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ADVERSE IMPACTS OF ORGANIZATIONAL STRESS ON OFFICER HEALTH AND WELLNESS

Causes, Correlates, and Mitigation

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Adverse Impacts of Organizational Stress on Officer Health and Wellness:

Causes, Correlates, and Mitigation

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List of Acronyms/Abbreviations

Acronym/Abbreviation	Full Description
AdvEmo	Adverse Emotional State and/or Reaction
CS	Compassion Satisfaction
HRV	Heart Rate Variability
IPJS	Lack of Internal Procedural Justice and Support
JDCM	Job Demands-Control Model
JDCS	Job Demands-Control-Support Model
JDRM	Job Demands-Resources Model
NIJ	National Institute of Justice (of the Office of Justice Programs, U.S. Department of Justice)
OpStress	Operational Stress
OrgAtt	Lack of Organizational Attachment
OrgStress	Organizational Stress
PHWB	Poor Health and Lack of Well-Being
PROMIS	Patient-Reported Outcomes Measurement Information System (*PROMIS)*
PTSD	Interchangeably used for Post-Traumatic Stress Disorder and/or its symptoms
PWP	Poor Work Performance
SEM	Structural Equation Modeling
WIF	Work Interference with Family

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Abstract

Stress is widely recognized as inherent in law enforcement work. Two main categories of stressors have been examined: operational stressors or those inherent to the job (e.g., danger, violence, and traumatic events), and organizational stressors (OrgStress), which arise from the work context (e.g., administrative burdens, workload, perceived fairness, etc.). Although operational stress (OpStress) was once viewed as most influential, recent research has shown that OrgStress more strongly relates to outcomes like poor health and well-being and to a lesser extent job performance. Despite these findings, existing theory and conceptual models lack integration of the factors, mechanisms, and pathways between OrgStress and a range of mediators and outcomes. In this study, we developed and tested an expanded OrgStress model using structural equation modeling (SEM). Four broad outcomes were examined: 1) symptoms of Post Traumatic Stress Disorder (PTSD), 2) poor health and lack of well-being (PHWB), 3) lack of organizational attachment (OrgAtt), and 4) poor work performance (PWP); the latter three being assessed with composite measures, and the former with a commonly-used, psychometrically sound instrument. The models explained 20–64% of the variance across outcomes and demonstrated excellent global and local fit indices. OrgStress (a composite) had a direct, significant relationship to PWP (beta = .38, a medium-to-large effect), and to PHWB and PTSD. However, the mediator called "coping/resilience" did not directly influence most outcomes and instead operated through the other two: "adverse emotional state or reaction" (AdvEmo) and "fatigue/poor sleep," which had direct, significant effects on most outcomes. The moderator, internal justice and support, also played a meaningful role. These findings highlight the need to reduce organizational stressors, enhance internal justice and support, and provide organizational and individual interventions to mitigate harmful effects.

Executive Summary*

Purpose of the Study

Stress is widely recognized as an inherent feature of law enforcement work. For decades, researchers and practitioners have focused primarily on the dangers and traumatic exposures associated with police work, often referred to as **operational stressors**. These stressors include responding to violent incidents, witnessing trauma, and operating in unpredictable and dangerous environments. While emphasized less frequently, **organizational stressors** are those that arise from the structure, policies, practices, and culture of the organization itself. These stressors include excessive workload, bureaucracy, role ambiguity, ineffective communication, and inconsistent supervision, among others.

Unlike operational stressors, which are often episodic and tied to critical incidents, organizational stressors are typically chronic and embedded within daily work life. As a result, officers often experience them repeatedly and over long periods. More recent research has underscored the importance of organizational stress with findings suggesting this type of stress may exert a more persistent and pervasive influence on adverse outcomes among officers.

Despite growing recognition of organizational stress as a major issue in policing, prior research has not fully explained how organizational stress affects officers or the mechanisms through which these effects occur. Much of the existing literature has examined isolated outcomes, such as burnout or PTSD, or focused heavily on individual coping strategies without fully examining the organizational conditions that create stress in the first place.

To address this gap, we developed and tested a comprehensive model of organizational stress using **structural equation modeling (SEM)**. Our goal was to examine how organizational stress relates to multiple officer outcomes and to identify the emotional, physiological, and

behavioral mechanisms through which these relationships operate. We also examined whether organizational conditions—specifically internal procedural justice and support—can reduce the harmful effects of organizational stress.

This study extends prior research in three important ways. First, we examined multiple outcomes simultaneously rather than focusing on a single outcome domain. Second, we incorporated multiple mediating mechanisms to better understand how organizational stress operates. Third, we relied on a multi-method approach that combined officer self-reports, physiological indicators, and administrative records to strengthen measurement and reduce bias. Together, these features allowed us to provide a more complete and practical understanding of how organizational stress affects officers and what agencies can do to reduce its harmful effects.

Study Methods

We collected data from multiple law enforcement agencies across the United States, including both municipal police departments and sheriff's offices. Including both agency types allowed us to broaden the relevance of the findings beyond the traditional focus on municipal policing and better reflect the range of organizational environments in law enforcement.

To understand how organizational stress affects officers, we examined several major constructs. Rather than treating stress as a single, simple experience, we conceptualized organizational stress as part of a broader process involving organizational conditions, emotional responses, physiological strain, behavioral responses, and organizational outcomes.

Major Constructs Examined

Organizational Stress (OrgStress)

The primary predictor in our model was organizational stress. This construct included stressors such as excessive workload, administrative burdens, bureaucratic demands, role

conflict, role ambiguity, unfair procedures, and insufficient resources. These stressors represent recurring conditions embedded within organizational life and may be within the control of the agency. Because organizational stressors occur repeatedly and often persist over time, they create cumulative strain that can influence officers' emotional health, physical recovery, and job functioning.

