Campbell Systematic Reviews
2012:7
First published: 18 April 2012
Last updated: December 2011
Search executed: 31 May 2010

The effects of stress management interventions among police officers and recruits

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Colophon

Title	The effects of stress management interventions among police officers and recruits
Institution	The Campbell Collaboration
Authors	Patterson, George T. Chung, Irene W. Swan, Philip G.
DOI	10.4073/csr.2012.7
No. of pages	53
Last updated	December 2011
Citation	Patterson GT, Chung IW, Swang PG. The effects of stress management interventions among police officers and recruits. Campbell Systematic Reviews 2012:7 DOI: 10.4073/csr.2012.7

Contributions	The review team will assume responsibility for updating the systematic review. An updated review will be conducted every three years after the present systematic review is completed based on Campbell Collaboration guidelines.
Editors for this review	Editor: David B. Wilson Managing editor: Charlotte Gill
Support/funding	We thank the National Policing Improvement Agency, Campbell Collaboration Crime and Justice Group, and George Mason University for funding this systematic review.
Last updated	December 2011
Potential conflicts of interest	Neither of the two reviewers, nor any others involved in this systematic review, have financial conflicts of interest. The review team did not receive a benefit in cash or kind, any hospitality, or subsidy that influenced the outcome of this systematic review.

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Campbell Systematic Reviews

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Abstract

BACKGROUND

Law enforcement organizations began to take notice of officer stress during the late 1970s. Stress has been found to not only affect the officers' job performance, but their personal lives and relationships as well. Because police officers are first responders to potentially stressful situations, their ability to successfully manage stress is critical not only to their own mental health but to the safety of society as a whole. Research has found that police officers who have difficulties coping with stress exhibit maladaptive behavior and personality traits such as aloofness, authoritarianism, cynicism, depersonalization, emotional detachment, suspiciousness, and excessive use of alcohol.

High levels of stress can lead to serious physiological (headaches, stomachaches, backaches, ulcers, heart attacks) and psychological (anxiety, depression, flashbacks, and panic attacks) symptoms. Stress among police officers has also been connected to police misconduct and can also have a negative effect on the law enforcement organization due to lawsuits resulting from officers' performance. Other organizational effects include impaired officer performance, lower productivity, poor morale, poor public relations, labor-management problems, tardiness and missed work, and officer turnover. Law enforcement organizations provide a wide variety of stress management interventions aimed at ameliorating officer stress.

OBJECTIVES

The objectives of this systematic review were to identify, retrieve, evaluate and synthesize the available evidence regarding outcomes of stress management interventions provided to veteran police officers and recruits. The review question is: What are the effects of officer stress management interventions on stress outcomes?

SEARCH STRATEGY

A variety of search methods were used to identify studies. These methods included: (1) searching electronic databases; (2) handsearching relevant journals, books, and

conference proceedings; (3) searching Internet websites; (4) visually scanning reference lists from relevant studies; (5) contacting organizations and authors who have knowledge of police stress management and development program evaluations; and (6) citation searching.

SELECTION CRITERIA

The criteria for inclusion of retrieved studies focused on population characteristics and sampling strategies, interventions, study methods and designs, data analysis and outcome results. Included studies required a population consisting of veteran police officers, police recruits, and/or civilian (non-sworn) police personnel; a randomized controlled trial (RCT), random assignment to conditions, or quasi-experimental designs that included a control group; a psychosocial or other type of stress management intervention; quantitative outcomes although studies that utilized qualitative methods (focus groups, interviews) were included as long as these studies focus on the interventions examined in the RCT studies; and published and non-published studies conducted in any geographic location.

DATA COLLECTION AND ANALYSIS

The meta-analysis was performed using the computer software program Comprehensive Meta-Analysis Version 2.2.050 (Borenstein et al. 2009a). For studies reporting multiple outcomes and time points these were not treated as independent. Effect sizes were separated out by outcome type (psychological, behavioral and physiological) and analyzed separately for different outcomes types. Among studies that contained multiple outcomes, the outcomes were averaged. Effect sizes were not averaged across different outcome types. Most often effect sizes were calculated using reported means, standard deviations and sample sizes, although some effect sizes were calculated using reported Cohen's d and t-test results.

RESULTS

The results of the present review indicate that stress management interventions had no significant effect on psychological, behavioral or physiological outcomes. Whereas stress can contribute to negative psychological, behavioral and physiological outcomes the 12 primary studies examined psychological stress outcomes. Only three studies examined behavioral outcomes, and two examined physiological outcomes. Near null effects were found for psychological, behavioral, and physiological outcomes. Moderator analyses, although difficult and exploratory with so few studies, also failed to find any meaningful differences across the studies. These results do not provide evidence to support the efficacy of stress management interventions for police officers or recruits. Given the weakness of the research designs, we can neither claim that these programs are effective or ineffective.

CONCLUSIONS

More rigorous studies are needed that evaluate the efficacy of stress management interventions among police officers and recruits. Several recommendations are proposed for future research. First, police organizations should conduct evaluation research of their current stress management interventions that includes random assignment. Second, stress management interventions for police officers and recruits should focus on specific types of stress (i.e., organizational or personal). The type of stress that is the focus of the intervention should be described in studies. Finally, more qualitative data are needed to contextualize participants' experiences with the intervention.

1 Background

Lazarus and Folkman (1984) defined stress as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 21). Stress is viewed as a transactional process that both influences and is influenced by cognitive appraisal, coping strategies, and stress outcomes such psychological well being. Importantly, individuals respond to stress in different ways.

Law enforcement organizations began to take notice of officer stress during the late 1970s (Cole & Smith, 2004). Stress has been found to not only affect the officers' job performance, but their personal lives and relationships as well (Burke, 1993; Finn & Tomz, 1997; Wilson, Tinker, Becker & Logan, 2001). Because police officers are first responders to potentially stressful situations, their ability to successfully manage stress is critical not only to their own mental health but to the safety of society as a whole (Lester, Leitner, & Posner, 1984). Research has found that police officers who have difficulties coping with stress exhibit maladaptive behavior and personality traits such as aloofness, authoritarianism, cynicism, depersonalization, emotional detachment, suspiciousness, and excessive use of alcohol (Bonifacio, 1991; Davidson & Veno, 1980; Evans, Coman, Stanley, & Burrows, 1993; Kroes, 1985; Niederhoffer, 1967; Violanti & Marshall, 1983).

High levels of stress can lead to serious symptoms that Stinchcomb (2004) identifies as both physiological (headaches, stomachaches, backaches, ulcers, heart attacks) and psychological (anxiety, depression, flashbacks, and panic attacks). The relationship between physiological and psychological manifestations of stress have been similarly studied by researchers such as Aldwin (2007) and Gaab, Blattler, Menzi, Pabst, Stoyer, and Ehlert (2003) who investigated the effects of cognitive-behavioral stress management training on endocrine stress responses and cognitive appraisals in a randomized controlled trial study. Outcomes included physiological and psychological self report measures. Similarly, Blumenthal et al (2005) examined the effects of stress management interventions in a randomized controlled trial that combined physiological and psychological self report measures. Whereas these studies did not use samples of police officers and the methods alone do not provide evidence of stress management program effectiveness, these studies are indicative of the advances made in investigating the efficacy of such interventions.

Job burnout, depression, substance abuse, marital problems and suicide have been suggested as reactions to stress in the lives of police officers (Anshel, 2000; Biggam, Power, & MacDonald, 1997; Brandt, 1993; Brown, Cooper, & Kirkcaldy, 1996; Burke & Deszca, 1986; Cooper, & Davidson, 1987; Jannik & Kravitz, 1994; Kirkcaldy, Cooper, & Ruffalo, 1995; Lennings, 1995; Violanti, 1995). Stress among police officers has also been connected to police misconduct. Amaranto, Steinberg, Castellano, and Mitchell (2003) emphasized the importance of preventing and treating stress to prevent officer misconduct. Finn and Tomz (1997) suggested that officer stress can also have a negative effect on the law enforcement organization due to lawsuits resulting from officers' performance. Other organizational effects include impaired officer performance, lower productivity, poor morale, poor public relations, labor-management problems, tardiness and missed work, and officer turnover.

Finn and Tomz (1997) describe four commonly used categories of police stress. One common stressor involves working in a bureaucratic organization where lack of resources, extraneous paperwork, and inattentive supervisors undermine an officer's sense of personal autonomy (Finn & Tomz, 1997; Brandt, 1993; Wilson, et al, 2001). Another significant source of stress stems from working with the public, including both offenders and victims, which expose police officers to life threatening and traumatic situations that are beyond accidents and natural disasters (Finn & Tomz, 1997; Wilson, et al, 2001). Police officers also experience stress working within a criminal justice system they feel is overly lenient on offenders (Finn & Tomz, 1997). Finally, the family life of officers can be affected by their job-related stress and in turn contribute to their overall stress level, which can contribute to domestic violence, separation, and divorce (Finn & Tomz, 1997; Wilson, et al, 2001).

Law enforcement organizations provide many types of interventions to help both veteran and recruit police officers manage stress, the most common of which is training designed to help recognize signs of stress along with ways of coping (On the Job, 2000; Sewell, 1999). More specific interventions typically entail the use of spot checking and scanning, positive self-talk, deep breathing, anchoring, cognitive rehearsal and desensitization, progressive muscle relaxation, meditation, imagery and biofeedback, goal setting, stress debriefing, time management, financial planning, visual-motor behavior rehearsal (VMBR), critical incident stress management (CISM), physical fitness, progressive relaxation, biofeedback, social support, eye movement desensitization and reprocessing (EMDR) (Addis & Stephens, 2008; Anderson, Swenson & Clay, 1995; Brandt, 1993; Carlier, Lamberts, van Uchelen, & Gersons, 1998; Chapin, Brannen, Singer, & Walker, 2008; Ellison & Genz, 1983; Everly, Flannery, & Mitchell, 2000; Shipley & Baranski, 2002; Webb & Smith, 1980; Wilson, et al, 2001). Among these interventions, cognitive coping strategies have perhaps received the most attention in the research literature, with cross-sectional studies investigating cognitive coping strategies that officers and recruits use to manage stress (Evans et al., 1993; Fain & Mc Cormick, 1988; Graf, 1986; Kirmeyer, & Diamond, 1985; Patterson, 2003; Violanti, 1992). Cognitive

appraisals have also been found to be an important component in the stress-distress relationship (Folkman & Lazarus, 1991; Folkman & Lazarus, 1985; Lazarus & Folkman, 1984; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

The strategies described above focus on individual officer's ability to manage stress. Hurrell (1995) argued that training police officers to cope with stressful work events, particularly organizational work events found in the work environment that are beyond officer's control, may be ineffective. Hurrell suggests that stress management interventions for police officers should include training police officers to coping effectively, and in addition interventions should address the organizational environment and the connections between officers and the law enforcement organization. Others have also suggested that the law enforcement organization be a target for change as a means of stress reduction (Collins & Gibbs, 2003; Morash, 2006; Stinchcomb, 2004).

