.

Author contributions

RNC, RS, and TT: conceptualization. RNC, RS, TT, TA, GA, GK, and LL: methodology. RNC, RS, TT, and GK: validation. RNC, RS, and TT: formal analysis. RNC, AB, GK, JPN, and SS-Z: investigation. RNC, AB, GK, and SS-Z: resources. RNC, TT, AB, GK, and JPN: data curation. RS, TT, and RNC: writing—original

draft preparation. All authors: substantial contributions consistent with the International Committee of Medical Journal Editors, writing—review and editing, and view and approve the submitted version of the manuscript.

Funding

The RCMP Study was funded by support from the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness. LL was supported by a Tier I Canada Research Chair in Methods for Electronic Health Data Quality. TA was supported by a Tier I Canada Research Chair in Childhood Adversity and Resilience. The development, analyses, and distribution of the current article was made possible by a generous and much-appreciated grant from the Medavie Foundation.

Acknowledgments

The RCMP Study is made possible by a large and diverse team, with detailed acknowledgements available online (www.rcmpstudy.ca).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Teckchandani, T. A., Shields, R. E., Andrews, K. L., Maguire, K. Q., Jamshidi, L., Nisbet, J., et al. (n.d.). Trouble with the curve: the 90-9-1 rule to measure volitional participation inequalities among Royal Canadian Mounted Police Cadets during Training. *Submitt. Front. Psychol. Spec. Issue*

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OPEN ACCESS

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RECEIVED 15 January 2023

ACCEPTED 14 September 2023

PUBLISHED 27 September 2023

CITATION

Teckchandani TA, Neary JP, Andrews KL,
Maguire KQ, Jamshidi L, Nisbet J, Shields RE,
Afifi TO, Sauer-Zavala S, Lix LM, Krakauer RL,
Asmundson GJG, Krätzig GP and
Carleton RN (2023) Cardioautonomic lability
assessed by heart rate variability changes in
Royal Canadian Mounted Police cadets during
the cadet training program.
Front. Psychol. 14:1144783.
doi: 10.3389/fpsyg.2023.1144783

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Zavala, Lix, Krakauer, Asmundson, Krätzig and
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Cardioautonomic lability assessed by heart rate variability changes in Royal Canadian Mounted Police cadets during the cadet training program

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Objective: The current study examined variations in cardioautonomic lability during the Royal Canadian Mounted Police (RCMP) Cadet Training Program (CTP) between cadets starting their training who did or did not screen positive for one or more mental health disorders (i.e., posttraumatic stress disorder [PTSD], major depressive disorder [MDD], social anxiety disorder [SAD], generalized anxiety disorder [GAD], panic disorder [PD], alcohol use disorder [AUD]).

Methods: Electrocardiogram (ECG) signals integrated into Hexoskin garments were used to record ECG and heart rate over the 26-week CTP. There were 31 heart rate variability (HRV) parameters calculated using Kubios Premium HRV analysis software. Mann–Whitney *U*-tests were used to perform groupwise comparisons of participant raw values and HRV during the CTP.

Results: A total of 157 cadets (79% male) were screened for any mental disorder using self-report surveys and then grouped by positive and negative screening. Analyses indicated a statistically significant ($p < 0.05$) decrease in low frequency (LF): High Frequency (HF) variability during CTP, but only for cadets who endorsed clinically significant anxiety symptoms on the GAD-7 at the start of their training. There were no other statistically significant groupwise differences.

Conclusion: The results indicate the participants have excellent cardiac health overall and suggest potentially important differences between groups, such that cadets who endorsed clinically significant anxiety symptoms on the GAD-7 showed less variability in the LF:HF ratio over the course of the CTP. The relatively lower variability suggests decreased parasympathetic tone in those without clinically significant anxiety symptoms. The results also have important implications for future investigations of cardioautonomic dysfunction and chronic hypothalamic pituitary adrenal (HPA) axis deviations in policing populations with anxiety disorders; specifically, cardioautonomic inflexibility related to cardiovascular

morbidity and mortality. In any case, the current results provide an important baseline for future cardiac research with cadets and serving officers.

KEYWORDS

heart rate control, generalized anxiety disorder (GAD), cardiac, RCMP cadets, cardioautonomic dysfunction

1. Introduction

Correctional workers, firefighters, paramedics, municipal and provincial police, public safety communicators, and the Royal Canadian Mounted Police (RCMP) are all examples of public safety personnel (PSP) who work to keep Canadians safe (Canadian Institute for Public Safety Research and Treatment, 2021). PSP are vocationally required to frequently engage with extremely stressful situations (Carleton et al., 2019). Stressors that involve real or threatened exposure to death, significant injury, or sexual assault can be described as potentially psychologically traumatic events (PPTs) (Canadian Institute for Public Safety Research and Treatment, 2021). Increased symptoms of mental health disorders, such as posttraumatic stress disorder (PTSD), major depressive disorder (MDD), generalized anxiety disorder (GAD), panic disorder (PD), social anxiety disorder (SAD), and alcohol use disorder (AUD), have frequently been linked to PPT exposures (Carleton et al., 2019), and are collectively referred to as posttraumatic stress injuries (PTSI; Public Safety Canada, 2019). Approximately half (i.e., 50.2%) of serving RCMP officers screened positive for one or more PTSI (Carleton et al., 2018), which is approximately five times higher than the prevalence (i.e., $\approx 10\%$) in the Canadian general population (Statistics Canada, 2012). Mental health disorders have been associated with poor health, including declines in cardiovascular health [e.g., coronary heart disease, hypertension, diminished heart rate variability (HRV); Tully et al., 2013; Pelletier et al., 2017]. Earlier PTSI identification and intervention could improve the mental and physical health of RCMP and other PSP.

