Prevalence of PTSD symptoms among police officers in Iceland
Factors related to symptoms
Kristjana Kristinsdóttir

2018
MSc in Clinical Psychology
Forewords and acknowledgments

This thesis was submitted in partial fulfilment of the requirements of the MSc Clinical Psychology degree, Reykjavik University and is presented in the style of an article. This thesis is a product of work that went on for three semesters, the second, third and fourth semester. In the second semester, I wrote a literature review of the subject and a first draft was made of the blueprint for the research. The third semester involved writing a proposal for the National Bioethics Committee of Iceland to grant a permission for the study and laying out and writing the first draft of the method chapter for the thesis. The fourth semester involved processing of the data and writing final drafts of what has now become this thesis.

This research is one of the first steps of gathering information about posttraumatic stress symptoms among Icelandic police officers, prevalence and other related factors. The information in this thesis will be used in a longitudinal study that will be conducted by my supervisors Heiðís B Valdimarsdóttir and Sigríður Björk Þormar. They will study Icelandic first responders, PTSD symptoms and related factors to examine how they change over time, to be able to understand which factors are risk factors and protective factors. With that information, we hope that we will be able to improve resources available to first responders with the aim of reducing prevalence of PTSD among first responders along with its harmful consequences.

The aim of this study is to assess the prevalence of PTSD symptoms among Icelandic police officers and to explore the relationship between PTSD symptoms and other factors. A questionnaire was sent to all police officers in Iceland to measure symptoms of PTSD, depression, anxiety, burnout, social support at work, social support from friends and family, along with background factors such as gender, age, work experience and sick days. We examined the relationship between PTSD symptoms and burnout, depression and anxiety symptoms. We also examined the relationship between social support and PTSD symptoms,
both work related social support and support from family and friends. Lastly we looked at the interaction between social support and burnout and the effects on PTSD symptoms.

I would like to thank the Icelandic police officers for giving their time to participate in this study and giving us a valuable information to work with. I would also just like to thank them for doing their job every day, if I have learned anything during the process of writing this thesis, it is that their job is deeply underestimated. I would like to thank Ingibjörg Johnson, psychologist at the office of the national commissionaire of the Icelandic police for her cooperation and readiness to help with everything I needed. I would like to thank my supervisors Heiðdis B Valdimarsdóttir and Sigríður Björk Þormar for all their help and support throughout this process, without them this project would never have come to fruition. I would also like to thank all the staff and teachers at the psychology department of Reykjavik University for the encouragement, their wisdom and availability throughout these last two years.

And last but not least I want to thank my family. My parents Jóhanna Haraldsdóttir and Kristinn Benónýsson for all their support, advice and encouragement throughout my undergraduate years and these last two years of working towards my master’s degree. And for my fiancé, Tómas Kristjánsson, my deepest gratitude for being there every step of the way. For always believing in me and pushing me forward when I doubted myself. If it wasn’t for you I wouldn’t be where I am at today, making my lifelong dream come true, to become a clinical psychologist.
Abstract

Post-traumatic stress disorder can develop after exposure to trauma. Repeated exposure to trauma increases the likelihood of developing PTSD. Police officers frequently find themselves in potentially traumatic situations. Studies have shown that police officers are at increased risk as a profession to develop PTSD symptoms and the prevalence is slightly higher than in the general population. This study focuses on the prevalence of PTSD symptoms among Icelandic police officers and what factors are related to the PTSD symptoms. A questionnaire was sent to all police officers in Iceland that measured demographics, symptoms of PTSD, as well as known risk and protective factors such as social support at work and social support from friends and family. Results showed that 19.8% of respondents showed clinical signs of PTSD. The following factors were found to be most strongly correlated to PTSD symptoms: depression, anxiety, burnout and social support at work. Interaction between the effects of social support and burnout on PTSD symptoms suggests that social support can mediate the effects between PTSD symptoms and burnout. Low social support at work seems to have a very negative impact on police officers. A longitudinal study is required to establish a causal relationship between the variables.