Adverse Emotional States and Reactions

We examined adverse emotional states as one of the primary mechanisms through which organizational stress affects outcomes. This construct captures emotional responses such as anger, anxiety, depression, irritability, and broader negative affect. These emotional states represent officers' immediate psychological responses to chronic organizational stress.

We included this construct because prior research has shown that emotional responses often serve as an important pathway between workplace stress and adverse outcomes. In policing, chronic frustration, anger, and emotional strain may affect decision-making, performance, relationships, and long-term well-being.

Fatigue and Poor Sleep

We examined fatigue and poor sleep as a second major mechanism through which organizational stress may affect officers. This construct captures sleep disruption, insufficient sleep, daytime fatigue, and broader sleep-related impairment. We included this construct because fatigue can influence attention, judgment, emotional regulation, health, and work performance.

Coping and Resilience

We examined coping and resilience as a third mediating mechanism. This construct reflects officers' ability to manage stress, regulate emotions, recover from setbacks, and maintain

healthy functioning. It includes coping beliefs, resilience capacity, mindfulness, and health-related behaviors.

Many interventions in policing focus heavily on strengthening coping and resilience. These approaches often assume that improving individual coping skills can reduce the harmful effects of stress.

Internal Procedural Justice and Support

We examined internal procedural justice and support as a moderating organizational factor. This construct reflects officers' perceptions of fairness, transparency, consistency, and support within their organization. It includes perceptions of fair treatment, trustworthy leadership, adequate support from supervisors, and organizational responsiveness.

We included this construct because organizational fairness and support may reduce the harmful effects of stress. Officers who feel respected, supported, and treated fairly may experience less emotional strain even when organizational demands remain high.

Major Outcomes Examined

Poor Health and Lack of Well-Being

This construct includes physical, psychological, and emotional functioning and is made up of health measures, burnout, and work-family interference.

PTSD Symptoms

This is a well-validated instrument that captures trauma-related symptoms and broader psychological distress associated with traumatic exposure.

Lack of Organizational Attachment

This construct is made up of a combination of organizational commitment and intentions to leave the organization.

Poor Work Performance

This construct was made up of a number of factors including self-reported mistakes, near misses, complaints, injuries, and related indicators of impaired functioning.

Composite Measurement Strategy

To capture these major constructs, we relied primarily on **composite measures** rather than single indicators. This involves a statistical method for combining multiple measures of a broader construct or phenomenon. We did this because many important constructs in stress research—such as organizational stress, emotional reactions and states, and well-being—are broad and multifaceted. No single measure can fully capture their complexity.

Using composites also improved parsimony or conciseness. Our statistical method--structural equation modeling – can become overly complex when too many individual indicators are included. This approach also strengthened statistical power (or the ability to detect an effect if one exists) by simplifying the model and improving the stability of parameter estimates. Finally, composite measures allowed us to integrate multiple types of indicators—including self-report, physiological, and administrative data—within broader conceptual domains. This strengthened the overall measurement strategy and improved our ability to examine organizational stress as a complex, multidimensional process.

Study Protocols

To strengthen the rigor of the study, we used a **multi-method research design** that combined separate survey administrations, physiological monitoring with a small subset of willing participants, and agency administrative records.

First, we administered **three separate officer surveys over a three-month period**, with each survey designed to capture different aspects of officers' experiences, perceptions, and

functioning. Using separate surveys allowed us to reduce response burden, improve measurement quality, and assess a broader range of constructs than would have been practical in a single survey administration.

Second, we collected physiological data through wearable devices among a subset of officers. These devices allowed us to capture objective indicators related to sleep, physical activity, and physiological stress responses over time. Including physiological indicators strengthened the study by incorporating objective measures of recovery and strain, which often complement and validate self-reported experiences.

Third, we collected administrative records from participating agencies, including indicators such as complaints, injuries, and sick leave. These records provided behavioral and organizational indicators of officer functioning that extended beyond self-perceptions.

By combining self-report, physiological, and administrative data, we created a stronger and more comprehensive framework for understanding organizational stress. This multi-method approach allowed us to examine organizational stress from multiple perspectives and reduced the likelihood that the findings reflected only one type of measurement.

In addition to the quantitative data collection, we conducted focus groups with a group of officers after completing the analyses. These discussions allowed us to gather practical feedback, contextualize the findings, and identify agency-level strategies for reducing organizational stress and its harmful effects.

Analysis and Results

We examined relationships between organizational stress and the four aforementioned outcomes and then evaluated the mediating roles of adverse emotional states, fatigue and poor sleep, and coping-related processes. We also tested whether perceptions of internal procedural

justice and support moderate these relationships.

Relying on structural equation modeling, we estimated four parallel models, one for each outcome. We observed excellent global and local fit across all models, indicating that the hypothesized structure adequately represented the relationships among organizational stress and mediators and moderators. The models accounted for from 22% (for work performance) to 64% (for PTSD) of the variance in the outcomes.

Organizational stress had **direct, statistically significant relationships** with PTSD symptoms, poor health and well-being, and poor work performance. We did not observe a statistically significant direct relationship between organizational stress and organizational attachment, indicating that this outcome operates primarily through indirect pathways.

With regard to the mediators, we found that as organizational stress increased, adverse emotional states—including anger, anxiety, and irritability—also increased, and higher levels of these emotional states corresponded to worse outcomes across all four domains. Organizational stress also corresponded to increases in fatigue and poor sleep, which in turn related to poorer health, lower organizational attachment, and poorer work performance. These patterns indicate that organizational stress operates through both emotional and physiological pathways.