The regulation of heart rate is a complex process involving interplay between neuroendocrine and neuroautonomic systems. Neurohormonal cascades occur between the neuroendocrine hypothalamic pituitary adrenal (HPA) axis and neuroautonomic vagus nerve-mediated parasympathetic suppression of the sinoatrial node (SA node). The regulation process produces beat-to-beat adjustments in cardiac inotropy and chronotropy, and sustained variations in myocardial performance, which respond to environmental demands or stressors (Roth et al., 2012; Faes et al., 2013; Tafet and Nemeroff, 2020). The magnitude and frequency of vagus parasympathetic nerves system (PNS) efferents innervating the sinoatrial node are regulated by the interplay between gamma-aminobutyric acid (GABAergic) sympathoinhibitory pathways from the caudal ventrolateral medulla acting upon the parasympathetic outflow tracts within the rostral ventrolateral medulla (Barman and Yates, 2017).

Neurohormonal pathways have been associated with symptoms of mental health disorders (Edwards and Williams, 2010; Tafet and Nemeroff, 2020). The HPA axis is responsible for altering immune, metabolic, and neuroautonomic processes in an intricate negative feedback loop to facilitate acute and prolonged adaptations to stress

(Dishman et al., 2000; Faes et al., 2013; Wood, 2014). Pituitary release of adrenocorticotrophic hormone (ACTH) in response to an acute external stressor triggers the activation of the “fight or flight” response system, regulated by the noradrenergic neurons in the locus coeruleus/norepinephrine system in the brain (Roth et al., 2012). The processes modulate stress response fidelity and efficacy, which means acute and chronic exposure to stressors can precipitate HPA axis dysfunction, facilitating a neuroendocrine cascade that negatively impacts end organ function over time (Verma et al., 2010; Flandreau et al., 2012; Roth et al., 2012; Wood, 2014; Tafet and Nemeroff, 2020).

Assessing susceptibility to changes in cardioautonomic lability requires examining the situational factors that contribute to a negative adaptation, including PPT exposures. Stressor-induced HPA axis dysfunction can vary greatly in clinical presentation, but acute overactivation or prolonged exposure to stressors that precipitate activation of the negative feedback system can result in acute HPA axis hypersensitivity or chronic hyposensitivity (Flandreau et al., 2012; Roth et al., 2012). Previous studies evidenced physiological consequences for immune, metabolic, and cardioautonomic health in clinical populations, and HPA axis deviations have been observed to substantially contribute to physiological impairments in persons with anxiety, panic, or mood disorders (Kemp et al., 2012; Alvares et al., 2013; Tully et al., 2013; Chalmers et al., 2014; Bilgin et al., 2015; Dimitriev et al., 2016).

HPA axis dysfunction or sustained deviations of the HPA axis away from a basal state can lead to cardioautonomic inflexibility or decreased autonomic lability during stressor exposures (Roth et al., 2012; Barbieri et al., 2017) such as exposure to a PPT. Decreased autonomic lability with prolonged HPA axis deviations caused by acute or chronic environmental stressors appears observable through evaluating the temporal and stochastic dynamics of changes in heart rate (Hagerman et al., 1996; Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996; Jain and Tiwari, 2014; Schmalenberger et al., 2019; Tolin et al., 2021). HRV analyses have been widely popularized as useful and easy tools for evaluating the effects of changes in autonomic lability in those with acute or chronic stressors (Tully et al., 2013; Levine et al., 2016); however, there are considerable methodological challenges and concerns related to meaningful use of HRV analyses for assessing stress and mental health (Billman, 2013; Hayano and Yuda, 2019; Vila et al., 2019).

The RCMP Study (Carleton et al., 2022) provides a unique opportunity to address several gaps in the extant literature regarding mental health and cardioautonomic lability among cadets and serving RCMP. The current study was designed to examine differences in cardioautonomic lability during the 26-week RCMP Cadet Training Program (CTP) by comparing participating cadets who screened positive for one or more mental health disorders (i.e., PTSD, MDD,

GAD, PD, SAD, AUD) when starting their training to cadets who did not. Observing potential differences and changes in cardioautonomic lability among RCMP cadets provides a basis for building tools to identify physiological characteristics or precursors to PTSD. The current study was also designed to provide baseline measures of cardioautonomic lability for future analyses as we follow RCMP cadets over the course of their careers. For the current study, RCMP cadets who screened positive for any mental health disorder at T1 (i.e., pre-training) were hypothesized to have lower HRV than cadets who did not screen positive (Gorman and Sloan, 2000; Miu et al., 2009; Pittig et al., 2013; Chalmers et al., 2016; Levine et al., 2016; Shinba, 2017; Spangler et al., 2021).