Keywords: PTSD, police officers, social-support
Prevalence of PTSD symptoms among police officers in Iceland

Factors related to symptoms

Police officers are mentioned in the diagnostic criteria of post-traumatic stress disorder (PTSD) in DSM-5 in relation to repeated exposure to trauma (American Psychiatric Association, 2013). Their profession is mentioned because of the nature of it, part of their job is to risk their own life in order to save others or risk serious injuries (Haugen, Evces and Weiss, 2012). Being a police officer is known to be a very stressful occupation where they often have to put themselves at risk such as when disarming people or preventing others from harming themselves. They can be exposed to violence directly and indirectly e.g. by viewing pornographic images or videos of children for investigative purposes or having to engage in high-speed chases or tolerating threats to themselves and their families (Skogstad et al., 2013). In spite of experiencing multiple traumatic events, the prevalence of PTSD among police officers is not much higher than in the general population or around 7-10% (Carlier, Lamberts and Gersons, 1997; Maia et al., 2007; Martin, Marchand and Boyer, 2009; Perrin et al., 2007). PTSD prevalence among police officers is lower than in other first responders such as firefighters and ambulance personnel, which is estimated to be around 14-20% (Jonsson, Segesten and Mattsson, 2003; Perrin et al., 2007; Psarros et al., 2018; Skogstad et al., 2013).

Post-traumatic stress disorder

PTSD symptoms have been described through history and gotten various names, such as battle exhaustion, war neurosis, combat fatigue, combat stress reaction and shell shock. Shell shock is probably the best known of those names and was used after the first world war (Jones, 2006). Combat stress reaction was described as a normal crisis that develops from exposure to the stress of combat, where external circumstances are unhelpful (Jones, 2006). These kinds of symptoms are also described in the Icelandic Saga of Gísli Súrsson. Where
Gísli often dreams of battle scenes, had a fear of the dark and was unable to be alone at night (Crocq and Crocq, 2000).

Only in the last decades, this cluster of symptoms has been named Post-Traumatic Stress Disorder or PTSD. According to the diagnostic features of DSM-5 the following symptoms need to be in place for the diagnoses of PTSD: the individual must have experienced the traumatic event him/herself, witnessing traumatic events in person, learn that a family member or a close friend has experienced traumatic event or repeatedly be exposed to trauma (American Psychiatric Association, 2013; Friedman, 2015). People can develop a cluster of symptoms called posttraumatic symptoms following a traumatic event. These symptoms can for example be disturbing memories about the trauma, disturbing dreams related to the trauma, flashbacks, severe and chronic psychological distress because of inner or outer triggers that reminds them of the trauma (American Psychiatric Association, 2013; Friedman, 2015). Following the trauma people begin to avoid those disturbing memories, thoughts and feelings that remind them of the traumatic event and even start to avoid outward triggers like certain places, people or situations (American Psychiatric Association, 2013; Friedman, 2015). Traumatic events affect cognitive processes, people tend to have difficulties with remembering critical parts of the traumatic event and they can develop chronic and exaggerated beliefs about themselves as well as becoming hypervigilant, easily startled, irritated and experience difficulties with attention (American Psychiatric Association, 2013; Friedman, 2015).

Although around 80-90% of people experience traumatic events over the course of their lives, most people do not develop PTSD (Breslau et al., 1998; de Vries and Olff, 2009). In fact, the lifetime prevalence of PTSD in general population is around 7-9% (Breslau et al., 1998). There are some cultural differences in PTSD prevalence, among the general
population a 12 month prevalence in USA it is around 3.5%, in the Netherlands 0.9% and in Australia it is 1.3% (Breslau, 2009).

Factors related to PTSD

There are a number of pre-trauma, peri-trauma and post-trauma factors that act together, making individuals more vulnerable to developing PTSD following a traumatic event. Pre-trauma factors include genetics, gender, prior traumas, history of mental illnesses with the individual or in the family, coping styles, personal adjustment and cognitive functioning (Marmar et al., 2006). Peri-trauma factors include the experienced severity of threat to life, psychological and biological responses during and shortly after the traumatic event and panic like reactions such as sweating, shaking, racing heart and dissociation during trauma (Marmar et al., 2006). Posttraumatic factors include unhelpful coping strategies such as alcohol abuse, avoidance of reminders of the trauma, stressful life events shortly after trauma, poor social support and negative work environment (Marmar et al., 2006). Other risk factors that increase the likelihood of developing PTSD are difficulties in social interactions with colleges, experiencing discrimination and being violated against, to be forced to work with a gear that does not work properly and experiencing uncertainty about one’s role at work (Regher, Johanis, Dimitropoulos, Bartram and Hope, 2003).

