



Police Stress in the Swedish Context: Development and Psychometric Properties of the Police Stress Identification Questionnaire

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Abstract

Policing is recognised as a stressful occupation. Stress is known to correlate with health problems. This study aimed to extend the available police stress measures and provide an instrument to measure the extent to which different stressors are perceived in general Swedish police work using the Police Stress Identification Questionnaire (PSIQ). The sample comprised patrolling police officers from 20 local police districts or units in all seven regions in Sweden ($n=539$). The 42 items of the PSIQ were analysed using exploratory factor analysis, and the factor structure was tested on the second random half of the data using confirmatory factor analysis. The final model comprised 40 items that were loaded on five factors. Future studies should focus on a broader range of stressors and on populations other than patrolling police officers.

Keywords

Factor structure, health, police officers, stress

Introduction

Studies in police work have a complex character and require an interdisciplinary approach. Police work would have a greater impact if it were grounded in evidence-based practices and scientific methods. Evidence-based practice in police work requires carefully designed methodological tools and valid and reliable instruments with high generalisability. To address this issue and contribute to this context, our work is focused on police officers' perceptions

and experiences of stress. Despite many investigations of police stress, there is still a lack of knowledge of what types of stressors are experienced that would negatively impact police officers' health and their performance. A body of studies on stress among police officers has been conducted, with very few investigations identifying which types of stressors are related to which part of police work. In this article, we aim to take the first step in developing items for a measuring instrument to identify stress domains of the police at work and the extent to which these stressors are perceived. Police work is stressful (Backteman-Erlanson, 2013; Chopko, 2010; Duxbury & Halinski, 2017; Garbarino et al., 2011; Padyab, Backteman-Erlanson, & Brulin, 2016; Stinchcomb, 2004). Stress is a known problem in the police profession because of the nature of the work. Exposure to crime scenes, intimate partner violence, shift work, political steering (Can & Hendy, 2014; Lucas, Weidner & Janisse, 2012), conflicts with colleagues, challenges concerning management, and dealing with death are common stressors in police work (Russell, 2014). Improper management of stress can adversely affect the officer's mental health (Alexopoulos, Palatsidi, Tigani, & Darviri, 2014; Darensburg et al., 2006; Kohan & O'Connor, 2002; Kula, 2017; Violanti & Paton, 1999). In addition, police officers in the USA have a relatively shorter life expectancy compared to the general population. Shift work, obesity, and exposure to hazardous work environments are possible explanatory factors for their elevated risk of death (Violanti et al., 2013). In Swedish studies, high psychological job demands and low decision latitude at work were associated with poor mental health among police officers (Sundqvist, Hansson, Ghazinour, Ögren, & Padyab, 2015); the joint effect of high job strain and low levels of work-related social support were also associated with police officer's poor mental health (Hansson, Hurtig, Lauritz, & Padyab, 2016). The long-term effects of stress on police officers have been investigated by researchers in North America (Kohan & O'Connor, 2002; Paton, Violanti, & Schmuckler, 1999) where they found maladaptive and antisocial behaviours, such as drinking problems, hyper-aggressiveness, and violence, both on and off the job. Studies confirm that sudden life events overwhelm a biological response. Fear and horror are affective responses, and the consequences of these processes are psychological and psychiatric disorders. Depression, PTSD including experiencing, witnessing, or being confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of the self or others are among the consequences (American Psychiatric Association, 2000, 2013; Van Den Berg et al., 2017). Police officers' private life should be a topic under consideration among scholars (Deschamps et al., 2003). Gershon et al., (2009) conducted an investigation of 1,072 officers from a large urban police department. They found that exposure to critical incidents, workplace discrimination, lack of cooperation among co-workers, and job dissatisfaction correlated significantly with perceived work stress. Work stress was significantly associated with adverse outcomes, including depression and intimate partner abuse. Officers with negative or avoidant coping mechanisms reported higher levels of perceived work stress and adverse health outcomes. Police stress correlates with certain mental (Burke, 2017; Chopko, 2010; Marchand et al., 2015) and physical health problems such as cardiovascular disease, both of which are prevalent among police populations (Franke, Ramey, & Shelley, 2002). Collins and Gibbs (2003) conducted a cross-sectional survey, including 1,206 police officers, to assess levels of strain associated with a series of potential home- and work-related stressors. They found organisational culture and workload to be the key stressors and highlighted that the degree of symptomatology appears to be worsening, suggesting the need of management action. They recommended further research to study common contributors to increased susceptibility among female officers. The influence of work characteristics on the association between police stress and sleep quality investigated by Ma and colleagues (2018)

among 365 police officers revealed that police officers' perceptions of the severity of stress and the frequency of stressors are associated with poor sleep quality.

The existing instruments to measure police stress, such as the Spielberger Police Stress Survey (S-PSS), are not contextualised for Swedish patrolling police work; given the changes in police training and modern developments in society, the aim of this effort is to develop an instrument that measures stressors among patrolling officers in Sweden.