Surprisingly, coping and resilience showed limited direct relationships with most outcomes, a finding that contrasts with the emphasis placed on these constructs in prior research and common policing approaches. Rather than exerting independent effects on adverse outcomes, poor coping and lack of resilience were related to adverse emotional states and fatigue, which then related to outcomes. This pattern indicates that coping does not function as a primary pathway when stronger emotional and physiological mechanisms are present.

Officers who experienced a greater sense of **internal procedural justice and support**

reported less emotional distress when organizational stress was high, indicating a meaningful buffering effect (called moderation). This finding highlights the importance of organizational conditions in shaping how officers experience stress.

Taken together, these results support a process-based model of organizational stress, in which organizational conditions influence outcomes primarily through intervening emotional and physiological mechanisms rather than through direct effects alone.

These findings have important implications for policy and practice. Interventions that focus exclusively on individual coping strategies are unlikely to produce substantial improvements in officer outcomes if organizational stressors remain unaddressed. Agencies can improve officer health, well-being, and performance by reducing organizational stressors such as excessive workload, role ambiguity, ineffective communication, and perceived unfairness in decision-making processes. Strengthening internal procedural justice and support systems can further reduce the emotional impact of stress. In addition, addressing fatigue and sleep represents a critical opportunity to mitigate the downstream effects of organizational stress.

In sum, this study demonstrates that organizational stress represents a central and modifiable factor in officer health, well-being, and performance. By identifying the mechanisms through which organizational stress operates and the conditions under which its effects are reduced, this research provides a strong empirical foundation for developing organizational-level interventions that address both the sources and consequences of stress in law enforcement.

*Note: The authors used AI to assist in constructing this Executive Summary from their original work.

Introduction

Stress has been defined in a variety of ways across disciplines (e.g., behavioral economics, epidemiology, neuroscience, physiology, and psychology). While there is an abundance of research on stress, there is no scientific consensus as to the definition (Kim et al., 2018), and even less so when considering law enforcement stress (Liberman et al., 2002).

Conceptualization of Organizational Stress in Policing

Early efforts to conceptualize stress in policing distinguished between stress arising from the nature of police work itself and stress embedded within police organizations (Symonds, 1970). Building on this distinction, subsequent research formalized two broad categories of police stressors: operational stressors, associated with the dangers and exposures inherent in performing the job itself, and organizational stressors (hereafter referred to as OrgStress), associated with the structure, culture, and management of police organizations (McCreary & Thompson, 2006), and typically under the control of the organization itself.

In a more recent study, McCreary et al. (2017) refined the OrgStress construct, emphasizing chronic conditions such as role ambiguity, conflicting demands, workload pressures, limited autonomy, and workplace incivility—stressors that are largely shaped by organizational policies and leadership practices. Importantly, operational stressors tend to be acute and episodic in nature, whereas OrgStress is typically chronic, cumulative, and more directly amenable to organizational intervention.

Despite this conceptual distinction, terminology in law enforcement stress research has not always been applied consistently. As noted by Liberman and colleagues (2002), stressors such as long work hours, shift work, and excessive workload have variably been classified as either organizational or operational stressors (e.g., Karasek, 1979; Maynard & Maynard, 1982;

McCreary & Thompson, 2006; Oliver & Meier, 2004; Sewell, 1981; U.S. Department of Justice, 2020). This overlap has limited conceptual clarity, complicated measurement, and hindered precise interpretation of stress-related findings across studies.

Nevertheless, organizational stressors are especially well suited for focused empirical study because they reflect stable, recurring features of the police work environment that are shaped by organizational policies, leadership practices, and workplace culture. Accordingly, in Exhibit 1, we summarize representative organizational stressors identified across the policing literature, illustrating both the breadth and consistency of these themes.

Exhibit 1

Representative Police Organizational Stressors Identified in Prior Research

OrgStress in Law Enforcement	Published Research
Dealing with bureaucracy, authoritarian structures, and hierarchy	Ayres & Flanagan, 1990; Zhao et al., 2002
Fluctuating schedules and long work hours	Amendola et al., 2011; Ayres & Flanagan, 1990; Barger et al., 2005; Bell et al., 2015; Duxbury & Halinski, 2018; Vila, 2006
Ineffective communication, leadership, and supervision	Ayres & Flanagan, 1990; Brown & Campbell, 1994; Kirkcaldy et al., 1995
Interpersonal conflict	Thompson et al., 2006; Tuckey et al., 2010
Lack of control over decision making, resources, and work environment/police culture	Standfest, 1996; Stinchcomb, 2004
Overburdening/excessive workload	Karasek, 1979; McCreary & Thompson, 2006; Stotland & Pendleton, 1989
Politics—both internal and external	Can et al., 2015; Gove, 2011; Toch, 2002
Role ambiguity and conflict	Ayres & Flanagan, 1990
Strained relationships with community	Stotland, 1991; Stotland & Pendleton, 1989
Unfair procedures, such as disciplinary actions or promotional practices	Ayres & Flanagan, 1990; Brooks & Piquero, 1998; Jaramillo et al., 2005; Noblet et al., 2009; Toch, 2002; Violanti, 2011

Exhibit Note. The stressors in Exhibit 1 reflect chronic, organization-controlled conditions that have been linked in prior research to adverse emotional reactions, fatigue and sleep disruption, and coping-related processes—mechanisms that are explicitly modeled as mediators in the present study's structural equation framework.