1.1 PRIOR REVIEWS

The lack of quality data describing the effectiveness of stress management interventions for police officers was highlighted most recently by Penalba, McGuire and Leite (2009), who conducted a Cochrane review to assess the effectiveness of psychosocial interventions given to law enforcement personnel (police officers and military police) to prevent psychological disorders. Randomized and quasi-randomized controlled trial studies of psychosocial interventions were included. Of the 10 studies included in the review, the authors indicated that only five reported data could be used for analysis. None of the studies fully met the review quality criteria. Many were missing pertinent data and the data showing effectiveness was minimal, leading the authors to conclude that the studies were generally of low quality. The authors also concluded that performing a meta-analysis was not possible, and that there was insufficient evidence to indicate whether psychosocial interventions given to law enforcement to prevent psychological disorders were effective.

A systematic review investigating the effectiveness of stress management programs among other worker populations found similar results. van Wyk and Pillay-Van Wyk (2010) conducted a Cochrane review to examine the effects of staff support interventions focused on coping with work stress, preventing burnout, and improving job satisfaction among healthcare workers who were primarily nurses. Three preventive interventions were examined: (1) support groups; (2) stress management training; and (3) management interventions provided to support staff. The authors concluded that most of the 10 primary studies were methodologically weak and low quality. Overall, they found that insufficient evidence exists to show whether stress management interventions reduced work stress, prevented burnout, or reduced staff absenteeism. Limited evidence showed that stress management interventions improved staff moral and job satisfaction. The authors suggest that more rigorous studies are needed.

In an early review of stress management interventions aimed at individual and organizational factors, Newman and Beehr (1979) concluded that the basis for intervention efficacy was "professional opinions" (p. 35) and few research approaches were rigorous. More recent reviews have found mixed results. van der Klink, Blonk, Schene, and Dijk (2001) conducted a meta-analysis to examine the effects of four types of stress management interventions: cognitive-behavioral interventions, relaxation techniques, multimodal programs, and organization-focused interventions. They found a moderate effect for cognitive-behavioral and multimodal interventions, and a small effect for relaxation techniques. The effect for organization-focused interventions was not significant. Significant effects were found for psychological outcomes, complaints, and quality of work life. The authors concluded that stress management interventions are effective.

van der Hek and Plomp (1997) updated a review of stress management interventions initially conducted by DeFrank and Cooper (1987). They examined studies published between 1987 and 1994 and concluded "it is still impossible to determine which specific interventions or techniques are most effective and should be recommended" (p. 140). When significant effects were found, it was difficult to assess which components on the intervention produced the effects. The basis for these conclusions was the heterogeneity among studies which made it difficult to compare studies, not a lack of sufficient studies.

Richardson and Rothstein (2008) updated a systematic review originally conducted by van der Klink, Blonk, Schene, and Dijk (2001). They investigated stress management interventions among teachers, nurses, factory workers, maintenance workers and social service workers, among others found medium to large effects with a sample size of 2,847. In general, their results support van der Klink et al.'s but they also found that weaker studies did not change the effects and larger effects resulted when only true experiments were included in the analysis.

2 Objectives

The objectives of this systematic review were to identify, retrieve, evaluate and synthesize the available evidence regarding outcomes of stress management interventions provided to veteran police officers and recruits. Such a review can inform readers about the effectiveness of these interventions and the strengths of the existing evidence.

2.1 REVIEW QUESTION

What are the effects of officer stress management interventions on stress outcomes?

To answer this question we: (a) examined the conceptual differences in interventions given to police officers and recruits; (b) examined variations in approaches to interventions given to police officers and recruits; (c) synthesized the body of knowledge on sources and types of stress for police and recruits, and the strengths and limitations of the interventions; (d) discovered reasons for conflicting intervention effects (e.g., different curricula, different outcome measures, different research methods); and synthesized what is known about the impact of different study designs, research methods, interventions, and data analysis procedures on outcomes.

3 Methods

3.1 CRITERIA FOR INCLUSION AND EXCLUSION OF STUDIES IN THE REVIEW

The criteria for inclusion of retrieved studies focused on *population characteristics and sampling strategies*, *interventions*, *study methods and designs*, *data analysis and outcome results*.

(1) The population includes veteran police officers, police recruits, and/or civilian (non-sworn) police personnel. Law enforcement organizations provide stress management training to recruits during academy training, whereas veteran police officers receive in service training (Finn & Tomz, 1997). The most obvious distinction between veteran police officers and recruits is the amount of work experience they possess, although other differences can also be noted. These include age, marital status, parental status and rank. These statuses are a source of stress. Because interventions may be given to veteran police and recruits together, in addition to including civilian law enforcement personnel, these three populations are included in the review. Civilians will be included because some stress management interventions include both sworn and non-sworn law enforcement personnel. Studies with a mixed population of police officers and non-police officers (e.g., teachers, nurses, firefighters) will be included in the review only if the findings can be extricated for police officers, police recruits, and/or civilian (non-sworn) police personnel.

(2) The following examples illustrate interventions given to the population to address stress: (a) eye movement desensitization and reprocessing (EMDR) (an eight step clinical approach in which negative thoughts are focused on while moving one's eyes back and forth in a rapid lateral manner); (b) debriefing (talking in a supportive environment to reduce the effects of a traumatic event (Everly, Flannery, & Mitchell, 2000); (c) goal setting (assessing goals and priorities, examine ways to achieve goals); (d) time management (addresses symptoms of poor time management and achieve a balance when scheduling time, set goals and establish deadlines); (e) financial planning (rational efforts and systematic planning for financial spending and budget development); (f) physical fitness (physical fitness

programs intended to improve physical health and increase ability to deal with stress); (g) meditation (learning to direct attention toward a mental device such as a visual symbol to facilitate calm and relaxation (Benson (1975) and Seer (1979) as cited in Ellison and Genz, 1983); (h) progressive relaxation (a form of relaxation that make the participant aware of muscle tension and works on the principle that a muscle which is held very tense will automatically relax in a short period of time); (i) biofeedback (a realization technique in which participants are trained to control such supposedly involuntary reactions as muscle tension, sweating, and heart rate); (j) social support (tangible or emotional support provided by others. Sources of support include other officers, family members, nonpolice friends); (k) cognitive-behavioral coping strategies (emotional and behavioral coping techniques used to manage stressful events).

(3) Retrieved studies that were published within the last 29 years (1980-2009). Law enforcement organizations began to focus on officer stress during the late 1970s (Cole & Smith, 2004).

(4) Studies that utilized a randomized controlled trial (RCT), random assignment to conditions, or quasi-experimental designs that utilized a control group.

(5) Outcome studies that utilized quantitative methods are the primary studies that will be included. Studies that utilize qualitative methods (focus groups, interviews) will be included as long as these studies focus on the interventions examined in the RCT studies. In this way consistency will be maintained and the qualitative data will provide contextual information to the quantitative data.

(6) Published and non-published studies, doctoral dissertations and master's theses, conference papers, and book chapters.

(7) One or more outcomes are reported for each intervention, training or officer development program. Examples of outcomes included in the review are psychological (attitudes, knowledge, perceptions of stress and coping); behavioral (performance or skills); or physiological outcome(s) based on self report or objective data (cardiac autonomic control, salivary free cortisol response) including observation.

(8) Any geographic location.

3.2 SEARCH STRATEGY FOR IDENTIFICATION OF RELEVANT STUDIES

A variety of search methods were used to identify studies. These methods included: (1) searching electronic databases; (2) handsearching relevant journals, books, and

conference proceedings; (3) searching Internet websites; (4) visually scanning reference lists from relevant studies; (5) contacting organizations and authors who have knowledge of police stress management and development program evaluations; and (6) citation searching.

We used the above methods to search for “grey literature” (e.g., book chapters, government reports, doctoral dissertations and master’s theses, conferences proceedings, and organizations that provide stress management and development programs to police officers) in order to reduce publication bias.

The following electronic databases were searched:

> Academic Search Premier, Applied Science and Technology Index, ArticleFirst, Arts and Humanities Citation Index, BIOSIS Previews, Book Review Digest Plus, Books@Ovid, Bureau of Justice Statistics, CINAHL, CINCH: Australian Criminology Database, Criminal Justice Abstracts, Criminal Justice Periodical Index; Custom Newspapers, Directory of Open Access Journals, Dissertations Abstracts, EJS, Emerald Full Text, ERIC, General Science Full Text, Google Books, Google Scholar, GPO, Health and Wellness Resource Center, Health Reference Center Academic, Health Source, Highwire Press, JSTOR, Lexis/Nexis, Linguistics and Language Behavior, LWW Nursing and Health Prof. Premier, MasterFile Premier, Medline, Military & Government Collection (EBSCO), National Criminal Justice Reference Service Abstracts Database; NetLibrary, PAIS International, ProQuest, PsychArticles, PsychInfo, PubMed, Readers Guide, SAGE (Communication Studies, Education, Health Sciences, Management, Politics, Psychology, and Sociology) and SAGE Journals Online; Science Citation Index, Science Direct, Scirus, Social Sciences Citation Index, Social Sciences Full Text, Social Work Abstracts, SocINDEX, SpringerLink, Urban Studies, Web of Science, Wiley InterScience, and WorldCat.