2. Materials and methods

2.1. Procedure

The current study is part of the wider RCMP Study being conducted at RCMP Depot in Regina, Canada. Full details on the RCMP study can be found in the protocol paper (Carleton et al., 2022). The RCMP Study was approved by the University of Regina Institutional Research Ethics Board (File No. 2019–055) and the RCMP Research Ethics Board (file No. SKM_C30818021312580). The RCMP Study was also approved through a Privacy Impact Assessment as part of the overall approval by the National Administrative Records Management System (NARMS) (file No. 201611123286) and Public Services Procurement Canada (PSPC) (file No. 201701491/M7594174191).

2.2. Data and sample

Participants were RCMP cadets ($n = 157$; 79% male) starting the 26-week CTP. Inclusion criteria included cadets who were Canadian citizens or permanent residents, 19 to 57 years old, and who could fluently read, write, and speak either English or French. Cadets must also have met several recruiting requirements, including security clearances, medical examinations, a polygraph test, and minimum physical standards (Hembroff et al., 2020). There were no conditions requiring exclusion of persons otherwise qualified for the CTP.

2.3. Self-report measures

Mental health disorders symptoms were assessed using web-delivery of the self-report survey at pre-training, which included the PTSD Check List 5 (PCL-5; Weathers et al., 2013a); the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001); the Panic Disorders Symptoms Severity Scale, Self-Report (PDSS-SR; Shear et al., 1997); the 7-item Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006); the Social Interaction Phobia Scale (SIPS; Carleton et al., 2009); and the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993). For the PCL-5, per the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; Vahia, 2013), participants reported on their lifetime exposures (i.e., prior to attending the CTP) to a specific list of PPTs provided by the Life Events Checklist for the DSM-5-Extended (LEC-5) (Weathers et al.,

2013a). The LEC-5 does not include “sudden and unexpected death of someone close to you” as a potential index PPT, making the screening process arguably more conservative (Ashbaugh et al., 2016). Participants select an index PPT (i.e., “Consider which event from the list was the worst, most distressing event. If more than one of these events happened to you, select the one event that currently causes you the most distress”) against which to rate their past month symptoms using the PCL-5 items. A positive screen on the PCL-5 required participants to report exposure to at least one LEC-5 item, meet minimum DSM-5 criteria for each PTSD symptom cluster subscale (e.g., intrusions, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity), and exceed the clinical cut off of >32 (Weathers et al., 2013b).

PHQ-9 symptoms were reported for the previous 14 days, PDSS-SR symptoms for the previous 7 days, GAD-7 symptoms for the previous 14 days, SIPS symptoms for no specified time frame, and AUDIT symptoms for the last year. Based on published guidelines for total scores, positive screenings for each scale were established: PHQ-9 >9 (Vahia, 2013); PDSS-SR >7 (Houck et al., 2002); GAD-7 >9 (Swinson, 2006); SIPS >20 (Carleton et al., 2009); and AUDIT >15 (Gache et al., 2005). Instead of being validated as definitive diagnostic tools, all measures have been validated for screening to identify people who may need more therapeutic care.

2.4. Sociodemographic variables

Sociodemographic characteristics, including sex (i.e., male, female), age (i.e., 19–29 years, 30–39 years, 40–49 years, 50–59 years), marital status (i.e., single, separated/divorced, married/common-law), province of residence [i.e., Western Canada (British Columbia, Alberta, Saskatchewan, Manitoba), Eastern Canada (Ontario, Quebec), Atlantic Canada (Newfoundland & Labrador, Prince Edward Island, Nova Scotia, New Brunswick), or Northern Territories (Yukon, Northwest Territories, Nunavut)], and education (i.e., high school graduate or less, some post-secondary school, and university degree/4-year college or higher) were used for detailed descriptions of groupwise comparisons and covariates (Carleton et al., 2022).

2.5. Cardioautonomic lability measures

The RCMP Study design originally used electrocardiography (ECG) to measure HRV through analyses of successive beat-to-beat intervals of sinus origin. The successive daily ECG recordings were collected by cadets wearing Hexoskin wearable biosensor garments (Carré Technologies Inc., Montréal, Canada) that were modified for operational policing requirements. The cadets were asked to record at least one 300-s-long resting state recording per day upon waking (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996). The cadets were then encouraged to wear the garment during training tasks, with the objective of obtaining at least three to five recordings per week, per participant. Collected recordings were downloaded to a secure server for offline processing and analyses (Carleton et al., 2022).