Stress and coping

Hans Selye (1907–1982), known as the 'father of stress', began his study on stress early in his medical career. His clinical observations of patients with nonspecific symptoms and experiments on laboratory rats underpinned his concept of General Adaptation Syndrome (GAS), which led him to assume that prolonged exposure to stress resulted in poor health. Although the GAS concept was later shown to be incorrect, it did put stress on the map and also emphasized the fact that stress greatly affected the immune system and the adrenal glands (Fink, 2009). Selye's work accelerated the study on stress. Lazarus, influenced by Selye's work, proposed the impact of cognition during stress. Together with Folkman, he studied the role of cognition in human behaviour and stress (Lazarus & Folkman, 1984b).

The first and most generic definition of stress based on Fink's scientific report was proposed by Hans Selye who stated that 'stress is the nonspecific response of the body to any demand' (Fink, 2009, p. 5). Selye proposed that stress is not identical to emotional arousal or nervous tension since stress can occur in humans and animals under or in response to anaesthesia, and it can also occur in plants and bacteria that have no nervous system. He emphasized that stress occurs all the time, even during sleep, when several organs have to function. However, his theory and definition of stress were criticized for being too general, biologically directed, and ignoring cognitive and psychological factors (Fink, 2009). He also focused on Lazarus' later work on coping with stress and recognised the role of emotions in coping with stress. Based on the coping theory and research, Lazarus (1993) contrasts two approaches to coping; one focuses on coping as style and personality characteristics, and the other focuses on coping as a process. From a process perspective, coping changes over time and is shaped by the situational context from which it generates. The theory of coping and stress, introduced by Lazarus (1981) and Folkman et al. (1980; 1981), posits two processes, cognitive appraisal and coping, as mediators of stress and stress-related adaptive outcomes. A key concept of the theory of psychological stress and coping developed by Lazarus and his colleagues (e.g., Lazarus & Folkman, 1984a; Lazarus & Folkman, 1984b) is cognitive appraisal, which is defined as a process through which a person evaluates whether a particular encounter with the environment is relevant to his or her well-being and, if so, in what ways. The cognitive theory of stress and coping is characterised by being relational and process-oriented. Cognitive appraisal occurs in the form of two main mechanisms that contribute to stress responses: primary and secondary appraisal. Primary appraisal constitutes the evaluation of the demands of the current situation, whereas secondary appraisal constitutes the evaluation of resources to handle the situation. Lazarus and Folkman (1984b) define coping as the sum of behavioural and cognitive efforts that are constantly changing and are intended to manage internal and external demands that are appraised as demanding or taxing. Coping is a relationship between a person and environment that is appraised by the person as taxing or exceeding his or her available resources. This relational definition separates this theory from other approaches. Stress can also be defined as a stimulus, i.e., a stressor in everyday life, as a product of intrapsychic conflict centring on a person's needs, motives, impulses, or beliefs, or as a response, such as physiological arousal or subjective

disturbances. In the definition discussed by Folkman, stress is not a property of a person or environment, and neither is it a stimulus or response. Stress is a particular relationship between a person and environment. ‘Process-oriented’ has two meanings in the cognitive theory of stress: first, the person and environment are in a dynamic relationship that is constantly changing; and second, this relationship is bidirectional, with the person and environment affecting each other (Folkman, 1984). The function of coping is twofold: problem-focused coping changes the troubled environment that causes distress, and emotion-focused coping regulates stressful emotions. These coping processes can be used together or separately (Lazarus & Folkman, 1984b). Patterson (2003) investigated the effects of coping and social support on psychological distress in response to stressful work and life events among police officers. Participants were 233 police officers employed within a mid-sized organisation who volunteered for this study. The results showed that life events such as ‘working a second job’, ‘a family member or close friend with health problems’, or ‘health-related events’ are strongly associated with distress. Problem-focused coping resulted in a ‘reverse buffering effect’; the relationship between work events and distress was associated with higher distress. Seeking social support buffered the relationship between work events and distress, and emotion-focused coping buffered the relationship between life events and distress. Although stress and coping have many dimensions to explore and understand, studies have focused on stress and physiology. Steptoe (2009) contributed to understanding behavioural control and physiological stress responses. He defined behavioural control as having at one’s disposal a behavioural response that can prevent, reduce, or terminate stressful stimulation. Other researchers focused on stress and the brain system (e.g., Vinson, Whitehouse, & Hinson, 2009; Solomon & Bouloux, 2009), stress and the autonomic nervous system (e.g., Habersaat et al., 2018; Strahler & Ziegert, 2015), and stress and memory (e.g., Di Nota & Huhta, 2019; Regehr & LeBlanc, 2017). However, we believe that both cognitive and physiological stress responses are two sides of the same coin, which should be investigated to understand more about human responses to stress, particularly among police officers.