Known outcomes of traumatic experiences such as depression, anxiety and burnout have also been found to predict symptoms of PTSD (e.g. Asmundson and Stapelton, 2008; Feldner, Zvolensky, Schmidt and Smith, 2008; Maggioni, Margola and Filippi, 2006; Mealer, Burnham, Goode, Rothbaum and Moss, 2009; Nolen-Hoeksema and Morrow, 1991; Sirratt, 2001) although others have argued that they are solely outcomes (e.g. Martin et al., 2009; Mitani, Fujita, Nakata and Shirakawa, 2006). Moreover, some have found the relationship to be bi-directional (e.g. Cardozo et al., 2012; Erickson, Wolfe, King, King and Sharkansky, 2001; Horesh et al., 2017; Marshall, Miles and Stewart, 2010).
Protective factors

Maguen et al. (2009) studied in a longitudinal study, the relationship between routine work environment stress and PTSD symptoms in police officers. They were first assessed in the police academy and again one year later. They discovered that work environment mediated the relationship between serious (critical) incident exposure and PTSD symptoms and between negative life experiences and PTSD symptoms. This shows that the relationship between variables that are thought to be central to developing PTSD are even more complex than thought before.

Interestingly, they also discovered that a supportive work environment can be a buffer in the development of PTSD, even for those that have experienced horrific traumatic events and are also experiencing negative life events in their personal lives that they have no control over (Maguen et al., 2009).

If social support mediates the relationship between PTSD and other factors, this should become apparent in a weaker relationship between PTSD and those factors when social support is controlled for. For example, as discussed above, studies have found strong relationship between burnout and PTSD (Mealer et al., 2009; Mitani et al., 2006). But if high social support prevents those with PTSD symptoms from developing burnout or vice versa, then controlling for social support should weaken or eliminate the relationship between burnout and PTSD.

Police and PTSD factors

Whilst most of the discussed factors, increasing or decreasing the likelihood of developing PTSD apply to police officers, researchers have found specific factors that apply to police officers, due to the nature of their work.

Police officers work in a very unpredictable work environment and thus have no control over the amount of exposure to traumatic events and negative life events, thus, it is
essential that a protective work environment is available for them (Maguen et al., 2009). According to an overview by Marmar et al., (2006) risk factors related to PTSD symptoms for police officers are: greater peri-traumatic distress, greater peri-traumatic dissociation, problem-solving coping, greater stress in the work environment and lower levels of social support.

Both Maguen et al. (2009) and Marmar et al. (2006) emphasize the importance of work environment and social support. One important factor applying to police officers that involves social support at work and the work environment is debriefing and Renck, Weisæth and Skarbô (2002) found that debriefing following a traumatic event decreased the likelihood of police officers developing PTSD. This highlights the importance of work related support for police officers, especially if considered that for police officers, it is less socially acceptable to disclose stress or talk about work than in other occupations (Buunk and Verhoeven, 1991).

Developing PTSD can have many negative consequences. For example, those police officers that develop PTSD are more likely to suffer from depression, to have more medical appointments, consult a mental health professional, take sick leave or score lower on hardiness or resilience assessment than officers without PTSD (Martin et al., 2009).

There are few psychological studies on police officers in Iceland. Recent pilot studies found that the prevalence of clinical PTSD symptoms was 15% among Icelandic police officers. Further, 26% of them reported high level of stress and 30% of them reported having symptoms of burnout. The police officers with low levels of social support and resilience were more likely to report PTSD symptoms than those with higher levels of social support and resilience (Ásmundsdóttir, 2017; Vigfúsdóttir, 2017).
Current study

The aim of the current study is to assess the prevalence of PTSD symptoms among Icelandic police officers and to explore the relationship between PTSD symptoms and other factors. We hypothesize that higher levels of PTSD symptoms are correlated with high levels of burnout, depression and anxiety. Also, that higher levels of social support will be correlated with lower levels of PTSD symptoms. Finally, if social support mediates the relationship between PTSD symptoms and burnout, controlling for social support should weaken or eliminate the relationship.

Method

Participants

The questionnaire was sent out to all police officers in Iceland. A total of 301 participants responded to the questionnaire. The response rate was around 45%, 249 male police officers and 51 female police officers, one participant chose not to disclose his or her gender. Age was reported in five age bins, with the most common age category being 40-49 years old.

Measures

The questionnaire was in Icelandic and consisted of standardized scales as well as background questions regarding age, gender, education, years working in the occupation (work experience), work related training, sick days and job title.