Although organizational stressors are widespread and consistently documented in the literature (see Exhibit 1), the dangers and critical exposures associated with police work

(operational stressors) have long been presumed to be the most stressful aspects of a police officer's job (e.g., Hickman et al., 2011; Sigler & Wilson, 1988; Violanti & Aron, 1993), these risks are lower in frequency than more routine stressors. Importantly, a growing body of research has demonstrated that officers' experiences of OrgStress and similarly "daily hassles" (Hart et al., 1994) outweigh operational stressors on the job (e.g., Acquadro-Maran et al., 2015; Conn, 2016; Crank & Caldero, 1991; Huddleston et al., 2007; Kroes et al., 1974; Lazarus & DeLongis, 1983; McCreary & Thompson, 2006; Violanti & Aron, 1993). Moreover, the impact of OrgStress has now been reported to be even more consequential than that of traumatic events (e.g., Drew & Williamson, 2024), despite some limited contrary findings (Padilla, 2020).

Problem Statement

Substantial gaps in research have limited our understanding of how OrgStress differentially impacts key outcomes in policing. This led McCreary & Thompson (2006) to call for more research examining the nature and consequences of police OrgStress. Although prior studies have demonstrated robust linkages between OrgStress and a wide range of adverse outcomes (see Exhibit 2), the specific mechanisms and pathways through which these relationships operate remain unclear. This lack of clarity has constrained the development and evaluation of both individual- and organizational-level interventions aimed at mitigating the harmful effects of OrgStress.

Despite a growing body of research on OrgStress, the absence of integration across theoretical frameworks has hindered the development of a comprehensive explanatory model linking OrgStress to mediators, moderators, and outcomes in policing. As a result, researchers have examined a limited set of variables, focused on narrower research questions, or emphasized emerging constructs (e.g., moral injury) without adequately situating them within a broader

OrgStress context. Consequently, there are a limited set of explanatory relationships and pathways between OrgStress, key mediators and moderators, and important outcomes.

Exhibit 2

Linkages between Organizational Stress and Adverse Outcomes

Adverse Outcome	**Published Research**
Lack of well-being:	
Job dissatisfaction	Julseth et al., 2011
Job burnout	Baker et al., 2023; Queirós et al., 2020
Strained relationships	Can et al., 2015; Finn, 1998; Karaffa et al., 2015; Patterson et al., 2014
Physical health problems	Barger et al., 2009; Dembe & Yao, 2016; Kang et al., 2012; Kivimaki et al., 2015, 2017; Marcatto et al., 2021; Garbarino & Magnavita, 2015; Violanti et al., 2009
Psychological distress/mental health challenges	Beauchamp & Jetelina, 2022; Chan & Andersen, 2020; Drew & Williamson, 2024; Purba & Demou, 2019; Ricciardelli et al., 2023
Poor work performance (PWP)	Fekedulegn et al., 2013; Jaramillo et al., 2005; Shane, 2010
Posttraumatic stress disorder (PTSD)	Gershon et al., 2009; Huddleston et al., 2007; Maguen et al., 2009
Reduced sleep and poor sleep quality	Charles et al., 2015; Kalimo et al., 2000
Turnover or lack of organizational commitment (referred to as Organizational Attachment herein)	Charman & Bennett, 2022

Additional limitations plague prior OrgStress research in U.S. law enforcement. Most studies have focused on municipal police, rather than sheriff's deputies, including those working in correctional or jail settings (e.g., Castle & Martin, 2006; Dowden & Tellier, 2004; Finn, 2000; Finney et al., 2013), despite assertions that job stress may be higher among corrections officers than police officers (Summerlin et al., 2010).

Moreover, relatively few studies of OrgStress research in law enforcement have incorporated non-invasive physiological measures—such as heart rate variability (HRV) [3] or

[3] HRV is an objective, physiological marker of stress and autonomic regulation that tests the body's response to stress and capacity for coping (Acharya et al., 2006).

objective sleep indicators—despite the increasing feasibility, affordability, and relevance of these methods for assessing stress-related processes.

Finally, much of the literature on mitigating occupational stress in law enforcement has emphasized individual coping strategies (e.g., Ortega et al., 2007) and resilience training (e.g., Papazoglou & Andersen, 2014; Paton, 2000, 2003), often with limited attention to the organization's responsibility for reducing structural stressors. As noted by Weinberg et al. (2010), this emphasis "...inadvertently [places] a level of blame on the employee" (p. 2).

To address these gaps, we developed and tested a comprehensive model specifying hypothesized relationships between OrgStress and multiple adverse outcomes. Specifically, we examined a broader range of OrgStress components, integrated multiple data sources (physiological, self-report, and administrative), tested theoretically relevant mediators and moderators, and assessed several outcome domains. Latent constructs were operationalized using composite measures to enhance construct validity and parsimony. Finally, by including both municipal police officers and sheriff's deputies from multiple agencies, this study moves beyond the historical emphasis on municipal policing and advances a more inclusive understanding of OrgStress in law enforcement.

Theoretical Framework

Although stress is often framed in terms of stimulus and response, Aldwin (2000) argues that the theoretical focus should be on understanding the complex and transactional stress process, including the direct relationships, mechanisms, mediators, and moderators in the many causal pathways linking stressors to their negative effects on human behavior and health. Several theories link stress to associated outcomes; however, few, if any, of them fully encompass the range of variables involved in the stress process. For instance, while one model

emphasizes control as a key factor of stress coping in policing (see e.g., Lawrence, 1984), another, the Job Demands-Control Model (JDCM) elucidates the interactive effects of demands and control on perceived stress and outcomes (Karasek, 1979). The Job Demands-Resources Model, or JDRM (Demerouti et al., 2001), and to a lesser extent, the JDCM (Karasek, 1979), provide frameworks for understanding workplace stress, but fail to properly differentiate among OpStress and OrgStress, particularly relevant in law enforcement. More specifically, the JDRM emphasizes a very broad conceptualization of resources but fails to fully operationalize the explanatory pathways to adverse outcomes, whereas the JDCM is simplistic given its focus is primarily on demands of the job and control mechanisms. Both theories also do not adequately account for organizational culture and justice perceptions, or what we refer to as internal justice, thereby limiting their capacity to provide a comprehensive conceptual framework tailored to the law enforcement context. Consequently, they are insufficient for adequately delineating the complex and varied relationships among variables and the pathways associated with outcomes.