The following Boolean search strategy was employed - police and ((stress or suicide or "substance abuse" or "alcohol abuse") and (management or prevention or awareness or debriefing or development)) and (training or program*). After identifying studies, the studies were imported to the bibliographic software Refworks. Refworks was used to manage and share the studies among the review team, and create the American Psychological Association (APA) bibliographic style.

We searched 35 databases. The number of hit results ranged from zero to over 11,000. A low number of hits was sometimes indicative of a lack of relevant sources but was also sometimes the result of a lack of sophistication in the search engine in terms of processing a complex Boolean search strategy. An increase in hits was sometimes possible if the search strategy was simplified to “police and stress”, but such simplification often led to articles addressing police officers dealing with

members of the public suffering from stress. A high number of hits also revealed a lack of ability in the search engine to process a complex Boolean search: in this case articles with any of the individual terms entered into the search were found, with the result that very few were related to the review topic. The key to fruitful searching in any of the databases was identifying relevant subject descriptors supplied by the database publisher. For example, Academic Search Complete uses the term stress management while BIOSIS Previews uses the term stress reduction: while the difference may seem minor, using the wrong terminology in a given database can significantly lessen the number and quality of hits.

As part of the search strategy, the review team contacted organizations and authors who perhaps have knowledge of police stress management and development program evaluations. Contacts with organizations and authors did not result in studies that could be used in the review.

3.3 DESCRIPTION OF METHODS USED IN THE COMPONENT STUDIES

While RCT designs are the preferred designs to assess intervention effectiveness, these designs are sometimes impractical in police settings particularly among police recruits who are required to receive the same training (and interventions). Observational designs (in which natural changes in interventions are examined (CRD, 2009)) and quasi-experimental designs (designs that do not use random assignment to control and experimental conditions) although weaker in external validity, are most likely to be used to assess stress management intervention effects among police officers and recruits.

The samples most likely used in the component studies will be volunteers who were randomly assigned to control and experimental conditions. It is likely that few studies will consist of samples randomly recruited from police departmental employee sampling frames.

Self report data are used most often to assess outcomes. A wide variety of outcome measures have been used to investigate stress management interventions for police officers and recruits. Measurement strategies include knowledge and attitudes about the effects of stress; alcohol use and abuse; and levels of anxiety and depression, for example.

3.4 DETAILS OF STUDY CODING CATEGORIES

The coding protocol (coding form, codebook) was piloted prior to beginning the primary data collection from retrieved studies. The pilot test also assisted the reviewers with testing procedures to resolve disagreements regarding relevance decisions. The coding form noted publication characteristics, sampling and population characteristics, intervention, measurement, design, and data analysis

characteristics. In some instances these characteristics were specific to police officers and recruits, such as officers' rank.

3.5 STATISTICAL PROCEDURES AND CONVENTIONS

The meta-analysis was performed using the computer software program Comprehensive Meta-Analysis Version 2.2.050 (Borenstein et al. 2009a). For studies reporting multiple outcomes and time points these were not treated as independent. Effect size estimates may lack statistical independence because different effect size estimates may be calculated on the same participants using different outcome measures; effect sizes may be calculated by comparing different interventions within a single control group or different control groups within a single intervention group; different samples may be used in the same study to calculate an effect size for each sample; or a series of studies may be conducted by the same research team (Hedges, 1990). To address these issues we separated out the effect sizes by outcome type (psychological, behavioral and physiological) and analyzed effect sizes separately for different outcomes types. Among studies that contained multiple outcomes, the outcomes were averaged. Effect sizes were not averaged across different outcome types. Effect sizes were calculated using reported means, standard deviations and sample sizes, and reported Cohen's d and t-test results.

Averaging the effect sizes across studies may result in biased average effect estimates and incorrect sampling errors if the effect sizes from different studies vary in precision. Therefore each effect size calculated for a study was weighted proportional to its precision, giving more weight to studies with more precision and larger samples. The standardized measure of effect Hedge's g was used to estimate the effect size. This measure also provides standardization among the variables included in the primary studies (Lipsey & Wilson, 2001).

3.6 TREATMENT OF QUALITATIVE RESEARCH

The qualitative findings obtained from retrieved studies will be used to interpret the quantitative results and to provide contextual information (CDR, 2009). Studies that utilize qualitative methods (focus groups, interviews) will be included in the systematic review only if these studies meet the other inclusion criteria, and are included in a study providing quantitative data. In other words, mixed methods studies that meet the inclusion criteria will be included in this systematic review. In this way consistency will be maintained and the qualitative data will provide contextual information to the quantitative data.

4 Results

4.1 DESCRIPTION OF ELIGIBLE STUDIES

Our search and contacts with organizations and authors who may have had knowledge of police stress management and development program evaluations occurred over a 9 month period from August 1, 2009 through May 31, 2010. The last search was conducted on May 31, 2010. Retrieved studies were published between 1984 and 2008. The total number of titles and/or abstracts identified from the search strategy and screened was 678. Of these titles and abstracts, 25 studies were retrieved. Upon closer examination, 13 of these 25 studies were excluded due to lack of insufficient data to perform the analysis. Studies were excluded due to the lack of either pre-test or posttest data, or the lack of separate outcome data for police officers. Table 1 provides examples of characteristics among the 13 excluded studies.

Table 2 provides a description of the 12 primary studies included in the systematic review.

The studies were published between 1984 and 2008. The studies included in the analysis comprised a total sample size of 906 participants. One study included a comparison group in addition to the experimental and control group (Coulson, 1987). The comparison group was excluded from the analysis. Among the 10 studies reporting gender, 401 participants were male and 91were female. Among the 11 studies reporting age, the average age was 34.48 (SD = 3.57). As Table 2 also shows, three studies reported racial/ethnic data. The years of police experience officers possessed were reported among 7 studies. Years of police experience excluded samples of police recruits. The average years of police experience was 10.77 years (SD = 4.00).

Only 3 studies reported the rank of the officers which were: below the rank of sergeant; police officer, detective and administrative officers; and deputy chiefs, commanders, lieutenants, sergeants, and police officers. Seven studies contained samples comprised only of police officers; two studies reported a sample of police officers and civilian personnel; one reported a sample of police officers and recruits while another included a sample of police officers and significant others, and one study included a sample of police recruits.

As Table 2 also shows, the types of interventions provided were quite varied. Among the 12 studies, 10 interventions were described: stress management program; stress reduction program; stress inoculation; brief interventions; counseling; nutrition and physical conditioning; circuit weight training; Eye Movement Desensitization and Reprocessing (EMDR), visual-motor behavior rehearsal (VMBR), and a writing intervention. Eleven of the primary studies provided a citation for the prior work establishing the basis for the intervention.

One study described the development and testing of a unique HeartMath stress and emotional self-management technique (McCraty & Tomasino, 1999). One study investigated an intervention as a treatment for police officers diagnosed with PTSD (Gersons, Carlier, Lamberts, & van der Kolk, 2000), and was the only study which required that study participants experience stress prior to or as a condition to participating in the study. The remaining 10 studies investigated interventions intended to either reduce stress outcomes or assess outcomes. As such, it was difficult to assess whether the interventions were intended as preventative interventions.

The length of the interventions ranged from a minimum of 1 week to a maximum of 16 weeks. When measured in minutes and hours, the duration of the interventions ranged from 35 minutes to 24 hours. The average length of the interventions was 10.95 hours (SD = 7.33).

4.1.1 Psychological outcomes

The number of reported outcomes among the 12 studies ranged from one to 20, with an average of 8 outcomes per study. Among the 12 studies, 100% measured psychological outcomes. As Table 2 shows, numerous psychological outcomes were measured such as anxiety, depression and perceived levels of stress. Although the table shows the range of outcomes described in each study, not all outcomes were reported in all studies or when data were reported it could not be used in the analysis. The following examples illustrate the wide range and diversity of the standardized instruments among the studies:

> The Social Readjustment Rating Scale, The Maslach Burnout Inventory, The Rotter Internal-External Locus of Control, The Competitive State Anxiety Inventory-2 (CSAI-2), State-Trait Anger Expression Inventory (STAXI), Posttraumatic Stress Diagnostic Scale (PTDS), The Profile of Mood States (POMS), EMAS-T, STAS-T, PSS, SES, the Symptom Checklist (SCL-90), the Depression Anxiety Stress Scales (Lovibond & Lovibond, 1995), Personal and Organizational Quality Assessment (POQA) survey, Hopkins Symptom Checklist, Perceived Stress Scale, Health and Fitness Questionnaire, Tennessee Self-Concept Scale (TSCS), Stage of Readiness Questionnaire, and 5F-Wel (Myers & Sweeney, 2004).

Some standardized instruments were specific to police officers such as the Police Officers Questionnaire and Police Job Stress Discussionaire (CPJSD) and the Police Stress Inventory (PSI).

4.1.2 Behavioral outcomes

Four studies (33%) described behavioral outcomes such as alcohol use or job performance indicators. Once again, not all data were reported for these outcomes or when data were reported some data could not be used in the analysis. A single study reported the number of alcoholic drinks consumed as behavioral outcomes (Richmond, Kehoe, Hailstone, Wodak, & Uebel-Yan, 1999).

Because only one study reported drinking behavior and the remaining behavioral outcomes were work-related outcomes, drinking behavior was eliminated from the analysis. Consequently, three studies (25%) reported behavioral outcomes that were used in the analysis. Examples of behavioral outcomes are illustrated below:

> Sick hours taken, number of vacation hours taken, complaints filed, number of disciplinary actions taken, number of accidents, times tardy, injuries, live-fire scenario, and self-ratings of work performance.

4.1.3 Physiological outcomes

Two studies (17%) reported physiological outcomes such as:

> Heart rate, heart rate variability, blood pressure, common physical symptoms, cardiovascular fitness (discontinuous step test), strength improvement (one-repetition maximum-strength measure), physical fitness measures (height, weight, waist size, biceps diameter, chest size), grip strength, exercise, and weight gain/loss.