Police stressors

A common consensus in many published scientific reports in the police field is that police work is stressful (Backteman-Erlanson, 2013; Chopko, 2010; Duxbury & Halinski, 2017; Garbarino et al., 2011; Padyab, Backteman-Erlanson, & Brulin, 2016; Stinchcomb, 2004). Violanti and Aron (1995) found that killing someone in the line of duty and experiencing a fellow officer being killed ranked as the two highest stressors among police personnel. They identified several stressors, which were related to organisation and work environment, e.g., work shifts and inadequate support by supervisors. We have been inspired by John Violanti’s outstanding work on police stress in which he highlighted the significance of stress on police work (Ma et al., 2018; Violanti, 2012; Violanti et al., 2016; Violanti, Vena, & Marshall, 1986; Violanti & Aron, 1994, 1995; Violanti et al., 2013; Violanti et al., 2017b) and the associations between police stressors and health outcomes (Violanti et al., 2017a). One of Violanti’s contributions to police studies was to identify various police stressors and where in policing the stressors are placed. We decided to explore police stressors through Violanti’s lenses by searching police literature using search engines (e.g., PsychInfo, PubMed, Web of Science, and Google Scholar) using the following keywords: police stress questionnaire, police stress survey, police stress instrument, police stress inventory, law enforcement stress questionnaire, law enforcement stress survey, law enforcement stress instrument, and law enforcement stress inventory. There are surprisingly few investigations on police stressors and their impact on police officers and organisations on a macro level. Our literature search was directed toward

the description of police stressors in published scientific reports on different aspects of police work. By referring to Lazarus (1981) and Violanti and Aron (1994; 1995), stressors, in contrast to *individual stress*, may be described as factors in the police environment external to the officer and subjectively perceived as being bothersome or frustrating.

Police stress measurement

It is important to use a valid and reliable instrument to offer an objective means of collecting data about police stressors. Violanti's and Aron's works (1993, 1994, 1995) were based on the 60-item S-PSS (Spielberger et al., 1981). The S-PSS instrument was originally factored into two major stressor components: (1) organisational and/or administrative and (2) inherent police work factors. Almost 40 years have passed since the introduction and use of S-PSS in police science. Our rationale for this project comprised several reasons. Policing and society have developed and changed with regard to technology and globalisation in Sweden and elsewhere. First, police training has changed over the past 40 years. For example, the basic training has moved from almost solely apprenticeship training to training inspired by science and academic knowledge. Second, stressors may change because of modern developments in society. For example, digitalisation can lead to global crimes and modern threats from terror groups acting globally. Finally, police work has changed based on the changes in society. For example, digitalisation has changed not only the possibilities of fighting crime but also the demands on the police to act on certain issues such as performance management (Cockroft & Beattie, 2009). Another motivation to develop a police stress measurement tool was that digitalisation and different medical techniques impact police stressor investigation. For example, Hickman and colleagues (2011) conducted a pilot study to reveal that continuous heart rate measurement over the course of the test of the officers' shift was possible and that these data could be placed in space-time context for exploring potential stress 'hot spots'. Andersen and colleagues (2016) reported basal and reactivity levels of cortisol regarding occupational duties among 18 special force police officers. This is important to note, as the field of police stress has shifted its focus away from perceptual measurement toward physiological measurements of stress. This shifting from perceptual measurement toward physiological measurements of stress responds to the physiological perspective of stress response. Meanwhile, our goal is to highlight the perceptual measurement of police response to stress. Moreover, we believe that these two approaches complete each other, which would eventually increase our understanding about human responses to stress, particularly among police officers.

Materials and methods

General research design

This study has been based on qualitative and quantitative methods. The assessment of whether prior instruments reflected police officers' perceived stress was addressed by a qualitative method. The psychometric properties of the instrument developed from the qualitative method was then quantitatively assessed.

Qualitative method

The work of Violanti (e.g., 1993, 1994, 1995, 2006) and Spielberger et al. (1981) was the point of departure for this study. Moreover, the theory of stress and coping was considered a key concept in developing this instrument. We used the S-PSS as our point of departure and created a pool of stressors in police work. Several studies have used S-PSS together with other self-assessment instruments (e.g., Addis & Stephens, 2008; Allison, Mnatsakanova,

Fekedulegn, et al., 2019; Allison, Mnatsakanova, McCanlies, et al., 2019; Martelli, et al., 1989; Storch & Panzarella, 1996). A preliminary list of items was obtained based on the theoretical standpoint and inspiration from Violanti's studies (e.g., 1993, 1994, 1995, 2006) and Spielberger's instrument (1981). To ascertain face validity, we interviewed nine police officers (two females) focusing on items provided to them and discussed them, given their personal experiences that may lead to generating new items. The interviewees, aged 30 to 60 years, had on average more than 10 years of experience in the field. They were informed about the study's aim. Each interview took approximately 30 minutes. The content of interviews was discussed in our authorship group using content analysis (Graneheim & Lundman, 2004) and our theoretical perspectives. Phrases identified from the content analysis were discussed in the expert panel, including one expert in the field of stress and coping and an experienced police officer, and provided the basis for modifying or rewording the items and generating new items that were not included in the preliminary list. Interview data were used to confirm concepts in the existing literature about police stress and explore new areas. This led to a 42-item questionnaire: the PSIQ. The exact wording of the instruction is 'These questions map different types of stressors that affect you as a police officer or civil servant. Mark with a cross how strong you experienced the stress. It can be both that you experienced the event or that you experienced the risk of it happening as stressful'. The measurement scales differ from Spielberger's instrument. A numerical rating from 0 to 9 is applied, where 9 indicates the most stressful level. This is designed in a way that respondents should explain that various degrees of stressful experience can be taken into account, and 'which pole am I close to?' is the point that the respondent is urged to consider (Scheaffer et al., 2011).