Trauma. Post-traumatic stress symptoms were measured using the Icelandic version of the post-traumatic stress disorder checklist 5 (PCL-5) a self-report scale constructed from the DSM-5 criteria for PTSD. It measures the severity of trauma symptoms. PCL-5 contains 20 items on a 5-point Likert scale, from zero to four, the higher the number the more severe the trauma symptoms. The scale is split into four parts or clusters, first five items are cluster B, the next two items form cluster C, the following seven items make up cluster D and the
last six items form cluster E. To meet the diagnostic criteria of PTSD, one symptom from cluster B and C needs to be present and two more symptoms from the other two clusters. The PCL-5 has shown strong internal consistency ($\alpha = .94$), test-retest reliability ($r = .82$) in addition to a good convergent ($rs = .74$) and discriminant validity ($rs = .31$ to .60) (Blevins, Weathers, Davis, Witte and Domino, 2015). PCL-5 was translated to Icelandic by Berglind Guðmundsdóttir, Agnes B Tryggvadóttir and Guðlaug Friðgeirsdóttir. In the present study, the reliability of the scale was good ($\alpha = .96$)

**Distress.** Anxiety was measured using The Generalized Anxiety Disorder scale (GAD-7). GAD-7 is a four-point, self-report anxiety scale that screens for generalized anxiety disorder, where 0 is equal to not at all, 1 is equal to several days, 2 is equal to more than half the days and 3 is equal to nearly every day. GAD-7 tests seven items and measures how often, over the last two weeks, a certain problem has caused them distress. For example, being nervous, anxious or high strung, not being able to avoid worrying or controlling the worries and having difficulties with relaxing. The scale gives total 21 points and cut points are considered as 5 = mild anxiety, 10 = moderate anxiety and 15 = severe levels of anxiety. According to Kroenke, Spitzer, Williams, Monahan and Löwe (2007) cut point of 8 or higher discriminates well between those with and without anxiety disorders. GAD-7 has been shown to have excellent internal consistency ($a=.92$) and test-retest reliability is considered good (intraclass correlation = .83) (Spitzer, Kroenke, Williams and Löwe, 2006). In the present study, the reliability of the scale was good ($\alpha = .93$).

Depression was measured using the Patient Health Questionnaire-9 (PHQ-9). PHQ-9 is a self-report four point Likert scale, where 0 is equal to not at all, 1 is equal to several days, 2 is equal to more than half the days and 3 is equal to nearly every day. PHQ-9 tests 9 items and measures how often, over the last two weeks, a certain problem has caused them distress. For example, having little interest or little joy when doing something, being sad or hopeless
and having difficulty falling asleep or sleeping the whole night through. The scale gives total of 27 points and cut points are considered 5 = mild depression, 10 = moderate depression, 15 = moderately severe and 15 = severe depression. A binary cut point of 12 points is commonly used to distinguish between depressed or non-depressed respondents (Manea, Gilbody and McMillan, 2012). PHQ-9 has been shown to have a good internal reliability (a=.86-.89) and excellent test-retest reliability (Kroenke, Spitzer and Williams, 2001). In the present study, the reliability of the scale was good (α = .91)

**Support.** Social support from colleagues was measured using the Work Related Basic Need Satisfaction Scale (W-BNS). W-BNS is a self-report seven point Likert scale, where one is equal to not at all true, four is equal somewhat true and seven is equal to very true. W-BNS assesses one’s feeling about their job during the last year or the entire time one has had the job, if the time is less than a year. Some of the questions are directed at social support from colleagues and some of them are directed at competence and autonomy. W-BNS has been shown to have a good test-retest reliability (a=.81-.85) (Broeck, Vansteenkiste, Witte, Soenens and Lens, 2010). In the present study, the reliability of the scale was good (α = .87).

Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS). The scale consists of 12 items and it is designed to measure a persons perceived sense of support from three different sources: family, friends and a partner (significant other). MSPSS is a self-report seven point Likert scale, where point one is equal to very strongly disagree, point 2 is strongly disagree, point 3 is mildly disagree, point 4 is neutral, point 5 is mildly agree, point 6 is strongly agree and point seven is very strongly agree. MSPSS has shown to have good internal and test-retest reliability (Zimet, Powell, Farley, Werkman and Berkoff, 1990). In the present study, the reliability of the scale was good (α = .98)
**Burnout.** Burnout was measured with two-sub dimensions, personal burnout and work-related burnout, of the Copenhagen Burnout Inventory (CBI). CBI is a self-report five point Likert scale (one to five), higher score indicating more burnout symptoms. CBI measures how well questions apply to the respondent. According to Kristensen and Borritz (1999) response options (one to five) were assigned a different number, 1 = 0, 2 = 25, 3 = 50, 4 = 75 and 5 = 100. Total of burnout symptoms was calculated by taking the mean of all the items, the scales had therefore a value ranging from 0 to 100. According to Kristensen and Borritz (1999) a cut-off point was considered to be 50, where 50 points or higher are suggestive of burnout. The scale is considered to have excellent psychometric properties (Kristensen, Borritz, Villadsen and Christensen, 2005). In the present study, the reliability of the scale was good (α = .95).