Similar to the reporting of psychological and behavioral outcomes, all of the data pertaining to physiological outcomes were not reported among the primary studies.

4.2 OVERALL MEAN EFFECT ACROSS STUDIES

Effect sizes were calculated from 8 published studies, 3 unpublished doctoral dissertations, and 1 unpublished report. The effect size was grouped by outcome type (psychological, behavioral or physiological) with separate analyses for each outcome. Multiple effect sizes for an outcome type were averaged. Table 3 reports the standard difference (Hedge's g) and 95% confidence intervals under the random effects model among behavioral outcomes. A total of 30 effects were combined. As the table shows, across the 3 studies, the effects ranged from -0.695 to 0.194. The mean effect was -0.176. These represent a very large negative effect to a very small positive effect. Table 4 shows the random effects model among physiological outcomes. Twenty-nine effects were combined across 2 studies. The effects ranged from 0.030 to 0.324, or near zero to medium effects. The mean effect was 0.196.

Table 5 presents the results of the random effects model among psychological outcomes. A total of 162 effects were combined to yield effect sizes that ranged from -0.485 to 0.975, a moderately large negative effect to a very large positive effect. The mean effect was 0.038.

4.3 HETEROGENEITY OF EFFECTS

The Q statistic was calculated to test the null hypothesis that all studies share a common effect size and to examine whether the heterogeneity among the 12 studies was statistically significant. As Table 6 shows, the Q value was statistically significant for psychological outcomes ($p = 0.035$). The Q values were not statistically significant for the physiological and behavioral outcomes. As such, we also computed I^2. These results are also shown in Table 6. I^2 was zero for physiological outcomes, suggesting little meaningful variability across effect sizes. I^2 was 47.23 among psychological outcomes suggesting that 47.23% of the variability among the effect sizes was the result of heterogeneity between the studies. Similarly I^2 was 61.69 among behavioral outcomes suggesting that 61.69% of the variability among the effect sizes was also the result of heterogeneity between the studies. However, these results should be interpreted with caution because both the Q and I^2 statistics have limited statistical power due to the low number of studies included in the analysis (Borenstein et al., 2009b).

4.4 ANALYSIS OF MODERATOR EFFECTS

Moderator analyses were performed among the 12 primary studies using the psychological outcomes only. Seven moderator variables were theorized to influence stress management intervention outcomes. These include: (1) length of stress management intervention - six studies provided a one day intervention and six studies provided a two day intervention. The length of the interventions was coded as either one day or two days in duration. The review team reached consensus to code the length of the interventions as either one day or two days in duration believing that an intervention described as lasting 4 weeks, although the actual intervention was only 15 minutes per day, could be misleading; (2) type of stress management intervention - two studies provided a physical exercise intervention and ten studies provided a psychosocial educational intervention; (3) population (recruit, veteran police officer, civilian) - seven studies included samples comprised only of police officers; one included a sample of police recruits; one included a sample of police officers and significant others, two studies reported a sample of police officers and civilian personnel; and one study reported a sample of police officers and recruits. The later three studies were coded as police officers and others; (4) gender - three studies included male samples and seven studies included both males and females among the samples. One study did not include females in the final analysis due to attrition and one did not report the number of males and females after attrition. Only samples that participated in all time points were

included in the present analysis; (5) years of police experience - years of police experience was coded as less than 10 years of experience, or more than 10 years. Three studies reported less than 10 years of police experience and four studies reported more than 10 years of experience; (6) random assignment to conditions - two studies used a control group without random assignment and 10 studies reported random assignment. One study used a control group but did not report how the group was obtained; and (7) attrition - five studies did not report the attrition rate among the sample and seven studies reported attrition among the sample. Among the seven studies reporting attrition, the dropouts were excluded from the final analysis.

Because only three studies reported the rank of the officers which were: below the rank of sergeant; police officer, detective and administrative officers; and deputy chiefs, commanders, lieutenants, sergeants, and police officers, the rank of the officer was not included as a moderator variable.

4.5 SENSITIVITY ANALYSIS

A sensitivity analysis was performed to examine the impact of each study on the mean effect. The analysis was performed in several ways. First, it was run with all studies included except the first study, then with all studies except the second study, and so forth. A second approach was performed with larger studies removed, then with smaller studies removed. Finally, the analysis was performed with the 7 moderator variables removed to assess the impact that these factors might have on the mean effect. Each analysis resulted in a zero effect.

4.6 SUMMARY OF QUALITATIVE DATA

Of the 12 studies included in the review, only one study (Richmond, Kehoe, Hailstone, Wodak, & Uebel-Yan, 1999) included a focus group component to explore attitudes toward alcohol consumption. The sample consisted of 43 participants of both genders and different police ranks, who were randomly assigned to 5 focus groups. The findings of the focus group discussion provided some contextual information regarding the lack of significant improvement in reducing excessive alcohol consumption, smoking and stress symptoms among the police officers who participated in the study's intervention. These factors included the lack of trust held by police officers toward the law enforcement organization's involvement in health issues, the perception that alcohol consumption was a private matter unless it interfered with job performance, and the stressors inherent in the work environment were conducive to the use of alcohol consumption as a coping mechanism and a central part of the police culture for bonding among officers.

Another study (Wilson, et al, 2001) conducted clinical and exit interviews with police officers and their significant others. The clinical interviews focused on the job stress inherent in police work, organizational issues, and personal issues. Officers

and their significant others were asked to describe one stressor for each area. Officers reported stressors such as inadequate salary, excessive paperwork and working overtime. These stressors formed the basis for the stress management interventions provided to the experimental and control groups. The exit interviews were also conducted with each couple focused on whether police officers and their significant others participated in interventions after completing the stress management intervention as well as any recommendations for providing the stress management intervention differently in the future, among others. Most of the qualitative data obtained from the exit interviews was not reported in the study although officers' significant others reported observing positive changes in their officer spouses following participation in EMDR, officers who received the EMDR stress management intervention referred colleagues to the intervention and many of the significant others expressed a desire to have participated in the EMDR intervention.

4.7 PUBLICATION BIAS

Only including published studies in the analysis can result in a file drawer problem. Omitting unpublished studies in a meta-analysis can result in findings that are misleading (Glass, 1981), and overestimate the true effect size (Borenstein et al., 2009b). Moreover, to ignore dissertations based on assumptions that they lack rigor is unwarranted (Glass, 1981), and to assume that peer reviewed journal publications result in high quality studies can be misleading (Borenstein et al., 2009b).

To assess publication bias, the funnel plot by precision proposed by Borenstein et al (2009b) was used. The funnel plot is displayed in Figure 1. The results show that the two large studies are situated near the top of the funnel plot and centered around the mean, whereas the 10 smaller studies are situated near the bottom and are more dispersed around the mean effect size. Of these 12 primary studies, eight (67%) were published studies, and four (33%) were either an unpublished report or unpublished doctoral dissertations.

5 Conclusion

This systematic review examined the question: What are the effects of officer stress management interventions on stress outcomes? Because police officers experience numerous work and personal stressors that can have negative consequences, this is an important question that warrants examination. Law enforcement organizations provide a wide variety of stress management interventions intended to help police officers and recruits manage stress although the efficacy of these interventions has yet to be demonstrated.

Twelve studies were found that met the inclusion criteria. Richardson and Rothstein (2008) noted that using a specific population to focus on the effects of stress management interventions are likely to result in a small number of studies. This review only examined studies having a control group. As expected, no samples were randomly recruited from police departmental employee sampling frames and the samples were comprised of volunteers. The methodological criteria were based on what Lipsey and Wilson (2001) refer to as "best' evidence" (p. 9).

The primary studies included in this systematic review provided a great deal of information regarding the components of the interventions which were quite varied. Moreover, numerous types of interventions were provided. Most of the interventions appear to have been offered by the study authors and were not part of an ongoing training program or program evaluation effort by the law enforcement organizations participating in the studies. The variety of intervention components made it difficult to code the components, and consequently to disentangle which components of the stress management interventions were likely to be effective. It is important to determine which components of stress management interventions are effective to contribute to the literature describing the effectiveness of stress management interventions and to guide organizations with implementing interventions (van der Hek & Plomp, 1997).

Given that the sources and types of police stress have been extensively categorized in the literature, it was also unclear among the primary studies which types of stress were the focus of the interventions. Giga, Cooper, and Faragher (2003) recognized that stress management interventions have a wide range of objectives, methods and structures, and are provided to different populations of workers. Some interventions focus on organizational factors (i.e., policies and the physical work

environment), whereas others focus on individual factors (i.e., workers' attitudes and behaviors).

The results of the present review indicate that stress management interventions had no significant effect on psychological, behavioral or physiological outcomes. Whereas stress can contribute to psychological, behavioral and physiological outcomes, the majority of primary studies examined psychological stress outcomes. Only three studies examined behavioral outcomes, and two examined physiological outcomes. Near null effects were found for psychological, behavioral, and physiological outcomes. Moderator analyses, although difficult and exploratory with so few studies, also failed to find any meaningful differences across the studies. These results do not provide evidence to support the efficacy of stress management interventions for police officers or recruits. Given the weakness of the research designs, we can neither claim that these programs are effective or ineffective.

Numerous plausible explanations are proposed for these findings including; the low quality of the primary studies, the varied aims of the interventions, methodological issues including the diversity in standardized instruments used to measure outcomes, and the small sample size among the primary studies. The present review included three of 10 studies identified in a prior systematic review that examined stress management interventions for police personnel (Penalba et al., 2009). Seven of the 10 studies did not meet our inclusion criteria and are listed in Table 1. The present findings and the findings reported by Penalba et al. (2009) point out the low quality of retrieved studies, and the diversity among participants, interventions and outcomes. Giga et al. (2003) concluded that the diversity among studies contributes to the conflicting results that have been reported. Indeed, numerous classifications of coping, measurement strategies, and methods used to investigate work stress and interventions have been reported (Dewe & Cooper, 2007). These are additional issues that may have contributed to the present review findings.