Quantitative method

Setting

The Swedish police is the central authority with seven geographical police regions, including 100 local police districts and a Department of National Operations with approximately 30,000 employees; out of which, 20,040 are sworn officers. In 2018, 33% of the 20,040 police officers were women, and the average age of all officers was 44 years. The Swedish Police Authority is led by a National Police Commissioner (The Swedish Police Authority, 2019a, 2019b).

Sample

Data were extracted from two investigations using the PSIQ, conducted between December 2017 and June 2018. The researchers had an agreement with the Stockholm Police Region to conduct a scientific investigation in the so-called 'prioritised areas'. One part of the investigation focused on health and working conditions, including a comprehensive survey. In addition, researchers were appointed to evaluate the Swedish Police Authority's test period on conducted energy weapons (CEW), including a survey. This data collection was completed before the CEW test period started. The entire sample consisted of patrolling police officers from 20 local police districts or units in all seven regions in Sweden ($n=539$).

Sample and data collection from police officers in the Mareld study

The researchers visited three local police districts in Stockholm Police Region in spring 2018 and personally informed about the project and ethical issues to obtain informed consent. The project was described in a letter, and a paper survey was distributed. A total of 180 patrolling police officers responded to the survey, and the researchers gathered the questionnaires. This study was approved by the Regional Ethical Review Board in Umeå University (Dnr 2017/516-31). The project was funded by the Stockholm Police Region.

Sample and data collection from police officers in the CEW study

The surveys and prepaid return envelopes were sent in a sealed envelope to the contact person at each local police district or unit to be distributed to the police officers who could respond to the survey and return it in the prepaid return envelopes in December 2017. The project was presented to the researchers' contacts in the police authority through written and verbal descriptions. A reminder was conveyed through e-mail to the contact persons and communicated further to the police officers. This convenience sample was used because of the secrecy rules in the Swedish police organisation. A total of 359 patrolling police officers responded and returned the questionnaires. This study was approved by the Swedish Ethical Review Authority (Dnr 2019-02464). The project was funded by the Swedish Police Authority.

Statistical methods

The best factor structure was validated by a random split sample cross-validation procedure. The procedure included (1) splitting the sample randomly into two approximately equally sized datasets, (2) conducting the exploratory factor analysis (EFA) on the first random sample, and (3) evaluating the acceptability of the model fit using confirmatory factor analysis (CFA) on the second random sample.

The EFA was conducted using principal component factor analysis with oblique rotation. Oblique rotation was applied because the factors were not expected to be independent of each other. From coping theoretical perspective, we expect people to choose from various coping strategies rather than to use a set of strategies to the exclusion of others (Folkman, 1980). Parallel analysis, an accurate factor retention method, was used to present the number of factors in the EFA (Hayton et al., 2004).

The EFA was performed on half of the sample selected randomly from the total sample ($n=539$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was calculated for each variable to investigate data for factorability. Variables with a KMO value of less than 0.5 were dropped from further analysis. Furthermore, Bartlett's test of sphericity was applied (Brace et al., 2012). We also checked the negative partial correlations for the existence of a factor structure underlying the variables (Tabachnick & Fidell, 2006).

The factor structure was tested on the second random half of the data using CFA and applying model modifications. The final solution was tested on the holdout sample. The cut-off for the loading factor of 0.4 was considered the threshold (Tabachnick et al., 2001). CFAs followed Jöreskog's guidelines (2004) for the analysis of ordinal data. The Diagonal Weighted Least Squares estimation was applied to polychoric correlations that were based on the asymptotic covariance matrix.

The models were evaluated using the goodness of fit index (GFI), incremental fit index (IFI), adjusted goodness of fit index (AGFI), and comparative fit index (CFI) using a threshold 0.9 to indicate a good fit. The models were also evaluated by root mean square error of approximation (RMSEA) with 90% confidence interval (CI), where values less than 0.05 indicated a close fit, values ranging from 0.05 to 0.08 indicated a fair fit, and values above 0.1 indicated a poor fit (Bentler, 1990; Bentler & Bonett, 1980; Bollen, 1989; Browne & Cudeck, 1993; Kline, 2005; Steiger, 1990; Tabachnick & Fidell, 2006).

The EFA was conducted using STATA 15.1, and CFAs were performed using LISREL 8.8.