**Procedure**

All police officers in Iceland were sent the questionnaire via e-mail. E-mail addresses were obtained by the former psychologist of the police, Sigrún Þóra Sveinsdóttir. The e-mail included informed consent, information about the purpose of the study and participants were assured of confidentiality and that no information would be collected that could identify them. Participants were informed that they could discontinue the survey at any time. The participants were also provided contact information if they had questions about the survey and the link to the online questionnaire. By clicking the link, the individuals were consenting to participate in the study.

**Design**

Data was obtained with self-report questionnaire in a survey format. The independent variables were, gender, age, education, job experience (years in job), sick days, job title, job description, depression, anxiety, social-support at home, social support at work and burnout. The dependent variable was PTSD symptoms.
Statistical analysis

Data was analysed in a similar fashion to Skogstad, Fjetland & Ekeberg (2015). A partial correlation table was produced for the questionnaires while controlling for all background variables. Separate univariate linear regressions were conducted for each variable with PTSD symptoms as the dependent variable. The variables that had significant univariate linear regressions were included in a stepwise linear regression. The best regression model was selected based on $R^2$ changes between models and collinearity diagnosis. For the analysis of the effect of social support, W-BNS and MSPSS were independently binned using visual binning so that 25% of respondents were in each bin. Univariate anova was used to test the effects of social support on PTSD symptoms. Post-hoc test using Bonferroni correction was used to identify where the difference between the groups of social support were significant.
Results

The post-traumatic stress symptoms (PCL-5 scores) had an expected positively skewed distribution with a mean of 18.59 and a standard deviation of 16.11. A total of 59 police officers, out of 298 scored 33 or higher with 33 being a known cut-off score from the literature that indicates that PTSD symptoms are severe enough to require formal diagnosis (Blevins et al., 2015). That suggests a possible PTSD prevalence of 19.8%. The distribution of the PTSD symptoms can be seen in Figure 1.

![Figure 1](image.png)

*Figure 1.* Histogram of posttraumatic symptoms (PCL-5 scores), the dashed horizontal line represents a cut-off point of 33 points. All scores above 33 indicate possible PTSD cases.

The likely prevalence of depression, anxiety and burnout was estimated based on clinical cut-off scores that have been established for PHQ-9, GAD-7 and CBI respectively. For depression, a total of 15.8% of Icelandic police officers scored at or above the clinical cut-off score (12 points), for anxiety, 21.1% scored at or above the clinical cut-off score (8 points) and 34% scored above the cut-off score (50 points) for burnout.
Partial correlation table was calculated where all background variables were controlled for. As can be seen, all correlations were significant at 0.01 level except the correlation between social support from friends and family and sick-days which was significant at 0.05 level (see Table 1). Note the negative correlations between the two social support measures and the psychological disorders. PTSD symptoms, the main outcome variable, was positively correlated with all the psychological disorders and negatively correlated with both social support measures.

Table 1
The partial correlation table of dependent and independent variables while controlling for background variables

<table>
<thead>
<tr>
<th>Control Variables</th>
<th>PTSD</th>
<th>Anxiety</th>
<th>Depression</th>
<th>SS at work</th>
<th>Burnout</th>
<th>SS friends and family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender, Age, Education, Job Title, Job, Working hours &amp; Job experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sickdays</td>
<td>.318**</td>
<td>.334**</td>
<td>.320**</td>
<td>-.289**</td>
<td>.301**</td>
<td>-.120*</td>
</tr>
<tr>
<td>PTSD</td>
<td>1</td>
<td>.801**</td>
<td>.849**</td>
<td>-.609**</td>
<td>.823**</td>
<td>-.433**</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS at work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burnout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS friends and family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Correlation is significant at 0.01 level
* Correlation is significant at 0.05 level

All background variables, in addition to the proposed independent variables, could be a predictive factor for variance in PTSD symptoms. This does not mean that they precede PTSD symptoms, only that levels of the predictor variable predicts variance in the dependent variable. Some of the factors are much more likely to be an outcome rather than a predictor of PTSD such as sick-days. Each variable was therefore tested as an independent variable in separate univariate linear regressions with PTSD symptoms (PCL-5 scores) as the dependent variable. This was done to identify all potential factors for a stepwise regression. The results from the univariate linear regressions can be seen in Table 2.
Table 2