Wilson et al (2001) conducted exit interviews with police officers and their significant others. and found that officers' significant others reported observing positive changes in their officer spouses following participation in EMDR and officers who received the EMDR stress management intervention referred their colleagues to the intervention. The qualitative data obtained from a second study reports officers' lack of trust toward the law enforcement organization's involvement in their health issues, including their perceptions that drinking alcohol was a private matter unless it interfered with job performance. Officers also expressed that police work stress was conducive to alcohol use as a coping and bonding strategy among officers (Richmond et al., 1999). Similarly, Carlan and Nored (2008) noted that officers did not feel that experiencing stress symptoms made officers less prepared for police work. At the same time, officers were hesitant about discussing their anxieties with other officers perhaps due to the stigma associated with receiving stress counseling. While their study used quantitative methods, taken together these findings indicate the need for more qualitative data that investigates police

officers' attitudes and perceptions of stress management interventions. Such data can contextualize their perceptions and participation in stress management interventions.

More rigorous studies are needed that evaluate the efficacy of stress management interventions among police officers and recruits. Several recommendations are proposed for future research. First, police organizations should conduct evaluation research of their current stress management interventions that includes random assignment. Second, stress management interventions for police officers and recruits should focus on specific types of stress (i.e., organizational or personal). The type of stress that is the focus of the intervention should be described in studies. This follows the approach used by Wilson et al (2001) to base the stress management interventions provided to the experimental and control groups on the stressors identified in clinical interviews with police officers and their significant others. Finally, as mentioned more qualitative data are needed to contextualize participants' experiences with the intervention. This can be achieved through mixed methods studies. The results of such studies can add to the body of knowledge demonstrating the efficacy of stress management interventions for police officers and recruits, and help guide law enforcement organizations.

6 Plans for Updating the Review

The review team will assume responsibility for updating the systematic review. An updated review will be conducted every three years after the present systematic review is completed based on Campbell Collaboration guidelines.

7 Acknowledgements

We thank the National Policing Improvement Agency, Campbell Collaboration Crime and Justice Group, and George Mason University for funding this systematic review. We also thank Dr. David B. Wilson for his generous time, support and knowledge assisting the review team with conducting this systematic review. The review team acknowledges the assistance of Daniel Schmidt who managed the study selection process and references; and Professor Marvie Brooks, Instruction Librarian, John Jay College of Criminal Justice (CUNY) New York, NY for assisting with the search strategy.

8 References

Ackerley, D.G. (1986). The effects of a stress management program on police personnel. *Dissertation Abstracts International*, DAI, 48, no. 05A.

Addis, N., & Stephens, C. (2008). An evaluation of a police debriefing programme: Outcomes for police officers five years after a shooting. *International Journal of Police Science and Management*, *10*, 361-373. doi: 10.1350/ijpsm.2008.10.4.092

Aldwin, C. M. (2007). *Stress, coping, and development: An integrative perspective* (2nd ed.). New York: Guilford Press.

Amaranto, E., Steinberg, J., Castellano, C., & Mitchell, R. (2003). Police stress interventions. *Brief Treatment and Crisis Intervention*, *3*, 47-54. doi: 10.1093/brief-treatment/mhg001

Anderson, W., Swenson, D., & Clay, D. (1995). *Stress management for law enforcement officers*. Englewood Cliffs, NJ: Prentice Hall.

Anshel, M. H. (2000). A conceptual model and implications for coping with stressful events in police work. *Criminal Justice and Behavior*, *27*, 375-400. doi: 10.1177/0093854800027003006

Arredondo, R., Shumway, S. T., Kimball, T. G., Dersch, C. A., Morelock, C. N., & Bryan, L. (2002). Law enforcement and corrections family support: Development and evaluation of a stress management program for officers and their spouses, final report. Washington, DC: Office of Justice Programs, National Institute of Justice, U.S. Department of Justice

Backman, L., Arnetz, B.B., Levin, D., & Lublin, A. (1997). Psychophysiological effects of mental imaging training for police trainees. *Stress Medicine*, *13*, 43-48. doi: 10.1002/(SICI)1099-1700(199701)13:1<43::AID-SMI716>3.0.CO;2-6

Barrett, R. F. (1985). The effectives of a cognitive behavioral intervention program in remediating symptoms of stress in a police communication center. *Dissertation Abstracts International*, DAI, 46, no. 06B.

Berglund, M. L. (1991). Effects of cognitive and biobehavioral interventions on hypertension levels in police officers. *Dissertation Abstracts International*, DAI, 52, no. 04B.

Biggam, F. H., Power, K. G., & MacDonald, R. R. (1997). Self-perceived occupational stress and distress in a Scottish police force. *Work & Stress*, *11*, 118-133. doi: 10.1080/02678379708256829

Blumenthal, J. A., Sherwood, A., Babyak, M. A., Watkins, L. L., Waugh, R., Georgiades, A., Bacon, S. L., Hayano, J., Coleman, R. E., & Hinderliter, A. (2005). Effects of exercise and stress management training on markers of

cardiovascular risk in patients with ischemic heart disease. *Journal of the American Medical Association*, *293*, 1626- 1634. doi: 10.1001/jama.293.13.1626

Bonifacio, P. (1991). *The psychological effects of police work*. New York: PlenuPress.

Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2009a). *Comprehensive meta analysis* (version 2.2.050) [Computer software]. Englewood, NJ: Biostat.

Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2009b). *Introduction to meta- analysis*. West Sussex, UK: Wiley.

Brandt, D. E. (1993). Social distress and the police. *Journal of Social Distress and the Homeless*, *2*, 305-313. doi: 10.1007/BF01065525

Brown, J. M., Cooper, C. L., & Kirkcaldy, B. (1996). Occupational stress among seniorpolice officers. *British Journal of Police Psychology*, *87*, 31-41.

Burke, R. J. (1993). Work-family stress, conflict, coping and burnout in police officers. *Stress Medicine*, *9*, 171-180. doi: 10.1002/smi.2460090308

Burke, R. J., & Deszca, E. (1986). Correlates of psychological burnout phases among police officers. *Human Relations*, *39*, 487-502. doi: 10.1177/001872678603900601

Carlan, P.E., & Nored, L.S. (2008). An examination of officer stress: Should police departments implement mandatory counseling? *Journal of Police and Criminal Psychology*, *23*, 8-15. doi: 10.1007/s11896-008-9015-x

Carlier, I.V.E., Lamberts, R.D., van Uchelen, J.J., & Gersons, B.P.R. (1998). Disaster-related posttraumatic stress in police officers: A field study of the impact of debriefing. *Stress Medicine*, *14*, 143-178. doi: 10.1002/(SICI)1099-1700(199807)14:3<143::AID-SMI770>3.0.CO;2-S

Centre for Reviews and Dissemination. (2009). *Systematic reviews: CRD's guidance for undertaking reviews in healthcare*. York, England: University of York. doi: 10.1016/S1473-3099(10)70065-7

Chapin, M., Brannen, S. J., Singer, M. I., & Walker, M. (2008). Training police leadership to recognize and address operational stress. *Police Quarterly*, *11*, 338-352. doi: 10.1177/1098611107307736

Cole, G. F., & Smith, C. E. (2004). *The American system of criminal justice*. (12th ed.). Belmont, CA: Wadsworth, Cengage Learning.

Collins, R. A., & Gibbs, A. C. C. (2003). Stress in police officers: A study of the origins,prevalence and severity of stress-related symptoms within a county police force. *Occupational Medicine*, *53*, 256-264. doi: 10.1093/occmed/kqg061

Cooper, C. L., & Davidson, M. (1987). Sources of stress at work and their relation to stressors in non-working environments. In R. Kalimo, M. A. E. El-Batawi, & C. L. Cooper (Eds.), *Psychological factors at work and their relation to health* (pp. 99-123). Geneva, Switzerland: World Health Organization.

Coulson, J.E. (1987). *The effectiveness of a stress reduction program for police officers*. University of North Texas, 1987.1987.8713941. Retrieved from ProQuest.

Davidson, M. J., & Veno, A. (1980). Stress and the policeman. In C. L. Cooper & J. Marshall (Eds.), *White collar and professional stress* (pp. 131-166). New York: John Wiley and Sons Ltd.

DeFrank, R. S., & Cooper, C. L. (1987). Worksite stress management interventions: Their effectiveness and conceptualization. *Journal of Managerial Psychology*, *2*, 4-10.

Dewe, P., & Cooper, C. L. (2007). Coping research and measurement in the context of work related stress. In G. P. Hodgkinson, J. K. Ford, G. P. Hodgkinson & J. K. Ford (Eds.), *International review of industrial and organizational psychology 2007 (vol 22)*. (pp. 141-191). New York: John Wiley & Sons Ltd.

Digliani, J.A. (1994). Stress inoculation training: The police. *Dissertation Abstracts International* DAI, 56, no. 04B

Doctor, R.S., Curtis, D., & Isaacs, G. (1994). Psychiatric morbidity in policemen and the effect of brief psychotherapeutic intervention – A pilot study. *Stress Medicine*, *10*, 151-157. doi: 10.1002/smi.2460100304

Ellison, K. W., & Genz, J. L. (1983). *Stress and the police officer*. Springfield, Ill: Charles C. Thomas.

Evans, G.S. (1989). A comparative statistical analysis of three therapeutic approaches to stress management. *Dissertation Abstracts International* DAI, 51, no. 01B.

Evans, B. J., Coman, G., Stanley, R. O., & Burrows, G. D. (1993). Police officers' coping strategies: An Australian police survey. *Stress Medicine*, *9*, 237-246. doi: 10.1002/smi.2460090406

Everly, G.S., Flannery, R.B., & Mitchell, J.T. (2000). Critical incident stress management (CISM): A review of the literature. *Aggression and Violent Behavior*, *5*, 23-40. doi: 10.1016/S1359-1789(98)00026-3

Fain, D. B., & McCormick, G. M. (1988). Use of coping mechanisms as a means of stress reduction in North Louisiana. *Journal of Police Science and Administration*, 16, 21- 28.