Results

This study included a sample of 539 police officers aged 36 ± 8 years. More than two-thirds of the sample was male. Table 1 presents the mean score for each item on a scale of 0–9. Police officers scored high on P3 ‘*threats of physical violence against someone in your own family*’, P7 ‘*becoming infected with a disease during an intervention*’, P14 ‘*that my colleague was suddenly shot, which led to a sudden injury*’, and P31 ‘*that family members have received a death threat*’, indicating very stressful events in their career. The most stressful event was found to be P14 ‘*that my colleague was suddenly shot, which led to a sudden injury*’ (mean score =7.18), and nearly three-quarters (72%) of police officers indicated the highest level of stress (score between 7 and 9) for P14. More than half (63%) of the participants reported P31 ‘*that family members have received a death threat*’ as a highly stressful event. More than one-third (39%) of the police officers indicated the highest level of stress for P3 ‘*threats of physical violence against someone in your own family*’, and nearly half (45%) expressed a high level of stress regarding P7 ‘*becoming infected with a disease during an intervention*’. In contrast, ‘*condescending claims*’ and ‘*regretting becoming a police officer*’ were perceived as lowest stressful events by respondents.

Table 1. Descriptive statistics for items

Variable	Mean	SD	0-3 N (%)	4-6 N (%)	7-9 N (%)
P1	1.35	1.7	475 (89.1%)	51 (9.6%)	7 (1.3%)
P2	2.96	1.9	349 (65.0%)	156 (29.1%)	32 (6.0%)
P3	5.40	2.5	143 (26.7%)	182 (34.0%)	211 (39.4%)
P4	3.65	2.0	269 (50.1%)	217 (40.4%)	51 (9.5%)
P5	4.85	2.4	172 (32.0%)	216 (40.2%)	149 (27.7%)
P6	4.42	2.3	212 (39.4%)	201 (37.4%)	125 (23.2%)
P7	5.71	2.6	128 (23.8%)	167 (31.0%)	243 (45.2%)
P8	2.85	2.2	342 (63.9%)	150 (28.0%)	43 (8.0%)
P9	3.32	2.3	301 (56.2%)	175 (32.6%)	60 (11.2%)
P10	2.12	2.2	412 (76.7%)	95 (17.7%)	30 (5.6%)
P11	3.57	2.4	284 (53.4%)	170 (32.0%)	78 (14.7%)
P12	3.63	1.9	263 (49.4%)	224 (42.1%)	45 (8.5%)
P13	2.57	2.5	365 (68.6%)	113 (21.2%)	54 (10.2%)
P14	7.18	2.5	74 (14.1%)	69 (13.1%)	383 (72.8%)
P15	4.57	2.8	210 (39.6%)	146 (27.5%)	174 (32.8%)
P16	3.93	2.4	247 (46.2%)	187 (35.0%)	101 (18.9%)
P17	3.60	2.6	294 (55.0%)	144 (26.9%)	97 (18.1%)
P18	3.28	2.4	309 (57.8%)	164 (30.7%)	62 (11.6%)
P19	3.39	2.2	303 (56.8%)	164 (30.8%)	66 (12.4%)
P20	3.05	2.1	319 (60.0%)	165 (31.0%)	48 (9.0%)
P21	3.52	2.4	288 (53.9%)	162 (30.3%)	84 (15.7%)
P22	3.85	2.5	256 (47.9%)	180 (33.6%)	99 (18.5%)
P23	3.34	2.3	298 (55.8%)	175 (32.8%)	61 (11.4%)
P24	4.55	2.6	208 (39.0%)	181 (33.9%)	145 (27.2%)
P25	4.12	2.3	230 (43.1%)	201 (37.6%)	103 (19.3%)
P26	2.43	2.3	382 (71.8%)	108 (20.3%)	42 (7.9%)
P27	2.39	2.6	352 (68.5%)	112 (21.8%)	50 (9.7%)

Variable	Mean	SD	0-3 N (%)	4-6 N (%)	7-9 N (%)
P28	3.85	2.6	248 (46.8%)	170 (32.1%)	112 (21.1%)
P29	3.31	2.6	282 (53.4%)	168 (31.8%)	78 (14.8%)
P30	2.33	2.3	387 (72.6%)	107 (20.1%)	39 (7.3%)
P31	6.55	2.7	89 (16.7%)	110 (20.7%)	333 (62.6%)
P32	3.05	2.4	319 (59.7%)	158 (29.6%)	57 (10.7%)
P33	2.16	2.2	397 (74.6%)	107 (20.1%)	28 (5.3%)
P34	2.71	2.3	355 (66.5%)	137 (25.7%)	42 (7.9%)
P35	2.51	2.3	372 (70.1%)	119 (22.4%)	40 (7.5%)
P36	2.60	2.3	379 (71.0%)	110 (20.6%)	45 (8.4%)
P37	2.03	2.1	418 (78.1%)	90 (16.8%)	27 (5.0%)
P38	1.21	1.9	477 (89.3%)	36 (6.7%)	21 (3.9%)
P39	2.33	2.2	381 (71.5%)	118 (22.1%)	34 (6.4%)
P40	3.56	2.8	270 (50.8%)	151 (28.4%)	110 (20.7%)
P41	4.91	2.5	167 (31.2%)	201 (37.6%)	167 (31.2%)
P42	4.04	2.3	236 (44.0%)	201 (37.5%)	99 (18.5%)