Moreover, Lazarus (1999) emphasized that the appraisal process serves as the cognitive underpinning for coping, which underscores the importance of cognitive framing in interpreting stressors. Finally, some have proposed reliance on the Job Demands-Control-Support model (JDCS) (Karasek & Theorell, 1990), in which social support from work colleagues and supervisors may serve as a protective factor by buffering the harmful effects of stress (e.g., Bezerra et al., 2016; Cooper et al., 2001; Johnson & Hall, 1988; Karasek & Theorell, 1990).

We considered a broad range of variables specific to law enforcement officers and their employers in our original conceptual model as suggested by prior research. These included personality characteristics, perceptions of internal procedural justice and support (IPJS), shift schedule, overtime, AdvEmo (anger, anxiety, depression, irritability), coping, resilience, health

habits (physical exertion, use of alcohol or nicotine), fatigue, sleep quality, disruption, and disorders, as well as sleep hygiene behaviors. In order to build a testable model, we reviewed our originally proposed conceptual or logic model and revised it to propose likely pathways for a testable model, including an array of interacting variables, in examining outcomes. The conceptual model shown in Exhibit 3 delineates the expected mechanisms (mediation and moderation), as well as specific pathways that served as our initial Structural Equation Model (SEM).

Exhibit 3

Conceptual Model of Organizational Stress and Outcomes

Major Goals and Objectives

The purpose of the proposed study was to enhance officer health and wellness and promote organizational effectiveness. The goals were to: a) better understand the impact of OrgStress on officer health and well-being, work performance, and other outcomes; b) inform law enforcement leaders and officers about these effects; and c) identify steps agency leaders and their personnel can take to alleviate the negative consequences of OrgStress.

The objectives of this research were to: a) gain a comprehensive understanding of the specific types of OrgStress associated with serving as a police officer or sheriff's deputy; b) examine the effects of OrgStress on organizational commitment, physical health and well-being, and work performance; and c) identify contributing factors among law enforcement officers (e.g., fatigue, sleep problems, poor coping and/or lack of resilience skills, AdvEmo) and agencies (supervision, leadership, and support) that contribute to the harmful impacts of OrgStress.

Research Questions

1. How does OrgStress relate to:
    a) fatigue, sleep amount, and sleep quality?
    b) short or long-term emotional states and reactions, including anger, anxiety, depression, irritability, and overall negative affect or mood?
    c) health and wellness outcomes (specifically, physical health, psychological well-being, and post-traumatic stress)?
    d) work performance and safety (specifically, collisions, mistakes, near misses, sick leave, and injuries)?
    e) organizational attachment (commitment to the organization and intentions to stay)?
2. What role do coping, resilience, and healthy behaviors play in mitigating the harmful impacts of OrgStress?
3. What role do internal justice and support play in reducing the adverse effects OrgStress?
4. Do officer shift schedules or overtime moderate the relationship between OrgStress and fatigue and/or sleep variables?
5. How well do the data fit the adapted logic models, and what are the strengths of the relationships, including path coefficients (standardized estimates)?
6. What is the explanatory value (R^2) of each model in accounting for the variance in the endogenous variables?
7. What steps might agencies take to reduce OrgStress on law enforcement officers and/or mitigate its harmful effects via strategies, procedures, support, etc.?

Research Design, Methods, and Analysis

Research Design

Although randomized experiments are generally the most rigorous designs in social science research, it would not be feasible, ethical, or practical to randomly assign individual officers to different levels or types of stress. Similarly, tracking the impact of OrgStress longitudinally would not be possible without a longer-term agency commitment and funding.[4] Therefore, we employed a cross-sectional, yet rigorous research design, using multiple data collection and analytical methods. Although this design was not experimental, it did allow us to test the strength and directionality of key relationships because we relied upon a conceptual model that was grounded in theory[5] and supported by existing empirical evidence. We extended previous research by examining a broader set of variables and modeling latent constructs as composites of multiple indicators. Therefore, our multi-pronged methodological and analytical approach was the most rigorous and practical design possible for exploring a more fully specified and comprehensive model of OrgStress in law enforcement.

Research Methods

We administered three separate surveys to participants over a period of three consecutive months. Each survey included different measurement indices, sometimes representing different measures of the same constructs. This redundancy was employed for two reasons: first, to ensure construct sufficiency, i.e., to enable us to capture different dimensions of a construct, and second,

[4] Violanti et al. (2006, 2017, 2025) have been examining a cohort of police in Buffalo, NY, for the past several decades with primarily medical research grants that typically span longer time periods. Their work has demonstrated long-term impacts of various stressors on some specific health-related outcomes among law enforcement personnel.

[5] Gottfredson and Hirschi (1987) systematically describe why cross-sectional nonexperimental research designs are often as good as longitudinal nonexperimental research designs at testing causal relationships and cost substantially less money. They describe why this is especially true when a well-defined theory supports directional claims. With an observational research design and typical monetary constraints, we believe that a longitudinal design would neither be feasible nor provide additional benefits over our design in evaluating causal relationships in our model.

to allow for backup measures in case any of the existing measures did not achieve acceptable reliability data.