Finn, P., & Tomz, J. E. (1997). *Developing a law enforcement stress program for officers and their families*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, National Institute of Justice.

Folkman, S., & Lazarus, R. S. (1991). Coping and Emotion. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping: An anthology* (pp.207-227). New York: Columbia University Press.

Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, *48*, 150-170. doi: 10.1037//0022-3514.48.1.150

Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. (1986). The dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*, *50*, 571-579. doi: 10.1037/0022-3514.50.5.992

Gaab, J., Blattler, N., Menzi, T., Pabst, B., Stoyer, S., & Ehlert, U. (2003). Randomized controlled evaluation of the effects of cognitive-behavioral stress management on cortisol response to acute stress in health subjects. *Psychoneuroedocrinology, 28*, 767- 780. doi: 10.1016/S0306-4530(02)00069-0

Gersons, B.P.R., Carlier, I.V.E., Lamberts, R.D., & van der Kolk, B.A. (2000). Randomized clinical trial of brief eclectic psychotherapy for police officers with posttraumatic stress disorder. *International Society for Traumatic Stress Studies, 13(2),* 333-347. doi: 10.1023/A:1007793803627

Gibbons, J. P. (1991). Stress management in emergency service occupations: A comparison of personalized, clinic supported vs. home based self directed stress reduction programs. *Dissertation Abstracts International*.DAI, 52, no. 12B.

Giga, S.I., Cooper, G.L., & Faragher, B. (2003). The development of a framework for a comprehensive approach to stress management interventions at work. *International Journal of Stress Management, 10(4),* 280-296. doi: 10.1037/1072-5245.10.4280

Glass, G. V., McGaw, B., & Smith, M. L. (1981). Meta-analysis in social research. Beverly Hills, CA: Sage.

Graf, F. (1986). The relationship between social support and occupational stress among police officers. *Journal of Police Science and Administration*, 14, 178-186.

Greene, D. J. (1984). The enhancement of the performance and judgement of SWAT officers involved in stress-shooting. *Dissertation Abstracts International*, DAI, 45, no. 10B.

Hurrell, J. J. (1995). Police work, occupational stress and individual coping. *Journal of Organizational Behavior*, 16, 27-28.

Ireland, M, Malouff, J.M., & Byrne, B. (2007). The efficacy of written emotional expression in the reduction of psychological distress in police officers. *International Journal of Police Science & Management, 9(4),* 303-311. doi: 10.1350/ijps.2007.9.4.303

Janik, J., & Kravitz, H. M. (1992). Linking work and domestic problems with police suicide. *Suicide & Like-Threatening Behavior, 24*, 267-274.

Kirkcaldy, B., Cooper, C. L., & Ruffalo, P. (1995). Work stress and health in a sample of U.S. police. *Psychological Reports, 76*, 700-702.

Kirmeyer, S. L., & Diamond, A. (1985). Coping by police officers: A study of role stress and Type A and Type B behavior patterns. *Journal of Occupational Behavior, 6*, 183- 195. doi: 10.1002/job.4030060303

Kroes, W. H. (1985). *Society's victims: The police* (2nd ed.). Springfield, Il: Charles C. Thomas.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Lennings, G. (1995). Suicide ideation and risk factors in police officers and justice students. *Police Studies, 15*, 146-147.

Lester, D., Leitner, L. A., & Posner, I. (1984). The effects of a stress management training programme on police officers. *International Review of Applied Psychology*, *33*, 25-31. doi: 10.1111/j.1464-0597.1984.tb01414.x

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage Publications, Inc.

McCraty, R., & Tomasino, D. (1999). *Impact of the HeartMath self-management skills program physiological and psychological stress in police officers*. Boulder Creek, CA:HeartMath Research Center, Publication No. 99-075.

McNulty, S., Jefferys, D., Singer, G., & Singer, L. (1984). Use of hormone analysis in the assessment of the efficacy of stress management training in police recruits. *Journal of Police Science and Administration, 12(2)*, 130-132.

Morash, M. (2006). Multilevel influences in police stress. *Journal of Contemporary Criminal Justice*, *22*, 26-43.

Newman, J.E., & Beehr, T.A. (1979). Personal and organizational strategies for handling job stress: A review of research opinion. *Personnel Psychology*, *32*, 1-43. doi: 10.1111/j.1744-6570.1979.tb00467.x

Niederhoffer, A. (1967). *Behind the shield*. Garden City, NY: Doubleday.

Norvell, N., & Belles, D. (1993). Psychological and physical benefits of circuit weight training in law enforcement personnel. *Journal of Consulting and Clinical Psychology*, *61(3)*, 520-527. doi: 10.1037/0022-006X.61.3.520

On the job stress in policing – reducing it, preventing it. (2000, January). *National Institute of Justice Journal*, *18-24*.

O'Neill, M. W., Hanewicz, W.B., Fransway, L.M., & Cassidy-Riske, C. (1982). Stress inoculation training and job performance. *Journal of Police Science and Administration, 10(4)*, 338-397.

Patterson, G. T. (2003). Examining the effects of coping and social support on work and life stress among police officers. *Journal of Criminal Justice*, *31*, 215-226. doi: 10.1016/S0047-2352(03)00003-5

Penalba, V., McGuire, H., & Leite, J.R. (2009). *Psychosocial interventions for prevention of psychosocial disorders in law enforcement officers*. The Cochrane Library, Issue 4. Retrieved http://www.thecochranelibrary.com doi: 10.1002/14651858.CD005601

Ranta, R.S. (2009). Management of stress and coping behaviour of police personnel through Indian Psychological Techniques. *Journal of the Indian Academy of Applied Psychology*, *35(1)*, 47-53.

Ranta, R.S., & Sud, A. (2008). Management of stress and burnout in police personnel. *Journal of the Indian Academy of Applied Psychology, 34(1)*, 29-39.

Richardson, K. M., & Rothstein, H. R. (2008). Effects of occupational stress management intervention programs: A meta-analysis. *Journal of Occupational Health Psychology, 13 (1)*, 69-93. doi: 10.1037/1076-8998.13.1.69

Richmond, R.L., Kehoe, L., Hailstone, S., Wodak, A., & Uebel-Yan, M. (1999).

Quantitative and qualitative evaluations of brief interventions to change excessive during, smoking and stress in the police force. *Addiction, 94(10),* 1509-1521.

Sarason, I.G., Johnson, J.H., Berberich, J.P., & Siegel, J.M. (1979). Helping police officers to cope with stress: A cognitive-behavioral approach. *American Journal of Community Psychology*, *7(6)*, 593-603. doi: 10.1007/BF00891964

Sewell, J. D. (1999). Administrative concerns in law enforcement stress management. In L. Territo and J. D. Sewell (Eds.), *Stress management in law enforcement* (pp. 361- 369). Durham, NC: Carolina Academic Press.

Shipley, P., & Baranski, J. V. (2002). Police officer performance under stress: A pilot study on the effects of visuo-motor behavior rehearsal. *International Journal of Stress Management, 9(2),* 71-80. doi: 10.1023/A:1014950602826

Short, M. A., DiCarlo, S., Steffee, W. P., & Pavlou, K. (1984). Effects of physical conditioning on self-concept of adult obese males. *Physical Therapy, 62(2),* 194-198.

Shrout, P. E., Spitzer, R. L., & Fleiss, J. L. (1987). Quantification of agreement in psychiatric diagnosis revisited. *Archives of General Psychiatry, 44,* 172-177.

Stinchcomb, J. B. (2004). Searching for stress in all the wrong places: Combating chronic organizational stressors in policing. *Police Practice and Research, 5,* 259-277.doi: 10.1080/15614260420022759 4

Tanigoshi, H., Kontos, A. P., & Remley, T. P. (2008). The effectiveness of individual wellness counseling on the wellness of law enforcement officers. *Journal of Counseling & Development, 86,* 64-74.

van der Hek, H., & Plomp, H.N. (1997). Occupational stress management programmes: A practical overview of published studies. *Occupational Medicine, 47(3),* 133-141. doi: 10.1093/occmed/47.3.133

van der Klink, J.J.L., Blonk, R.W.B., Schene, A.H., & Dijk, F.J.H. (2001). The benefits of interventions for work-related stress. *American Journal of Public Health, 91(2),*270-276. doi: 10.2105/AJPH.91.2.270

van Wyk B.E., & Pillay-Van Wyk, V. (2010). Preventive staff-support interventions for health workers. The Cochrane Library, Issue 3. Retrieved from http://www.thecochranelibrary.com.

Violanti, J. M. (1992). Coping strategies among police recruits in a high-stress training environment. *The Journal of Social Psychology*, 132, 717-729.doi: 10.1080/00224545.1992.9712102

Violanti, J. M. (1995). The mystery within: Understanding police suicide. *FBI Law Enforcement Bulletin, 64,* 19-23.

Violanti, J. M., & Marshall, J. R. (1983). The police stress process. *Journal of Police Science and Administration,* 11, 389-394.

Violanti, J. M., Marshall, J. R., & Howe, B. (1985). Stress, coping, and alcohol use: The police connection. *Journal of Police Science and Administration*, 13, 106-110.