All ECG recordings were collected using the integrated 3-lead ECG in the Hexoskin wearable biosensor garments at a frequency of

256 Hz. The ECG lead exported is equivalent to Lead I configuration. To analyze changes in HRV, the raw ECG waveforms collected by the Hexoskin wearable biosensor garments were exported as a European Data Format (EDF) file, with waveform recognition, pre-processing, and beat-to-beat analysis afforded by Kubios HRV Premium (Version 3.3.0 HRV Biosignal Analysis and Medical Imaging Group, Finland). The total number of records collected during the 26-week CTP period totaled 6,699 across 157 cadets. After preprocessing and manual review of the ECG recordings collected by the Hexoskin shirts, a total of 3,828 records were excluded from the sample due to poor signal quality over the 300 s recording period, eliminating 56 cadets (75% males). Poor signal quality was defined as a 300 s segment collected during rest that featured more than 5% artifact as detected by a moving average filter featured in Kubios Premium (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996). The remaining 2,871 records were uniformly analyzed and manually reviewed to ensure the recordings contained no ectopic activity.

HRV time domain analysis used a 50-millisecond threshold for both NNxx and pNNxx, denoting the number of successive heart beats that vary by more than 50-milliseconds. Both approximate entropy and sample entropy used an embedding dimension of two beats and a tolerance of $0.2 \times$ standard deviation in the 300 s window. Spectral analysis used a window width of 300 s with a 50% window overlap. The low frequency (LF) band ranged from 0.04–0.15 Hz, where the high frequency (HF) band ranged from 0.15–0.4 Hz. All HRV parameters summaries were calculated by Kubios HRV Premium and processed for export as a text file to be compiled using Microsoft Excel (Microsoft Corporation, Seattle, USA) and imported to IBM SPSS Statistical Analysis Software (IBM, v.26 Premium, New York, USA) for statistical analysis.

The dependent variables were HRV analyses parameters derived from electrocardiogram data collected using the Hexoskin wearable biosensors by cadets daily during training. HRV was evaluated using a combination of 31 index, time domain, nonlinear, and power spectral density parameters. Index values included stress index, parasympathetic nervous system index, and sympathetic nervous system indexes, calculated to normalize HRV compared to normal resting values provided by Kubios Premium. Time domain parameters included analyses of the time difference between heart beats measures in milliseconds and in beats per minute. These included the average and standard deviation of the interval between heart beats (RR interval), average and standard deviation of heart rate, minimum and maximum heart rate recorded in the sample window, root mean squared standard deviation of the RR interval, the number of successive RR intervals that exceed 50 milliseconds, and the baseline width of the RR interval histogram. Nonlinear analyses included Fourier transforms to represent variability in the frequency domain. Values derived from the power spectral density function of the 300-s sample window included total, low, and high frequency power represented as milliseconds squared, as well as the percent contribution to the total power that each of the spectral bands represent. The ratio of low-to-high frequency contribution to the total spectral power was also included (LF:HF ratio). Nonlinear analyses included Poincaré analysis featuring SD1 and SD2, SD2/SD1 ratio, as well as measures of approximate entropy, and sample entropy. Detrended fluctuation analysis and recurrence plot analyses were also included to investigate changes in stochastic and harmonic

properties of heart rate over the 300 s window. HRV parameters were calculated for each 300-s resting state recording, with within-participant averages calculated across the 26-week training period to produce a single value for each participant, per dependent variable. A mirrored calculation was performed to capture the standard deviation of the within participant HRV parameters to produce a single standard deviation value per participant during the 26-week CTP.

2.6. Statistical analyses

Descriptive statistics during pre-training included sociodemographic variables (i.e., sex, age, marital status, ethnicity, province of residence, and education). A series of *t*-tests and an analysis of variance (ANOVA) were used to assess for differences across sociodemographic groupings. The prevalence of positive screenings were computed as percentages based on self-report screening tools. Familywise error rate in multiple comparisons from *post hoc* testing was controlled using Holm-Bonferroni modifications to alpha values. Cohen's *d* values were calculated as standardized effect sizes for *t*-tests and interpreted as small ($d=0.20$), medium ($d=0.50$), and large ($d=0.80$). Partial eta squared (η_p^2) were calculated as standardized effect sizes for ANOVA tests and interpreted as small ($\eta_p^2=0.01$), medium ($\eta_p^2=0.06$), and large ($\eta_p^2=0.14$) (Cohen, 2013).

Groupwise comparisons were performed using Mann-Whitney *U* tests with grouping determined by GAD-7 binary screening for those who endorsed clinically significant anxiety symptoms on the GAD-7 and those who did not (i.e., positive, negative) upon the start of the CTP. Two-tailed Mann-Whitney *U* tests were used to analyze groupwise differences due to independence of observations, unequal group sizes, and violations of the assumption of normality. Shapiro-Wilke tests were used to assess data distributions of the dependent variables individually by group, with all HRV measures between groups revealing nonparametric distributions ($p<0.05$). Effect size analyses used the biserial rank correlation coefficient. There were no statistically significant sex differences for number of recordings per participant or age.