Analytical & Data Analysis Techniques

To examine the relationships between constructs and assess the overall variance accounted for by the empirical OrgStress models, we employed Structural Equation Modeling (SEM) and associated techniques, including factor analysis and regression, to address the research questions. To examine differential patterns of relationships and increase power, we ran four separate models, one for each of four outcome measures. While SEM can provide solid evidence regarding related variables, absent an experimental design, the model results should not be interpreted as causal in nature.

To provide context for our preliminary results, officers from both included and non-included agencies participated in remote focus groups. During those meetings, we presented broad, preliminary findings. The primary goal of the focus groups was to generate potential ways agencies could reduce OrgStress, and officers at all levels could mitigate the negative impact of OrgStress on their health and well-being, performance, as well as increase organizational commitment and reduce turnover.

Measures

Measuring OrgStress and its impact on officers requires a comprehensive and complex approach. To address this complexity, we collected both subjective and objective data from three primary sources: officer self-report surveys, ambulatory biomarker tracking via wearable devices (i.e., Garmin smart watches), and agency administrative records (See Exhibit 4). The smart watch data collection was administered to a randomly selected subset of officers from three of the larger agencies. For some measures collected from the smart watch (e.g., sleep quality), we

also included a self-report measure to ensure we had an indicator of the variable for all participants, which also provided a form of cross validation. Data from smart watches were collected over a two-month period beginning after the first survey was completed. Our use of multiple methods and sources allowed us to more comprehensively address the relationships between OrgStress, other explanatory variables (including demographics, mediators, and moderators), and key outcomes, while also reducing common method bias.

Exhibit 4

Measurement Type, Frequency of Collection, and Constructs

Data Collection Type	Measurement Frequency & Time Frame	Constructs / Measures
Officer Self-Report Surveys	Administered across three waves, one month apart	Instruments included scales measuring: • Collisions, mishaps, and mistakes • Coping and resilience • Demographics • Employment characteristics (e.g., shift type and length, overtime, tenure) • Fatigue, sleep amount, quality, disorders • Perceived stress • Physical health and wellness • Quality of life • Work interference with family
Ambulatory Biomarkers (Smart Watches)	Passive data collection for 2 months	• Sleep amount, quality, disruption • Stress level (computed) • Physical activity (i.e., steps)
Agency Administrative Data	17-month period (Jan 2024 – May 2025)	• Complaints filed against officers • Demographics • Injury leave • Sick leave

Measures were selected to align with the latent constructs in our conceptual models. For most of the major constructs in our models (all but PTSD symptoms), we relied upon a variety of related instruments to represent the broader constructs by creating composite measures, using z-

score transformations.[6] The use of composite variables allowed us to avoid construct insufficiency and increase parsimony and statistical power. Composite measures simplify the model by reducing the number of estimated parameters, providing more stable estimates, and improving the detection of significant relationships. The use of composites allowed us to more broadly define the latent variables and increase power in our models.

Reliability of Measures. The indicators we included in the composites have, for the most part, demonstrated strong reliability and validity evidence in prior research and attained excellent levels of reliability in our sample. Our estimates of reliability (for both individual and composite measures[7]) were computed using McDonald's omega (ω) instead of Cronbach's alpha (α). While the latter has traditionally been considered the standard for internal consistency of measures, many scholars have noted psychometric problems when alpha is used as a reliability indicator, e.g., the assumption of *tau*-equivalency. [8, 9] Our reliability coefficients are presented in the description of each individual and composite measure.

Officer Self-Report Surveys

The selection of self-report and physiological measures to employ in our study was based on several factors, including cost, ease of administration, fidelity, psychometric properties

[6] Using z-score transformations allows for combining variables measured on different scales and to account for the varied number of items per scale. Different sub-scales or dimensions within a construct can also be weighted differently when warranted.
[7] Because extracting items from scales and combining them with others often leads to changes in the psychometric properties of scales, we report reliability for the adapted versions of the scales.
[8] When that assumption is violated, as it frequently is, it results in underestimates of reliability.
[9] Omega has since been established as a better and more appropriate measure given some limiting assumptions of alpha (Hayes & Coutts, 2020; Madadizadeh & Bahariniya, 2025; Peters 2014; Streiner, 2003). For example, Stensen and Lydersen (2022) noted that *"Cronbach's alpha [relies upon] the assumption that the responses to individual questions are normally distributed, have equal variance and equally explain the factor."* (para. 3) Because these assumptions are rarely met, omega overcomes these concerns and is thus more accurate and robust than α (Goodboy & Martin, 2020; Hou et al., 2025). For example, omega is congeneric, based on factor loadings and error variances (as opposed to inter-item correlations), allows unequal item loadings, and works with multidimensional scales.

(demonstrated reliability and validity), job-relatedness, and length.[10] Our study focused on the constructs/latent variables defined in the conceptual logic model. Surveys were administered to capture officers' perceptions and experiences related to OrgStress, as well as its correlates and consequences. Key domains included: a) a more comprehensive indicator of OrgStress; b) coping, resilience, and health-related behaviors; c) AdvEmo; d) psychological well-being (PWB); e) fatigue, sleep quality, and sleep disruptions; f) health behaviors and lifestyle; g) work-family conflict (WFC); h) social and organizational support; i) internal (organizational) justice perceptions; j) operational and safety incidents; k) organizational attachment (OrgAtt); and l) symptoms of PTSD.