Webb, S. D., & Smith, D. L. (1980). Stress prevention and alleviation strategies for

the police. *Criminal Justice Review, 5*, 1-15. doi: 10.1177/073401688000500102

Wilson, S. A., Tinker, R. H., Becker, L. A., & Logan, C. R. (2001). Stress management with law enforcement personnel: A controlled outcome study of EMDR versus a traditional stress management program. *International Journal of Stress Management, 8(3)*, 179-200. doi: 10.1023/A:1011366408693

9 Tables

9.1 CHARACTERISTICS OF EXCLUDED STUDIES

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
Arredondo, Shumway, Kimball, Dersch, Morelock, & Bryan (2002)	TG 19 CG 51 Total: 70 Pre-attrition: 250 Gender: 37M, 33F; Years of experience: no information; TG: Anglo 74%, Hispanic 26%; CG: Anglo 92%, Hispanic 8%	Random	Couple communication skills, relationship strengthening strategies, coping with shift work and long hours, unpredictability of police work and public scrutiny, depression, trauma and stress reactions, substance abuse	Psychological: Distress and symptoms, coping styles, interaction satisfaction with spouse/significant others	6-8 weeks, 2 hours each week (12 – 16 hours total)	Multi-modal stress management: didactic, process/treatment group and ongoing support mentor-led group	Lack of post-test data

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
	Police officers/ spouses/ sig. others						
Backman, Arnetz, Levin, & Lublin (1997)	TG = 37 CG = 38 Police recruits	Quasi-experimental	Stress theory, physical and mental relaxation, learning activities (problem management, triggers and self-image, goal, environment, technique, concentration and practical training)	Psychological: Type A behavior, mental exhaustion, coping, quality of sleep, worry/depression, burnout, cynicism; Physiological: Sex hormones (oestrogen, testosterone), stress hormones (prolactin, DHA and cortisol), blood lipids (total cholesterol, HDL and LDL cholesterol, triglycerides, Apo lipoprotein A_1 and Apo lipoprotein B), liver enzymes (ASAT, ALAT and GT), electrolytes (Na, K and Ca), fructosamine and albumin	20 hours	Mental imaging training	No outcome data reported
Barrett (1985)	TG 45 Pre-attrition: 74 Telephone operators and radio dispatchers	No control/ comparison group	Cognitive Behavioral treatment: recognition of dysfunctional cognitions, problem-solving skills, self-monitoring of maladaptive self	Psychological: Stress, state anxiety, trait anxiety, burn out, Physiological: symptoms, medical conditions.	4 one-hour weekly sessions = 4 hours total	Relaxation training, cognitive component,	No control/ comparison group

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
	Gender: 66 females, 8 males in pre-attrition sample Years of exp: 4.82		statements and behaviors, rehearsal of effective self statements, specific coping skills such as relaxation, in vivo behavioral assignments; Homework assignments				
Berglund (1991)	TG = 11 TG = 9 TG = 10 CG = 10 Police officers	Random	The cognitive treatment, the menninger treatment, the integrated resources protocol	Psychological: anxiety, depression, hostility, positive affect, sensation-seeking, dysphoria, PA/SS (composite of positive affect and sensation-seeking; Physiological: systolic blood pressure, diastolic blood pressure	8 hours	Blood pressure treatment	Four groups were compared using ANOVA models assessing between and within subject comparisons
Doctor, Curtis, & Isaacs (1994)	TG = 31 CG = 29 Police officers	Random	Ventilation of feelings, supportive atmosphere, safe space, expression of emotion, reduce the need for denial	Psychological: psychiatric morbidity, perceived sources of stress	12 hours	Group counseling sessions	No outcome data reported
Evans (1989)	TG = 17 CG = 12	Quasi-exp.	Rational emotive therapy (RET), traditional methods (passive	Psychological: Perceived stressful events; Physiological: blood	7 hours	Combined methods approach (RET and	Three groups were compared using

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
	CG = 16 Police officers		concentration, body scanning, progressive muscle relaxation, deep breathing, meditation, imagination/guided imagery, autogenics, assertiveness training, time management, biofeedback)	pressure, heart rate, skin temperature		traditional methods)	ANOVA models assessing between and within subject comparisons
Gibbons, (1991)	TG 60 CG: Pre-att: 150 Police officers, fire department paramedics and hospital ER nurses Gender: 39 M, 21 F	Quasi-exp.	Group 1: relaxation training; cognitive/behavioral stress reduction methods, partial restricted environmental stimulation. Group 2: causes of stress and relaxation guide/tape	Psychological: state-trait anxiety, internal versus external locus of control; Physiological: symptom check list; Behavioral: check list of diet and exercise	3 half- hour sessions for Group 1, half-hour for Group 2 Total 1 ½ hours + ½ hour	Stress Lab-stress reduction training (SSRT) for Group I – one-on-one training, daily log, hypno-subliminal messages ; Self directed stress reduction training for Group 2 : educational materials and relaxation tape	No separate data provided for police officers (data for police, fire and nursing personnel were combined)
Greene	54 divided into 3 groups:	Random	Group 1 & 2: Classroom session on	Psychological: anxiety trait and	2 hours	Group 1: modified	Three groups were

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
(1984)	18-18+ 36 T Groups 18 CG Police officers (SWAT) All males Years of exp: 6.9		the impact of stress on the accuracy, timing and judgment in stress-shooting, motivational lecture, homework assignments to practice shooting twice daily. Group 1: training and practice in progressive relaxation. Group 2: modified attention control training: centering and mental rehearsal	anxiety state, attentional abilities and interpersonal characteristics Behavioral: job performance (stress shooting accuracy and judgment score and completion time)		attention control training; Group 2: progressive relaxation training	compared using ANOVA models assessing between and within subject comparisons
McNulty, Jefferys, Singer, & Singer (1984)	TG = 22 CG = 22 Police recruits	Quasi-exp.	Physical, cognitive modes of handling stress	Physiological: adrenaline levels, noradrenalin levels	15 hours	Stress management training	Time by group ANOVA models were used
O'Neill, Hanewicz, Fransway, & Cassidy-Riske (1982)	TG = 86 CG = not reported Police officers, correctional officers	Quasi-exp.	Exercise and sports fitness, psychological (focused group discussion and training)	Psychological: psychological distress, state-trait anxiety, alcohol screening, stress, perceptions of the world; Physiological: treadmill stress test, lung capacity, blood	Not reported	Stress innoculation training	Four groups were compared. Control and sample size data missing

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
	Gender: not reported Years exp: not reported			pressure, body fat, physical performance test, health hazard appraisal; Behavioral: accidents, injuries, sick leave, separations, citizens complaints, internal complaints, disciplinary actions, use of firearms			
Ranta (2009)	TG = 40 CG = 40 Police officers	Random	Relaxation training, self management/mood management, rehearsal	Psychological: job related stressors, coping strategies	3 hours	Multi-dimensional intervention	Time by group ANOVA models were used
Ranta & Sud (2008)	TG = 40 CG = 40 Police officers	Random	Relaxation training, self management/mood management, rehearsal	Psychological: job related stressors, burnout	3 hours	Multi-dimensional intervention	Time by group ANOVA models were used
Sarason, Johnson, Berberich, & Siegel (1979)	TG = not reported CG = not reported Police recruits	Random	Self-monitoring of reactions to stress, muscular relaxation, development of adaptive self-statements, cognitive-behavioral, physiological responses, scenario	Psychological: state trait anxiety, test anxiety, hostility; Physiological: pulse readings, blood pressure readings; Behavioral: job performance self-ratings	12 hours	Stress management program	Time by group ANOVA models were used. Sample size for experimental and

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Reason excluded
			(traffic stop, filed interrogation, felony stop, conflict situation, building search)				control groups missing

9.2 CHARACTERISTICS OF INCLUDED STUDIES

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
Ackerley (1986)	TG = 24 CG = 25 Total: 49 Pre-attrition: Same (100% participation) Police officers and civilian personnel Gender: 44 M, 5 F Years of exp: not reported	Random block design	The stress process, physical education, relaxation training, dietary programming, cognitive restructuring, sleep and biological cycles, communication skills, coping, exercise program	Psychological: social stress, burnout (emotional exhaustion, depersonalization, personal accomplishment), job satisfaction, quality of family life, coping, internal-external locus of control; Behavioral: Indicators of job performance: sick hours taken, number of vacation hours taken, complaints filed against, complaints	24 hours	Stress management program	32	U.S

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
				filed, number of disciplinary actions taken, number of accidents, times tardy, injuries				
Coulson (1987)	TG = 21 CG = 21 Total: 63 Pre-att: 85 Police officers and recruits Gender: only males at follow-up Years of exp: not reported	Quasi-experimental	Stress inoculation, cognitive-behavioral approach, stress awareness, stress control	Psychological: Mood disturbance (tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, confusion-bewilderment)	10 hours	Stress reduction program	32	U.S
Digliani (1994)	TG = 23 CG = 28 Total: 51 Pre-att: no info. Police officers Gender: 34M, 17 F Years of exp:11.3	Quasi-experimental	Conceptualization, skills acquisition and rehearsal, application and follow-through	Psychological: trait anxiety, personal stress, self-efficacy, trait anger	10 hours	Stress inoculation training	37.6	U.S.
Gersons,	TG=22 (18M, 4F)	Random	Psychoeducation,	Psychological: phobic anxiety,	16 weekly	Brief Eclectic	35 (SD = 6.00)	Netherlands

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
Carlier, Lamberts, & van der Kolk (2000)	CG=20 Total: 42 Police officers Gender: 37M, 5F Years of exp: 16		imaginary guidance, writing assignments and mementos, domain of meaning or integration, farewell ritual	anxiety, depression, somatization, obsessive compulsive, interpersonal sensitivity, hostility, sleeping problems, psychoticism (SCL-90 scales); co-morbid Disorder as per DSM-III-R Behavioral: return to work	sessions, 60 minutes per session	Psychotherapy (BEP), a combination of cognitive-behavioral and psycho-dynamic approaches	for TG	
Ireland, Malouff, & Byrne (2007)	TG=28 CG=39 Total: 67 Pre-att: 129 Police officers Gender: 39M, 28 F Years of exp: not reported	Random	Writing intervention	Psychological: stress, anxiety, depression (Depression Anxiety Stress Scale DASS, Lovibon & Lovibond, 1995)	4 work days, 15 minutes each day total: 1 hour	Writing intervention	35.85 (SD = 8.95) for TG; 38.83 for entire sample	Australia
McCratty, Tomasino, Atkinson, & Sundram, (1999)	TG = 28 CG = 31 Total: 59 Pre-att: 65 Police officers, civilian personnel	Random	HeartMath stress techniques and emotional self-management techniques (freeze-frame technique,	Psychological: coping skills, family relationships, work performance, interpersonal skills, stress, emotional well being, physical stress symptoms; Physiological: heart rate variability, blood pressure	4-6 hours (5 hours average)	HeartMath stress and emotional self-management techniques	39	U.S.