3. Results

Self-reported participant sociodemographic characteristics and self-reported mental health disorder symptom scores are provided in Table 1. Participants were mostly male (79.0%), between the age of 19–29 years old (51.7%), and single (48.3%) or married/common-law (48.3%). Participants were mostly from Western Canada (55.2%; i.e., British Columbia, Alberta, Saskatchewan, Manitoba) and reported having either some post-secondary school (36.0%) or a university degree, 4-year College or higher level of education (32.0%). Self report average body weight was 188.49 ± 12.32 lbs, average height was 70.78 ± 2.32 inches, and average BMI was calculated to be 26.51 ± 1.73 kg/m².

No participants screened positive for MDD, PD, AUD, SAD, or PTSD, which is consistent with expectations given the high levels of health among new cadets (Carleton et al., 2023). Small statistically significant effects for cadets that endorsed clinically significant anxiety symptoms considered a positive screen on the GAD-7 only

TABLE 1 Median of heart rate variability parameters by group during CTP.

	Parameter	Median (IQR)		U statistic	P-value	Effect size (<i>r</i>)
		Negative (<i>n</i> = 95)	Positive (<i>n</i> = 12)			
	Stress Index	11.72 (4.97)	9.62 (5.58)	262	0.741	0.03
Index values	SNS Index	0.86 (1.82)	0.62 (1.14)	235	0.163	0.07
	PNS Index	−0.74 (1.45)	−0.20 (0.80)	188	0.472	0.14
Time domain	Mean RR (ms)	824.70 (141.53)	852.91 (153.45)	213	0.301	0.10
	STD RR (ms)	38.96 (26.63)	52.67 (27.02)	245	0.565	0.06
	RMSSD (ms)	30.01 (32.72)	48.16 (33.74)	201	0.227	0.12
	Mean HR (bpm)	74.72 (13.09)	72.18 (13.64)	233	0.455	0.07
	STD HR (bpm)	3.92 (1.89)	4.05 (2.31)	279	0.931	0.01
	Min HR (bpm)	64.64 (12.88)	63.36 (11.21)	244	0.556	0.06
	Max HR (bpm)	90.54 (15.19)	86.66 (15.25)	221	0.358	0.09
	NNxx	38.20 (77.82)	71.47 (71.52)	204	0.244	0.12
	pNNxx	12.69 (24.18)	21.25 (21.71)	199	0.217	0.12
	TINN (ms)	200.56 (134.56)	264.05 (128.12)	249	0.605	0.05
Spectral analysis	LF (%)	67.07 (10.62)	63.96 (13.95)	184	0.147	0.15
	HF (%)	24.85 (12.73)	28.35 (15.60)	204	0.244	0.12
	LF:HF Ratio	4.14 (2.64)	2.72 (1.62)	251	0.625	0.05
	LF (ms ²)	1224.63 (1688.69)	1702.19 (1127.88)	189	0.168	0.14
	HF (ms ²)	383.56 (1194.02)	929.45 (2748.37)	231	0.438	0.08
	Total Power (ms ²)	1594.24 (2794.74)	2843.50 (4248.12)	149	0.051	0.20
Nonlinear analyses	SD1 (ms)	21.51 (23.28)	34.37 (23.92)	230	0.429	0.08
	SD2 (ms)	73.08 (37.24)	92.56 (29.64)	223	0.373	0.09
	SD2:SD1	3.48 (1.19)	3.08 (1.08)	265	0.774	0.03
	ApEn	1.10 (0.10)	1.10 (0.08)	218	0.336	0.10
	SampEn	1.37 (0.22)	1.44 (0.16)	164	0.082	0.17
	Alpha 1	1.33 (0.25)	1.26 (0.17)	213	0.301	0.10
	Alpha 2	0.87 (0.10)	0.91 (0.15)	179	0.128	0.15
	D ²	2.47 (0.96)	3.04 (0.99)	270	0.829	0.02
	Mean line length	11.85 (2.80)	12.41 (9.26)	217	0.328	0.10
	Max line length	266.23 (138.94)	206.24 (94.92)	259	0.709	0.04
	Recurrence rate (%)	35.15 (6.04)	33.78 (8.88)	226	0.397	0.08
	Determinism (%)	98.52 (1.07)	98.13 (1.26)	277	0.908	0.01

*Results are statistically significant at the $p < 0.05$ level.

were observed for total spectral power and sample entropy (i.e., $p = 0.051$, $r = 0.20$; $p = 0.082$, $r = 0.17$, respectively). Tables 1, 2 provide the HRV parameters by group during the CTP for cadets who screened positive for GAD using the GAD-7 questionnaire at the start of the CTP.

Results of groupwise variability in HRV parameters (Table 2) indicated a single statistically significant difference between groups with the LF:HF ratio of relative contribution to total spectral power. Cadets who endorsed clinically significant anxiety symptoms on the GAD-7 prior to their training during the CTP evidenced statistically significantly less variability over time in their relative power spectral density frequency band contributions, despite no statistically significant difference in averaged values over time (i.e., Standard deviation in LF:HF ratio over time, $p < 0.05$, $r = 0.21$; Average LF:HF

ratio, $p = 0.625$, $r = 0.05$). Variability in the parasympathetic nervous system index during CTP was borderline significantly decreased in the positive screening group as well (i.e., PNS Index, $p = 0.060$). For the positive screening group, nonlinear analyses also indicated no statistically significant increases in SD2 and ALPHA 2 variability over time for Poincaré ($p = 0.098$) and Detrended Fluctuation Analyses, respectively, ($p = 0.076$). All differences were associated with small effect sizes.