*The slope, standard error and significance of separate univariate linear regressions on PTSD symptoms*

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>4.38</td>
<td>2.42</td>
<td>.072</td>
</tr>
<tr>
<td>Age</td>
<td>3.5</td>
<td>.84</td>
<td>.672</td>
</tr>
<tr>
<td>Education</td>
<td>-2.41</td>
<td>1.09</td>
<td>.028</td>
</tr>
<tr>
<td>Job Title</td>
<td>-1.04</td>
<td>1.00</td>
<td>.298</td>
</tr>
<tr>
<td>Area of work</td>
<td>.51</td>
<td>.89</td>
<td>.571</td>
</tr>
<tr>
<td>Working hours</td>
<td>.11</td>
<td>1.60</td>
<td>.944</td>
</tr>
<tr>
<td>Job experience</td>
<td>.85</td>
<td>.69</td>
<td>.219</td>
</tr>
<tr>
<td>Sick days</td>
<td>3.35</td>
<td>.61</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Anxiety</td>
<td>2.87</td>
<td>.12</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depression</td>
<td>2.50</td>
<td>.09</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social support at work</td>
<td>-1.92</td>
<td>.15</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Burnout</td>
<td>.60</td>
<td>.02</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social support from friends and family</td>
<td>-0.47</td>
<td>0.06</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

From the possible predictive factors education, sick days, anxiety, depression, social support at the workplace, burnout and social support from friends and family were significant in univariate linear regressions. Those factors were selected as predictive variables in a stepwise linear regression. Stepwise linear regression automatically eliminates the weakest predictive variables creating the models with the strongest explanatory power while limiting the number of variables.
Table 3
Stepwise linear regression model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R^2</th>
<th>Adjusted R^2</th>
<th>Std. Error</th>
<th>R^2 Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.846a</td>
<td>0.715</td>
<td>0.714</td>
<td>8.553</td>
<td>0.715</td>
<td>711.630</td>
<td>1</td>
<td>283</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>.878b</td>
<td>0.771</td>
<td>0.770</td>
<td>7.679</td>
<td>0.056</td>
<td>69.058</td>
<td>1</td>
<td>282</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>.885c</td>
<td>0.784</td>
<td>0.781</td>
<td>7.483</td>
<td>0.012</td>
<td>15.948</td>
<td>1</td>
<td>281</td>
<td>.000</td>
</tr>
<tr>
<td>4</td>
<td>.891d</td>
<td>0.794</td>
<td>0.792</td>
<td>7.308</td>
<td>0.011</td>
<td>14.638</td>
<td>1</td>
<td>280</td>
<td>.000</td>
</tr>
</tbody>
</table>

a Predictors: (Constant), Depression  
b Predictors: (Constant), Depression, Burnout  
c Predictors: (Constant), Depression, Burnout, Anxiety  
d Predictors: (Constant), Depression, Burnout, Anxiety, Social support at work

The results of the stepwise regression can be seen in Table 3. The highest R^2, that is the proportion of the variance in PTSD symptoms scores explained by the included predictor variables, comes from the model with four predictive variables. The four predictor model has a very strong R^2 of .794. Table 4 shows the regression model with the four selected predictors which are depression, burnout, anxiety and social support at work.

Table 4
The regression model of four predictor variables from a stepwise linear regression. SS stands for social support

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients B</th>
<th>Standardized Coefficient B</th>
<th>Std. Error</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>7.187</td>
<td></td>
<td>2.586</td>
<td>2.780</td>
<td>0.006</td>
<td>2.097 – 12.277</td>
</tr>
<tr>
<td>Depression</td>
<td>1.039</td>
<td>.351</td>
<td>0.166</td>
<td>6.255</td>
<td>&lt;.001</td>
<td>0.712 – 1.365</td>
</tr>
<tr>
<td>Burnout</td>
<td>0.217</td>
<td>.296</td>
<td>0.036</td>
<td>5.985</td>
<td>&lt;.001</td>
<td>0.146 – 0.288</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.798</td>
<td>.223</td>
<td>0.185</td>
<td>4.323</td>
<td>&lt;.001</td>
<td>0.435 – 1.162</td>
</tr>
<tr>
<td>SS at work</td>
<td>-0.410</td>
<td>-.127</td>
<td>0.110</td>
<td>-3.740</td>
<td>&lt;.001</td>
<td>-0.626 – -0.194</td>
</tr>
</tbody>
</table>

a Dependent Variable: PCL-5

All the predictors are highly significant, the betas should be interpreted with the different scales in mind. While burnout (CBI) has the lowest beta, the scale has 100 points, the difference in predicted value on PTSD symptoms (PCL-5) between the highest and lowest possible value on burnout (CBI) is therefore 21.7 points. The anxiety scale (GAD-9) has a
maximum score of 21 so the difference in predicted value of PTSD symptoms (PCL-5) between the highest and lowest possible scores on the anxiety scale (GAD-9) is 16.8 points. Visual representation of the regression model can be seen in Figure 2. It is clear from the figure, that the model fits the data very well with vast majority of the predicted values falling within the 95% confidence interval.