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
	Gender: 55M, 10F (Pre-att) Years of exp: 14.4		coherent communication, heart lock-in), scenarios (building search, high-speed pursuit, domestic violence,	Behavioral: training officer ratings, self-ratings of work performance				
Norvell & Belles (1993)	TG = 14 CG = 15 Total: 29 Pre-att: 43 Police officers Gender: 29M Years of experience: 8.56 Race: 85% White	Random	Initial circuit weight training, no individualized training following initial instruction, circuit machines	Psychological: psychological symptom patterns (somatization, obsessive-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychotism), distress (global severity, positive symptom distress, positive symptom total), perceived stress, satisfaction with nature of work, pay, promotional opportunities characteristics of supervision, co-workers); Physiological: Common physical symptoms, Cardiovascular fitness	16 hours	Circuit weight training	32.84	U.S.

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
				(discontinuous step test), strength improvement (one-repetition maximum-strength measure), physical fitness measures (height, weight, waist size, biceps diameter, chest size), grip strength				
Richmond, Kehoe, Hailstone, Wodak, & Uebel-Yan (1999)	TG = 152 CG = 203 Police officers Gender: not reported at follow-up Years of exp: 5	Quasi-experimental	Health assessment, alcohol intervention, brief advice, self-help materials	Behavioral: Alcohol consumption, cigarette smoking; Psychological: stress; Physiological: exercise, weight gain/loss	35 minutes	Brief interventions	33.2	Australia
Short, DiCarlo, Steffee, & Pavlou (1984)	TG = 22 CG = 23 Total: 45 Police officers	Random	Physical fitness instruction and conditioning	Psychological: self-concept (physical self, personal self, social self, identity, self-satisfaction, behavior, self-criticism)	12 hours	Nutrition and physical conditioning program	Not reported. Age range: 29-52	U.S.

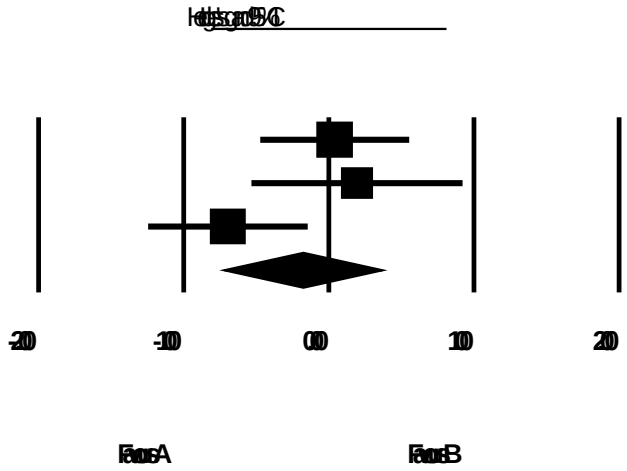
Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
	Gender: all males Years of exp: not reported							
Shipley & Baranski (2002)	TG = 26 CG = 28 Police recruits Gender: 40 males, 14 females	Random	Progressive relaxation (breathing exercise, systematic relaxation of major muscle groups), imagery/mental rehearsal (energizing cue words, positive self-statements, imagery), scenario ("live fire")	Psychological: cognitive state anxiety, somatic state anxiety, self-confidence; Behavioral: job performance self-rated, facilitator-rated	30 minutes	Visuo-motor behavior rehearsal (VMBR)	27	Canada
Tanigoshi, Kontos, & Remley (2008)	TG = 24 CG = 27 Total: 51 Pre-attrition: 60 Police officers	Random	Indivisible self model, wellness plans, prevention plans	Psychological: Wellness (essential self, social self, physical self, creative self, coping self), willingness to change	5 hours	Individual wellness counseling	35	U.S.

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
	Gender: 42M, 9F Years of exp: 7 Race: 45 Caucasian, 3 African Am, 3 Native Am							
Wilson, Tinker, Becker, & Logan (2001)	TG = 31 CG = 31 Police officers/sig. others Gender: 21% female, 79% male Years of exp: 13 (SD = 7.00) Race: 75% Caucasian, 16%	Random	EMDR	Psychological: personal and job stress (subjective disturbance, stress, state-trait anger, coping), marital adjustment, PTSD, general psychological functioning	6 hours	EMDR stress management program	36.8	U.S.

Author	Sample size and description	Methods	Intervention components	Study outcomes	Length of Intervention	Intervention type	Age	Country
	Hispanic, 5% African Am Rank: 5% deputy chiefs and commanders, 3% lieutenants, 13% sergeants, 79% police officers							

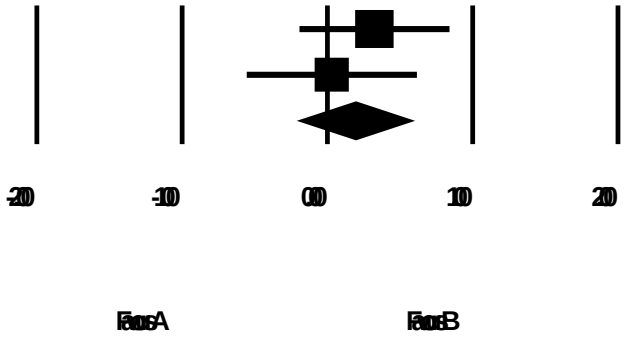
9.3 HEDGE'S G RANDOM EFFECTS FOR BEHAVIORAL OUTCOMES

Study name	Outcome	Treatment	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-value	p-value
Mayea	Clinical	Clinical	0.41	0.28	0.07	-0.45	0.96	0.18	0.85
Nelson	Clinical	Clinical	0.24	0.18	0.03	-0.26	0.95	0.28	0.57
Shyen	Clinical	Fetus	-0.65	0.27	0.07	-1.28	-0.13	-2.52	0.02
			-0.16	0.27	0.07	-0.79	0.47	-0.65	0.25



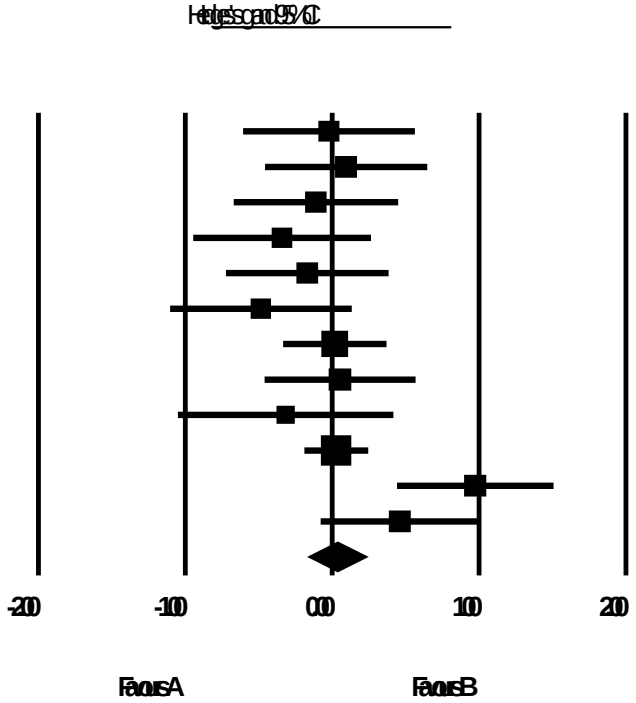
9.4 HEDGE'S G RANDOM EFFECTS FOR PHYSIOLOGICAL OUTCOMES

Study name	Outcome	Treatment	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-value	p-value
Mayea	Clinical	Clinical	0.24	0.15	0.03	-0.05	0.53	1.27	0.23
Shuea	Clinical	Clinical	0.03	0.25	0.07	-0.49	0.49	0.12	0.99
			0.16	0.15	0.03	-0.07	0.53	1.03	0.35



9.5 HEDGE'S G RANDOM EFFECTS FOR PSYCHOLOGICAL OUTCOMES

Study name	Outcome	Timepoint	Statistics for each study						
			Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Stuart et al	Combined	Combined	-0.022	0.125	0.016	-0.269	0.225	-0.176	0.860
Taylor et al	Combined	Combined	0.095	0.128	0.016	-0.156	0.346	0.744	0.457
Akerley	Combined	Combined	-0.110	0.182	0.033	-0.467	0.247	-0.606	0.545
Colson	Combined	Combined	-0.341	0.185	0.034	-0.703	0.021	-1.844	0.065
Dijan	Combined	Combined	-0.170	0.129	0.017	-0.423	0.083	-1.317	0.188
Gerson et al	Combined	Combined	-0.455	0.132	0.017	-0.713	-0.196	-3.446	0.001
Hendricks et al	Combined	Combined	0.018	0.176	0.031	-0.327	0.363	0.102	0.919
McGlave et al	Combined	Combined	0.154	0.129	0.017	-0.099	0.407	1.194	0.232
Novak et al	Combined	Combined	-0.137	0.130	0.017	-0.392	0.118	-1.055	0.291
Richardson et al	Psychosis	Combined	0.028	0.107	0.011	-0.182	0.238	0.263	0.793
Vickers et al	Combined	Pre-test	0.975	0.268	0.072	0.449	1.500	3.636	0.000
Spiegel et al	Psychosis	Pre-test	0.462	0.222	0.049	0.027	0.896	2.077	0.038
			0.138	0.098	0.010	-0.055	0.330	1.404	0.160



9.6 HETEROGENEITY TEST RESULTS

	k	Hedge's g Mean Effect	Q	df(Q)	p	I^2
Behavioral Outcomes	3	-0.176	5.220	2	0.074	61.689
Physiological Outcomes	2	0.196	0.558	1	0.455	0.000
Psychological Outcomes	12	0.038	20.844	11	0.035	47.23

10 Figures

10.1 FUNNEL PLOT OF PRECISION BY HEDGE'S G