4. Discussion

The current study was designed to examine variations in cardioautonomic lability among RCMP cadets based on positive or

TABLE 2 Standard deviation of heart rate variability parameters by group during CTP.

	Parameter	Median (IQR)		U statistic	P-value	Effect size (r)
		Negative (n = 95)	Positive (n = 12)			
Index values	Stress Index	1.09 (0.52)	1.32 (3.02)	124	0.431	0.08
	SNS Index	0.86 (0.62)	1.26 (1.68)	123	0.418	0.08
	PNS Index	3.23 (0.21)	3.22 (0.33)	79	0.060	0.19
Time domain	Mean RR (ms)	3.30 (2.11)	4.56 (10.04)	88	0.102	0.16
	STD RR (ms)	91.76 (41.30)	107.94 (66.76)	90	0.113	0.16
	RMSSD (ms)	10.92 (6.57)	11.18 (14.82)	96	0.148	0.15
	Mean HR (bpm)	15.56 (12.39)	21.77 (35.35)	128	0.488	0.07
	STD HR (bpm)	8.81 (3.78)	9.10 (14.02)	150	0.860	0.02
	Min HR (bpm)	1.31 (1.45)	1.06 (2.24)	108	0.245	0.12
	Max HR (bpm)	7.83 (3.21)	9.42 (12.08)	137	0.630	0.05
	NNxx	17.73 (19.54)	27.86 (64.82)	114	0.307	0.10
	pNNxx	40.25 (31.82)	42.51 (36.04)	98	0.162	0.14
	TINN (ms)	3.10 (2.19)	3.98 (2.77)	111	0.275	0.11
Spectral analysis	LF (%)	10.64 (5.77)	10.64 (4.27)	144	0.751	0.03
	HF (%)	10.79 (5.73)	10.40 (7.53)	126	0.459	0.07
	LF:HF Ratio*	2.58 (1.77)	1.28 (1.64)	68	0.035	0.21
	LF (ms ²)	900.97 (1061.47)	1138.56 (3246.81)	100	0.177	0.14
	HF (ms ²)	432.30 (1214.74)	1262.12 (11197.00)	93	0.130	0.15
	Total Power (ms ²)	1344.12 (2117.44)	2266.99 (14689.89)	91	0.118	0.16
Nonlinear analyses	SD1 (ms)	12.61 (13.83)	19.81 (46.02)	96	0.148	0.15
	SD2 (ms)	26.55 (18.55)	32.30 (23.25)	87	0.098	0.17
	SD2:SD1	0.98 (0.57)	0.95 (0.82)	140	0.681	0.04
	ApEn	0.10 (0.07)	0.08 (0.09)	148	0.823	0.02
	SampEn	0.26 (0.10)	0.24 (0.17)	154	0.934	0.01
	Alpha 1	0.19 (0.08)	0.20 (0.19)	119	0.366	0.09
	Alpha 2	0.16 (0.04)	0.19 (0.07)	82	0.076	0.18
	D ²	1.06 (0.40)	1.21 (0.41)	112	0.285	0.11
	Mean line length	3.35 (3.67)	4.76 (46.07)	140	0.681	0.04
	Max line length	103.75 (33.40)	126.79 (81.50)	113	0.296	0.10
	Recurrence rate (%)	7.96 (3.20)	6.99 (8.15)	141	0.698	0.04
	Determinism (%)	1.06 (0.68)	1.04 (0.92)	156	0.972	0.00
	ShannonEn	0.29 (0.10)	0.29 (0.39)	125	0.445	0.08

*Results are statistically significant at the $p < 0.05$ level.

negative screens for one or more mental health disorders at the start of the CTP; however, only analyses regarding GAD were possible given that no cadets screened positive for clinically significant anxiety symptoms among the other included mental health disorders at the start of the CTP or those who did, did not participate in the Hexoskin data collection. Consistent with HRV literature in persons with anxiety disorders, we observed statistically significant decreases in HRV with small effect sizes (0.18–0.21) (Chalmers et al., 2014; Schmalenberger et al., 2019). Cadets who endorsed clinically significant anxiety symptoms on the GAD-7 at the start of CTP had a statistically significant decrease in the daily variability of the LF:HF ratio. Reduced LF:HF variability may better reflect a coupling of the sympathetic and

parasympathetic contributions to HRV considering the mathematical and interpretive challenges when using the raw ratio value itself.