The EFA was used to explore the psychometric properties, and then the CFA was applied to confirm the structure. To achieve this, the entire sample was randomly divided into two subsamples. We conducted an EFA with the first half (Sample A). We then confirmed the factors using the other half of the sample (Sample B). Parallel analysis was used as a factor retention method to decide the optimum number of factors in the EFA (Hayton, Allen, & Scarpello, 2004). According to parallel analysis, factors from the real data with eigenvalues greater than the corresponding eigenvalues from the random data would be retained and based on these criteria.

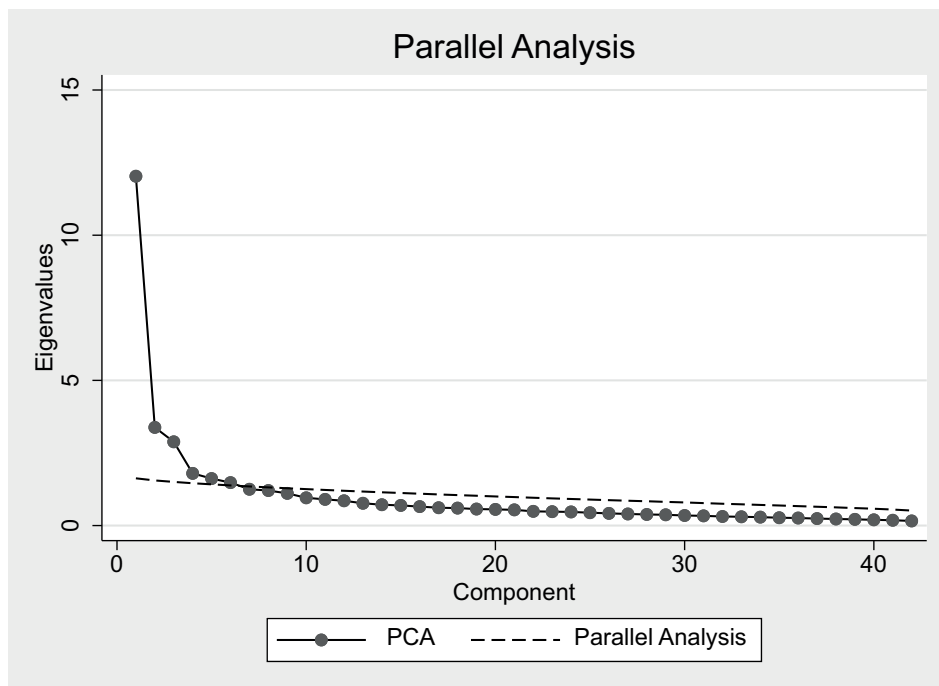


Figure 1. Parallel Analysis for Principle Components
Eigenvalues Averaged Over 100 Replications

Figure 1 suggests a five-factor solution. However, a clear distinction cannot be made between three, four, and five factors since they align very closely to each other; therefore, model fit indices from CFA were reported for these possible solutions (Table 2). All 42 items were used in EFA, forcing the extraction of three to five factors. Table 3 shows the items and corresponding factors. The first factor represents 'organisational stress', including items such as P17 '*that reorganisation takes place*' (mean score = 3.6), P34 '*that I feel that police work has become much more difficult than before*' (mean score = 2.71), and P36 '*performing new routines in connection with reorganisation*' (mean score = 2.60). The second factor represents stressors related to 'stress concerning significant others', including items like P31 '*that family members have received a death threat*' (mean score = 6.55) and P28 '*to have a low degree of communication with one's life partner*' (mean score=3.85). The third factor represents stressors related to 'operational stress', including items such as P4 '*threats of physical violence*' (mean score = 3.65) and P6 '*receiving a death threat when being on duty*' (mean score = 4.42). The fourth factor represents stressors related to 'self-image', including items such as P1 '*condescending claims*' (mean score=1.35) and P37 '*the colleagues' view of me*' (mean score=2.03). The fifth factor represents stressors related to 'death confrontation', including items such as P11 '*handling body parts in connection with suicide or accidents*' (mean score=3.57). Two items (P7 and P13) had low loadings (less than 0.4) and were omitted from the item pool.

Table 2. Summary results from Confirmatory Factor Analysis

	Variance explained	RMSEA (90% CI)	CFI	IFI	GFI	AGFI
3-factors	42%	0.0950 (0.0906 – 0.0994)	0.917	0.917	0.935	0.927
4 factors	47%	0.0997 (0.0956-0.104)	0.909	0.909	0.929	0.920
5 factors	52%	0.0919 (0.0879-0.0960)	0.922	0.923	0.937	0.929

Note: RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; IFI = incremental fit index; GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index.