![Figure 2](image)

*Figure 2.* The regression model with standardized predicted value on the x-axis, the dashed line illustrates the 95% confidence interval.

To test for the effect of social support on PTSD, social support at work and social support from friends and family were independently binned so that 25% of participants were in each bin on each measure of social support. A univariate ANOVA was conducted with the binned social support variables as independent variables and PTSD symptoms as the dependent variable. The results are shown in Figure 3. There was a significant main effect of social support at work; $F(3,269) = 19.87, p < .001, \eta^2_p = .181$. The main effect of social
PTSD AND RELATED FACTORS AMONG ICELANDIC POLICE

support from friends and family was not significant; $F(3,269) = 2.02, p = .111, \eta^2_p = .022$.

The interaction between the two social support measures on PTSD symptoms was not significant; $F(9,269) = .65, p = .751 \eta^2_p = .021$. Using criterion suggested by Miles and Shevlin (2001) the effect-size of social support at work on PTSD symptoms is large.

![Graph](image)

*Figure 3. The effect of both social support measures on PTSD scores (PCL-5). The scores on the X-axis represent the level of social support. 1 is the lowest social support and 4 is the highest social support.*

To explore the main effect of social support at work, post-hoc tests was conducted with the Bonferroni correction. There was a significant difference between the lowest group of social support and all other groups (all $p$’s $\leq .001$). In addition, group 2 differed from group 4, those with highest levels of social support at work ($\text{Mean difference} = 8.15, \text{SE} = 2.512, p = .008$).

In the stepwise regression model on PTSD scores, only social support at work was part of the model, social support from friends and family did not explain enough of the variance to become part of it, suggesting that social support at work has a stronger protective effect than social support from friends and family. Same results are found in the ANOVA.
where main effect of social support at work, but not from friends and family is significant. However, the univariate linear regressions from Table 1, suggest that both social support measures have a significant relationship with PTSD scores. A multiple linear regression, with both social support scales as independent variables and PTSD scores as the dependent variable was conducted. Both measures of social support were significant. For social support at work (WBNS), \(B = -1.636, t = -8.86, p < .001\) and for social support from friends and family (MSPSS), \(B = -.167, t = 2.74, p = .006\). This is important as this shows an effect for both measures when the other one is controlled for.

If social support is a mediating variable, as found in some previous research. We would expect to find an interaction when controlling for the effects of social support in a hierarchical regression. This was tested with burnout (CBI scores) as an independent variable and PTSD symptoms (PCL-5 scores) as the dependent variable and both social support measures (WBNS and MSPSS scores) as mediating variables. The first block entered, therefore included both social support measures, in the second block burnout was added. Adding burnout increased \(R^2\) by .309 with the adjusted \(R^2\) of the whole model .697. The F-change of model 2 is significant (\(F(1,281) = 289.24, p < .001\)), indicating a significant interaction between social support and burnout on PTSD symptoms. The regression model was significant (\(F(3, 281) = 218.61, p < .001\)). The coefficients can be seen in Table 5. Social support at work (WBNS) and burnout (CBI) were significant predictors of PTSD symptoms (PCL-5 scores). Social support from friends and family (WBNS) was not significant, although it approached significance (\(p = .072\)). However, the standardized betas show, that even when controlling for the effects of social support, burnout is still a strong predictor of the variance in PTSD symptoms. This suggests that social support could indeed mediate the effects of burnout on PTSD symptoms, but controlling for it does not explain away the effect.
Table 5

The coefficients of the second block in a hierarchical regression model. SS stands for social support