The LF:HF ratio has been widely used to compare vagal balance in biological signals such as heart rate, but the value remains is widely scrutinized based on interpretive variability within heterogeneous clinical populations (Billman, 2013). The LF peak may represent sympathetic tone, whereas the HF peak may represent the parasympathetic tone, and the balance between the two represents the reciprocal interplay between the two competing but complementary pathways (Billman, 2013; Barbieri et al., 2017). There were no statistically significant groupwise differences in the variables of age, sex, or number of recordings available for analysis; nevertheless, there

were differences in time varying latent neurobiological adaptations for acute or chronic shifts in the HPA axis associated with chronic stressors.

The evaluation of HRV in persons with anxiety disorders has been widely used, but there are considerable methodological discrepancies that limit clinical applicability and interpretation (Billman, 2013; Faes et al., 2013; Hayano and Yuda, 2019). In participants with GAD, few researchers have reported statistically significant decreases in HF spectral power and percent contribution to total spectral power (Lyonfields et al., 1995; Pittig et al., 2013), and others report no differences compared to age- and sex-matched healthy controls at rest (Hammel et al., 2011; Chalmers et al., 2014). Similar trends have been observed in those with panic disorder, with statistically significant decreases in HF percent contribution to total power spectral density compared to age- and sex-matched controls (Hammel et al., 2011; Fisher and Woodward, 2014; Chalmers et al., 2016). Decreases in HF spectral power and relative percent contribution to total power spectral density have been observed in participants with any anxiety-related disorder, regardless of specific diagnosis (Hedges' $g = -0.29$, $p < 0.001$), all associated with small to moderate effect sizes (Chalmers et al., 2014).

The observably greater attentional bias towards threat perception in anxiety disorders has been documented to facilitate the maintenance of higher-than-normal levels of corticotropin releasing factor and higher basal levels of cortisol (Flandreau et al., 2012). Threat perception and HPA axis deviations lends perspective to the role that persistent stress can induce persistent latent neurobiological adaptations for neuroendocrine mediated changes in cardiac function (Edwards and Guillems, 2010). The same neurobiological adaptations may support an acute hypersensitivity to threatening stimuli associated with activation of the HPA axis, and acutely decreased HRV in the HF band of the power spectral density function (Miu et al., 2009; Juruena et al., 2020; Spangler et al., 2021). The decrease in variability within the HF band is believed to be due to an increase in heart rate and a decrease in parasympathetic lability associated with decreased vagal inhibition of the sinoatrial node (Shinba, 2017; Spangler et al., 2021). The increased presence of circulating catecholamines support an increase in cardiac output in response to a threatening stimulus (Hammel et al., 2011; Pittig et al., 2013; Spangler et al., 2021). An increase in cardiac output affords a reduction in harmonic variability on a beat-to-beat basis as parasympathetic withdrawal is largely reported as the greatest contributing factor for rapid decreases in variability, while circulating catecholamines largely increase heart rate and decrease variability (Hagerman et al., 1996; Nichols et al., 2011; Barbieri et al., 2017; Chen et al., 2017; Owens et al., 2018).

HRV measures are designed to describe complex cardiovascular regulation mechanisms that coalesce from sympathetic and parasympathetic regulatory pathways, with near infinite variability (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996; Vila et al., 2019). The HPA axis deviates from rest in support of an autonomic balance that favors the conditional requirements of an acute stressor (DeBeck et al., 2010). Prolonged or repeated exposure to stressors, such as PPTs, precipitate repeated HPA axis deviations and may cause maladaptive long-lasting effects to the

normal stress response (Edwards and Guillems, 2010; Flandreau et al., 2012; Juruena et al., 2020; Tafet and Nemeroff, 2020). Acute and chronic stressors are associated with decreases in autonomic lability (DeBeck et al., 2010; Shinba, 2017; Spangler et al., 2021); however, the mechanisms that are responsible for such changes vary in meaningful ways. An acute stressor (DeBeck et al., 2010), such as operational and organizational stressors, will precipitate a decrease in autonomic variability due to a situationally matched increase in heart rate and preferential shift in metabolism (Owens et al., 2018; Spangler et al., 2021). Maladaptation to a chronic stressor, such as repeated exposure to PPTs, precipitates a decrease in autonomic variability due to exhausted or blunted autonomic responses (Kawachi et al., 1995; Gorman and Sloan, 2000; Hammel et al., 2011; Harrewijn et al., 2018). The current results support the coupling of the parasympathetic and sympathoinhibitory pathways within the medullary regions of the brainstem. The evidence supports the presence of varying degrees of HPA axis deviations observable at least in part by HRV metrics in a free living population (Pivatelli et al., 2012; Barbieri et al., 2017; Shinba, 2017; Chang et al., 2020).