To validate the factor structure of the data, CFA was utilised on the second half of the sample (Sample B). The CFA model tested whether the sample data would support the factor structure derived from the EFA. Goodness of fit measures were used to indicate the overall model fit. Using Sample B to perform the CFA, it was found that the model moderately fitted the data. None of the items had residuals higher than 0.8 (theta-delta), indicating a low measurement error for all items. Table 2 presents fit indices of models.

Table 3. Factor loadings from exploratory factor analysis (sample A, $n=269$) and from confirmatory factor analysis on Sample B ($n=270$)

Item	Organizational stress	Stress concerning significant others	Operational stress	Self-image	Death confrontation	Factor loadings from Confirmatory factor analysis on second half of the sample (Sample B)
P1				0.6418		0.597
P2			0.6371			0.392
P3			0.6052			0.701
P4			0.8185			0.797
P5			0.6127			0.609
P6			0.6565			0.788
P7						
P8			0.4076			0.712
P9					0.6798	0.567
P10					0.6598	0.690
P11					0.7511	0.688
P12					0.6325	0.708
P13						
P14		0.6582				0.609
P15		0.5381				0.674
P16	0.6072					0.721
P17	0.7833					0.655
P18	0.7011					0.805
P19				0.5244		0.607
P20	0.4023					0.624
P21	0.4335					0.573
P22	0.6162					0.600
P23	0.6929					0.741
P24	0.6218					0.640
P25	0.4566					0.677
P26		0.4646				0.664
P27		0.6714				0.675
P28		0.7423				0.694
P29		0.6773				0.820
P30				0.4195		0.677
P31		0.7053				0.724
P32	0.6270					0.603
P33	0.6463					0.684
P34	0.7142					0.779
P35	0.7366					0.723
P36	0.7653					0.758
P37				0.5729		0.648
P38	0.4445					0.551
P39				0.4036		0.659
P40				0.5187		0.411
P41	0.5376					0.678
P42	0.4263					0.590

Note: items with factor loadings smaller than 0.4 or cross loadings on the factors were dropped.

The results from CFA showed that five-factor solution had the highest fit indices (RMSEA=0.0919; 90% CI: 0.0879 – 0.0960, IFI=0.923, GFI=0.937, AGFI=0.929, CFI=0.922), compared to the three and four factor solutions (Table 2). Table 3 shows the factor loadings from CFA on Sample B. The final model comprised 40 items that were loaded on five factors, accounting for 52% of the total variance (Table 2).

Discussion

The findings showed that a five-factor model was the best available solution, suggesting the suitability of using the PSIQ in the context of Swedish police work. The absence of measurement error (the degree to which observed values are not representative of the true value) eliminates the possibility of imprecision for measuring the items (Hair et al., 1998). Owing to the lack of clear distinction between three, four, and five factors in the parallel analysis, we reported the model fit indices from the CFA for these possible solutions. The CFA suggested the five-factor model as the highest fit for data, suggesting construct validity of the PSIQ and the potential for further developments of the instrument in the Swedish police context. Most studies exploring the factor structure of a newly developed instrument test its construct through EFA only. The results from EFA should be interpreted with some caution since it is not a hypothesis-testing procedure (Hanley et al., 2005). Since CFA is a more advanced method to test the underlying theoretical structure of latent processes, this is an essential step toward the validation of the PSIQ in the police context.

Item P7 '*becoming infected with a disease during an intervention*' was perceived as a high stressor (mean score=5.71, Table 1), which was not loaded in any of the proposed factors because of the loading factor less than the critical value 0.4. However, we decided that this item should be considered as a single item in measuring stressful events in police work. We suggested retaining this item in future investigations because during the construction of the questionnaire, several police officers perceived this item as very stressful.

Our results demonstrated that the stress perceived by Swedish police officers concerns five major stressors, namely 'organisational stress', 'stress concerning significant others', 'operational stress', 'self-image', and 'death confrontation'. In the first domain, the Swedish police officers reported organisational stressors in accordance with Violanti and Aron's (1995) investigation; they reported that the desk sergeant ranked organisational factors as stressors. A possible explanation for this finding could be that our study only included patrolling officers who might not have been as keen to take on administrative tasks. In the second and third domain statements, such as '*that my colleague was suddenly shot, which led to serious injury or death*' or '*that family members have received a death threat*', our findings are more prone to individual cognitive and emotional responses to the situation. Police work includes street fighting and being involved in complex conflict situations. Police officers receive conflict and firearms training within their education and in the field. This means police officers have a certain level of theoretical and practical knowledge and skills to deal with gunfire and complicated conflict situations. However, a question occurs why a colleague being suddenly shot (P14, mean score=7.18, Table 1) was perceived as the highest stressor among all items. One possible explanation could be that the respondent's attention was caught by the term 'suddenly'; the stressful situation is about gunfire, which is a life-and-death situation. One limitation at the current stage of the development of this measurement includes a mixture of both real and vicarious (imagined) experiences of stressors. There is a qualitative, psychological difference between fearing a dreadful experience that might lead to anger if they experience the stressor and fearing a dreadful experience that