Control variables. Factors such as age, rank, sex, race, and tenure have been shown to correlate with measures of stress and its outcomes. For example, research has demonstrated that stress among male police officers is more likely to result in less sleep and greater sleep problems (Charles et al., 2015). Demographic characteristics, such as greater age, years of service, and rank, have also been associated with lower stress resilience (Balmer et al., 2014). Nevertheless, researchers conducting meta-analyses among police and correctional officers have noted that the relationships between demographics and stress, or its outcomes, are not particularly strong (see, e.g., Dowden & Tellier, 2004; Purvanova & Muros, 2010). As such, we controlled for demographic variables. We examined age, race, sex, and years of service in our analysis.

Independent measures. OrgStress was comprised of instruments with sufficient psychometric properties. These included the *Police Stress Questionnaire* (McCreary & Thompson, 2006)[11] (adapted), the *Police Daily Hassles and Uplifts Scale* (Hart et al., 1993), the

[10] Shorter scales are generally less reliable but efficient. As such, wherever possible, we have relied on 'short forms' of instruments for which there was sufficient psychometric evidence.
[11] An adapted version that is described later.

Perceived Stress Scale (Cohen et al., 1983), the effort scale from the *Effort-Reward Imbalance Questionnaire* (Siegrist et al., 2014), and the role conflict and ambiguity dimensions of the JDRM (as measured by Frank et al., 2017)[12], collectively addressing both global and context-specific aspects of stress. Also, as part of our OrgStress composite, we incorporated three exploratory scales targeting stressors not fully captured by existing scales, but frequently cited in practitioner accounts and policing literature as significant sources of organizational strain: an 8-item scale of stress related to internal affairs investigations and/or prosecution (ω = .95), a 5-item scale of stress related to perceived leniency within the criminal justice system (ω = .93)[13], and a 3-item scale of stress related to the media's coverage of police (ω = .97). Including these items allowed us to examine emerging or context-specific stressors that are inherent in the local context, organization, or jurisdiction. The OrgStress composite was highly reliable (ω = 1.09).[14]

The Police Stress Questionnaire (PSQ). We included all 20 items from the OrgStress subscale and five items from the OpStress subscale that had previously been characterized as OrgStress in other research, e.g., shift work, overtime, off-duty responsibilities, and paperwork. Some are considered OrgStress because they fall under management's control (see Abdollahi, 2002; Ayres & Flanagan, 1994; Crank & Caldero, 1991). These 25 items collectively represent the most widely cited OrgStress in law enforcement and are supported by strong empirical and psychometric evidence. This scale, called Adapted OrgSt, was sufficiently reliable (ω = .95).

[12] Reliability evidence was limited to the original reported item to scale correlations for role conflict (RC) and ambiguity (RA), with RC's items ranging from .58 - .73 and RA items = .76.
[13] The judiciary had previously been identified as a stressor (Crank & Caldero, 1991), similar to our criminal justice system variable.
[14] Composite reliability was assessed using McDonald's omega calculated for second-order composites with attenuation correction for subscale measurement error. Several values slightly exceeded 1.0 (range: 1.010-1.114), which can occur when subscales are highly reliable and strongly inter-correlated. All correlation matrices passed diagnostic checks. This does not violate test theory; it reflects properties of the specific estimation method (e.g., Raykov, 2004).

The Police Daily Hassles and Uplifts Scale (PDH). This is a 40-item instrument designed to measure the frequency and perceived severity of minor recurring stressors encountered in daily police work. Unlike global stress measures, this scale focuses on routine irritants—such as paperwork, equipment issues, and administrative demands—that cumulatively contribute to overall stress. The PDH also emphasizes many low-intensity stressors often characterized as organizational. This scale was sufficiently reliable (ω = .93).

The Perceived Stress Scale. This 14-item global measure was designed to assess perceptions of stress, specifically the stress appraisal process. Scores reflect the degree to which individuals perceive situations in their lives as stressful, incorporating both emotional and cognitive appraisal items consistent with theoretical models of stress. This makes this scale particularly useful for capturing individual differences in stress appraisal critical for understanding OrgStress and its emotional impact. This scale was sufficiently reliable (ω = .92).

Effort Reward Imbalance Questionnaire. We included the three-item subscale of effort that was made up of time pressures, demands, and disturbances. This scale's reliability was sufficient (ω = .75), albeit somewhat lower than most, likely due to the limited number of items.

The Job Demands-Resources Scales (JDRS). Finally, from the *JDRS,* we included two critical aspects of OrgStress related to role expectations. Role conflict refers to incompatible or competing demands being placed on employees, while role ambiguity captures uncertainty about responsibilities, expectations, and performance criteria. These constructs are theoretically grounded in the JDRM (Demerouti et al., 2001) and often captured in measures of OrgStress. Both dimensions are particularly relevant for policing, where unclear or conflicting role expectations can exacerbate OrgStress. Combined, role conflict and ambiguity were of satisfactory reliability (ω = .88).

Moderators. Two composite variables served as moderators in our *initial* conceptual model. First, to identify conditions that may buffer or amplify the effects of OrgStress, we included a composite moderator capturing perceptions of Internal Procedural Justice and Support (IPJS). We also included a composite of coping, resilience, and health-related behaviors (hereafter "Poor Coping"), as a potential moderator. However, after running our initial model, it became clear that the latter composite served as a mediator, and not a moderator.

The first composite moderator contained indicators of fairness in decision-making processes (internal justice) and perceived adequacy of support from supervisors, peers, and the public. The 45-item composite measure of IPJS was highly reliable ($\omega = 1.1$).