The current study focused on the HRV parameters of RCMP cadets who endorsed clinically significant anxiety symptoms on the GAD-7 at the start of the CTP compared to the age- and sex-matched peers. The results were consistent with research evidencing the association between GAD and increased and prolonged activation of the HPA axis (Juruena et al., 2020). Persons with GAD experience excessive worry and anxiety related to several topics (e.g., money, health, family; Pelletier et al., 2017). The anxiety and worries are difficult to control, are experienced nearly every day for at least 6 months, and cause significant distress or impairment to daily activities (Pelletier et al., 2017). The chronic nature of GAD helps explain the association with clinically significant symptoms and decreased HRV (Kessler et al., 2001). Individuals who develop GAD in adolescence or early adulthood often remain undiagnosed for 10 years (Kessler et al., 2001). The extended lapse between the onset of GAD symptoms and diagnosis is concerning when the delay impedes delivery of the appropriate evidence-based treatment. Screening for GAD in early career PSP is warranted as earlier identification and intervention could improve both their mental and physical health. Information regarding when participants in the current study started experiencing symptoms of GAD was not available at the time of analyses; thus, the current sample may have heterogeneity regarding their autonomic lability due to time varying adaptations to acute or chronic stressors. Future researchers should include serial observations of all cadets as they begin their careers as PSP to observe acute (i.e., daily occupational stressors) and chronic stressor exposure (i.e., exposure to PPTs) to evaluate the potential for recognizable changes in autonomic lability associated with autonomic maladaptation.

4.1. Strengths and limitations

A significant strength of our study is the observation of HRV over a controlled timespan, and the implementation of volitional participation during CTP. The CTP provides a unique and predictable environment, with the ability to screen cadets prior to training and

evaluate a plethora of biometric signals during their time during training and thereafter. The CTP provides novel information that we can use to build injury models, and investigate the existence of, or observe the development of, neurobiological adaptations to stress that can manifest as PTSD. The same neurobiological adaptations present a unique perspective on PTSD as we can longitudinally evaluate cadets based on their anxiety symptoms as measured by the GAD-7 questionnaire and observe groupwise differences between acute and chronic PTSD. Groupwise and longitudinal analyses can provide unique insights about the neurobiological adaptations that may occur due to trauma exposure prior to their training, or while operating as PSP.

The study limitations include poor ECG recording quality for many records collected, changes in volitional participation over time precipitating non-equidistant sampling intervals, participant sociodemographic heterogeneity, and no reporting of if or when cadets may have been clinically diagnosed with anxiety disorders or the duration of their anxiety symptoms. Additionally, the absence of positive mental health disorder screens other than the endorsement of clinically significant anxiety symptoms on the GAD-7 limits the generalizability of the results, given the low rates of mental health disorder prevalence in all cadets at the start of training and the characteristics of volitional participation while wearing the Hexoskin garments. Left censorship bias is a particular challenge due to the often-heterogeneous presentation of acute but appropriate stress responses, compared to long term neurobiological maladaptation that can precipitate from chronic stressor exposure. The small number of cadets who screened positive for clinically significant anxiety symptoms on the GAD-7 also limits the generalizability of the results, although future analyses will examine longitudinal trends with an expanded sample as data collection continues in the years to come.

5. Conclusion

The role of stress and anxiety on HPA axis deviations as evaluated by HRV has been extensively studied, although with mixed and heterogeneous results. Our study was designed to examine differences in cardioautonomic regulatory pathway integration in cadets that screened positive for GAD prior to their training at CTP, compared to age- and sex-matched community controls. Our results support the current literature, with statistically significant differences between groups, suggesting that cadets with clinically significant anxiety symptoms on the GAD-7 prior to CTP show less variability in the LF:HF ratio over the course of their 26-week training program compared to cadets who did not endorse symptoms. The results have important implications for future investigations of cardioautonomic dysfunction and chronic HPA axis deviations in persons with anxiety disorders, suggesting a statistically significant decrease in serial recording variability, rather than a statistically significant decrease in raw values, when observed during the CTP.

Data availability statement

The datasets presented in this article are not readily available because data access will not be provided due to the sensitive nature of

the content. Requests to access the datasets should be directed to jonathan.burphy@uregina.ca.

Ethics statement

The studies involving humans were approved by University of Regina Institutional Ethics Review Board. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

RNC, TT, KM, RS, JN, and KA: conceptualization. RNC, TT, RS, TA, GA, GK, LL, KM, LJ, JN, and KA: methodology. RNC, TT, RS, GK, KM, and LJ: validation. RNC, TT, RS, KM, and LJ: formal analysis. RNC, GK, JPN, and SS-Z: investigation. RNC, RK, and SS-Z: resources. RNC, TT, GK, and JPN: data curation. TT, RNC, KM, LJ, JN, and KA: writing – original draft preparation. TT, JPN, KA, KM, LJ, JN, RS, TA, SS-Z, LL, RK, GA, GK, and RNC: writing – review and editing. All authors viewed and approved the submitted version of the manuscript.

Funding

The RCMP Study is funded by support from the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness. LL is supported by a Tier I Canada Research Chair in Methods for Electronic Health Data Quality. TA is supported by a Tier I Canada Research Chair in Childhood Adversity and Resilience. The development, analyses, and distribution of the current article was made possible by a generous and much-appreciated grant from the Medavie Foundation.

Acknowledgments

The RCMP Study is made possible by a large and diverse team, with detailed acknowledgements available online (www.rcmpstudy.ca).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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