might lead to fear if they imagine the stressor (Folkman & Lazarus, 1980, 1981, 2011). The participants included those who previously had experienced the same situation and those who never had. We assume that for those who have not experienced such a situation, reading the item created a scenario in their mind. Folkman (2011) discusses several ways of coping with stress arising from the internal perceptual picture of events or being exposed to the situation, e.g., seeking social support, self-controlling, or distancing. Our findings confirm the importance of family life in police officers' health. Stressors perceived by respondents as a threat toward a family member are a concern: '*that the family's life has been threatened*'. This situation was perceived as extremely serious by 63% of the respondents and as serious by 21% of the respondents (Table 1). The lack of control and how it affects others are also similar to the situation of a colleague getting shot. Based on Folkman's (1984, 2011) investigation, we assume that a common factor in both police stress areas, i.e., fieldwork and emotionally experienced threat toward family, is 'fear'. This means that fear, as an emotion, plays an important role in how police officers behave in different situations. Meanwhile, most attention has been given to police anger management (Bor et al., 2018; Galovski et al., 2016; Meffert et al., 2008); less attention has been focused on how police officers deal with fear and how fear impacts their behaviour and decision-making.

Others' views on police officers and confronting with death-related issues were other sources of stress that need a closer attention in police work and training modules. To some degree, our investigation confirms a previous investigation by Violanti and Aron (1995), where killing someone was the highest-ranked stressor. We are aware that the context of Swedish police work may impact our results. For instance, police shootings are more common in the USA, which are often followed by a massive public outcry against the police.

Our investigation has several limitations, such as the possibility of a broader range of police stressors in Swedish police work than those being the focus in this study. Moreover, the generalisability of the results is subject to certain limitations because the sample comprised only patrolling police officers. Our sample represented patrolling police officers from 20 local districts in all seven regions in Sweden. Items were selected from a range of possibilities that are relevant to patrolling police officers whose tasks are unique and somehow different from other police employees. Including desk police officers would require a different set of items that specifically concerns the target group. Being a police officer is a complex and diverse profession, and it seems impossible to capture each stressor in police work in a questionnaire. As the first step, we decided to focus on patrolling police officers, who deal with certain types of stressors and move forward to a broader range of police in future research.

Another limitation of the current instrument, which is in an early stage of development, was the lack of distinguishing between stress related to fearing a dreadful experience and actually having experienced the event. This issue will be a part of the future development process.

Conclusion

Despite the limitations of this study, our findings supported that the stress measurement instrument can be used in the Swedish police context. Fear in police officers' private life and its relation to working life are two points that scholars need to consider, both in police trainee modules and in organisational leadership. Based on previous studies and the present study, we suggest that the time is right for preparing literature, programmes, or other useful tools to teach police students and officers the ways of coping with fear and increase their knowledge about its intertwined impact on private and working life.

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Appendix 1. The Police Stress Inventory Questionnaires statements

- P1. Condescending claims
- P2. Verbal aggressive threats
- P3. Threats of physical violence against someone in your own family
- P4. Threats of physical violence
- P5. Being physically abused during an intervention
- P6. Receiving a death threat when on duty
- P7. Becoming infected with a disease during an intervention
- P8. Internal fear of being attacked
- P9. Informing next of kin regarding the death of a person
- P10. Being exposed to odour from a dead body
- P11. Handling body parts in connection with suicide or accidents
- P12. Police intervention against crowd
- P13. Working night shift
- P14. That my colleague was suddenly shot, which led to serious injury or death
- P15. To be injured by chemical substances
- P16. Lacking a good supervisor
- P17. That reorganization takes place
- P18. That the division of roles is unclear in the unit or in the organization
- P19. Living with guilt related to unsuccessful assignments
- P20. Lacking advanced knowledge in police work
- P21. That internal investigation is carried out when mistakes are made
- P22. The cumbersome paperwork
- P23. That supervisors do not do their job
- P24. That the law is ineffective in dealing with interventions against offenders
- P25. Having access to poor and outdated equipment
- P26. To be away from the family because of business travel within the country
- P27. To be away from the family because of business travel to another country
- P28. To have a low degree of communication with one's life partner
- P29. Not to receive support from one's life partner when it comes to conflicts at work
- P30. Not sharing anything from my work in order to not disturb my family
- P31. That family members have received death threats
- P32. That the image of the police is distorted on the internet and in the media such as TV and newspapers
- P33. It is hopeless to be a police officer
- P34. That I feel that police work has become much more difficult than before
- P35. That the work culture within the organization disturbs me
- P36. Performing new routines in connection with reorganization
- P37. The colleagues' view of me
- P38. Regretting becoming a police officer
- P39. To perform tasks that are against my own values
- P40. Being harassed or receiving a death threat when being off duty
- P41. Not being able to do the job due to scarce personnel resources
- P42. Meeting vulnerable people without being able to help them