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Standardized B</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% CI for B Lower Bound</th>
<th>Higher Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>12.855</td>
<td>3.595</td>
<td></td>
<td>3.576</td>
<td>.000</td>
<td>5.778</td>
<td>19.932</td>
</tr>
<tr>
<td>SS at work</td>
<td>-.553</td>
<td>.146</td>
<td>-.170</td>
<td>-3.774</td>
<td>.000</td>
<td>-8.41</td>
<td>-2.64</td>
</tr>
<tr>
<td>SS friends and family</td>
<td>-.076</td>
<td>.042</td>
<td>-.072</td>
<td>-1.807</td>
<td>.072</td>
<td>-.158</td>
<td>.007</td>
</tr>
<tr>
<td>Burnout</td>
<td>.507</td>
<td>.030</td>
<td>.690</td>
<td>17.007</td>
<td>.000</td>
<td>.448</td>
<td>.566</td>
</tr>
</tbody>
</table>

Dependent Variable: PTSD symptoms

Discussion

The proportion of police officers that have scores indicating possible PTSD is alarmingly high, at 19.8%. This does not mean that the prevalence of PTSD is 19.8% amongst Icelandic police officers. First of all, a score over 33 does not confirm a case of PTSD, only that a further diagnosis is required (Blevins et al., 2015). Also, with the self-selection that happens with internet surveys, it is possible that those police officers that have some PTSD symptoms were more likely to answer the survey as they were more likely to find it relevant or important than those that do not have any symptoms of PTSD. With that being said, the fact that 59 respondents score over the cut-off limit of PTSD symptoms shows that this issue has to be taken very seriously. Given the fairly decent answer rate (45%) a selection bias does not seem like a likely explanation for the answer rate, although some influence cannot be excluded.

The warning signs get even more alarming when considering that PTSD symptoms show a high correlation with other psychological issues such as depression, anxiety and burnout in addition to being correlated with increased number if sick days. The direction of those correlations cannot be established by this research design, however, there are suggestions from other researches that the effect can be bi-directional. For example, Marshall
et al. (2010) found that anxiety sensitivity and PTSD symptoms had a reciprocal effect on each other and each served as a predictor over time for the other. Not everyone has found this bi-directionality, Ginzburg, Ein-Dor and Solomon (2010) conducted a 20-year longitudinal study of war veterans and found that PTSD symptoms predicted anxiety and depression but not vice versa. Our results show a strong correlation between measures of PTSD, anxiety, depression and burnout, it is of utmost importance that the direction of this correlation is studied further so that appropriate support structures and protocols can be established to minimize the effect on the psychological well-being of police officers.

We also studied the effects of a known protective factor, social support. Social support, especially at work, was highly negatively correlated with symptoms of PTSD. Even when controlling for one type of social support, the other one was still significantly correlated. Social support at work was a stronger predictor in a stepwise regression model than social support from family and friends. The reason for this might be that police officers are likely to experience trauma in a line of duty. The support from fellow police officers, that have the same demands and expectations on them and have gone through and experienced similar traumatic events could be stronger than the support from others, that do not fully understand what police officers go through.

Social support at work was strongly correlated with PTSD symptoms. Interestingly, it seems that there is a larger difference between those that experience the lowest social support at work and the rest of the police officers than between any other groups of social support. Due to the research design, there are at least three possible interpretations of these results. It might be that social support acts as a buffer for PTSD. Second, it might be that those with PTSD receive less social support. Third, this relationship could be bi-directional. That is what Kaniasty and Norris (2008) found in a longitudinal study following a natural disaster in Mexico. In the beginning phases, social support predicted less PTSD symptoms (6-12
months), from 12-18 months the relationship was bi-directional, each factor predicted the other. From 18-24 months, PTSD symptoms predicted social support, but not the other way around.

Maguen et al. (2009) suggest that social support works as a mediating variable. We tested this assumption by testing whether social support mediates the relationship between burnout and PTSD symptoms. The results suggest a possible mediating role of social support on the relationship between burnout and PTSD symptoms. This mediating effect does not explain away the effect of burnout on PTSD symptoms, but the fact that it reduces it suggests that bolstering social support of Icelandic police officers might prove beneficial to reduce the harmful effects of experiencing stressful and traumatic events. We cannot say whether burnout increases the likelihood of developing PTSD or vice versa, but we can say that social support, especially at work, mediates this relationship and whatever the direction might be, we should be doing everything we can to minimize it.

Social support from friends and family is correlated with PTSD symptoms but all the results suggest that this relationship is considerably weaker than the relationship between PTSD symptoms and social support at work. Resources and interventions should focus more on social support at work than social support from friends and family according to these results.

**Concluding remarks**

The results indicate a high rate of possible PTSD cases among Icelandic police officers and that depression, anxiety, PTSD and burnout are highly correlated. Social support on the other hand is associated with lower levels of PTSD. But in order to understand the cause and effect of this relationship and to be able to understand the interplay between these factors it is imperative that a longitudinal study is conducted.
References