Internal Procedural Justice (IPJ). The perception of fairness in an organization is generally referred to as organizational justice. It is the topic of numerous studies in Industrial and Organizational (I/O) Psychology and Management, where the literature emphasizes the relationship between organizational justice and outcomes like job performance, commitment, and satisfaction, as well as helping behavior (e.g., Colquitt et al., 2001; Cropanzano et al., 2007). Among the dimensions of justice, researchers have identified three to four dimensions, of which procedural justice appears to account for a significant portion of the variance in key outcomes. Stemming from work by Thibaut & Walker (1975), the idea of procedural justice originally emphasized having a voice and control over one's work environment. In our study, we refer to this construct as IPJ to distinguish it from the literature on procedural justice in police-citizen interactions.

IPJ was assessed using items focusing on fairness, transparency, and consistency in internal investigations and disciplinary actions as described by Sweeney & McFarlin (1997), with a previously reported internal consistency for the 13-item procedural justice scale of .84.

These items capture whether officers perceive organizational processes as impartial and respectful, which is critical for maintaining trust in supervisors, commanders, leaders and the organization itself. This scale was sufficiently reliable (ω = .89).

Support. This was measured using several validated scales assessing support from supervisors, peers, the organization, and the public (Cullen et al., 1985; Frank et al., 2017; Karasek et al., 1998; Liberman et al., 2002; Morgeson & Humphrey, 2006). These items address dimensions such as sufficiency of resources, which is consistent with the JDRM, along with communication, and social support or practical assistance. Since this was comprised of several measures of support, we only computed the composite's reliability.

IPJS was hypothesized to moderate the effects of OrgStress by influencing coping, as well as AdvEmo (also a composite variable), but not the fatigue and poor sleep composite. Including the IPJS moderator was essential because it is consistently identified in policing research as a protective factor that can mitigate the negative consequences of stress. Officers who feel they are treated fairly and receive support (internally and externally) are more likely to maintain psychological well-being and job performance under stressful conditions (e.g., Javadizadeh, 2024; Piotrowski et al., 2021; Rodrigues et al., 2024; Zeng et al., 2020). Together, these elements reflect officers' confidence in organizational fairness and their perceptions of support they get from peers, supervisors, the organization, and the community.

The second moderator – Poor Coping – was tested and based on modification indices and other data was changed to a mediator (see "*Changes in Approach*" section below).

Mediators. Mediators were included to clarify the mechanisms through which OrgStress influences officer outcomes. We examined two key pathways in our original conceptual model: fatigue and poor sleep**,** and AdvEmo, and then later added poor coping and lack of resilience,

when its role as a moderator was not well-supported by the data.

Adverse Emotional State or Reaction (AdvEmo). This construct was measured using a composite comprised of the Patient-Reported Outcomes Measurement Information System (*PROMIS) Anger, Anxiety, and Depression scales* (Pilkonis et al., 2012), negative affect items (including anger, anxiety, and irritability) from the *Type D* (*Distressed) Personality Scale or DS14* (Denollet, 2005), as well as stress readings from the Garmin Vivosmart wearable device. Anger has been associated with increases in punitiveness and attributions of hostile intentions (Ask & Pina, 2011), so it may impact officer behavior in encounters with members of the public. This multi-source approach allowed us to capture both subjective emotional experiences and objective physiological indicators of stress. The reliabilities for the individual scales are as follow: PROMIS Anger (ω = .93), PROMIS Anxiety (ω = .96), PROMIS Depression (ω = .98), DS14 Negative Affect (ω = .94). The composite for AdvEmo overall was also established as reliable (ω = 1.05).

Fatigue and Poor Sleep. This composite consisted of several measures, including the *Epworth Sleepiness Scale or ESS* (Johns, 1991), items from the *PROMIS Sleep-Related Disturbance (SRD) and Impairment* (SRI) item banks (Yu et al., 2012), and two sleep habit items dealing with frequency of sleep sufficiency and lack of disruption from the National Law Enforcement Applied Research & Data Platform.[15] These measures capture both sleepiness and sleep quality, which are critical for understanding how stress affects physiological recovery and alertness. The reliabilities for the individual scales are as follow: ESS (ω = .93), SRD (ω = .94), and the SRI (ω = .95). The composite was also established as reliable (ω = 1.05).

[15] Two-item scales are generally not reliable, so we didn't calculate omega for those alone.

Poor Coping, Resilience, and Unhealthy Behaviors. Our composite measure assumed that there is a latent construct that comprises beliefs about coping ability, resiliency, and health-related behaviors that may be adaptive or maladaptive. It was comprised of measures of coping self-efficacy, resilience (includes general resilience, emotional regulation, and mindfulness), coping behaviors and unhealthy behaviors. Our composite measure – Poor Coping – attained an Omega reliability coefficient of 1.10. This composite is also referred to herein as "coping," "poor coping," or "poor coping & unhealthy behaviors"

Coping Self-Efficacy (CopeSE). The CopeSE is one's belief about the ability to cope with stress. This was measured using the Chesney et al.'s 2006 instrument. This scale was sufficiently reliable (ω = .96).

Resilience. Resilience is the capacity to adapt to stressors and maintain healthy functioning and positive outcomes despite them (Bonanno, 2004; Masten, 2001). Mindfulness may be defined as purposeful attention in the present moment accompanied by non-judgment and acceptance (Bishop et al., 2004; Kabat-Zinn, 1994). Resilience was captured using the Difficulties in Emotion Regulation Scale, or DERS-16 (Bjureberg, 2016), the Connor Davidson Resilience Scale, or CD-RISC, (2003), poor coping habits (two items from the National Law Enforcement Applied Research & Data Platform), and a scale of mindfulness (Bohlmeijer et al., 2011). The reliabilities of the individual scales are as follow: DERS-16 (ω = .97), CD-RISC (ω = .96), Mindfulness (ω = .89). Because 2-item scales are generally not reliable, we did not compute the poor coping habits omega but instead included the items in the overall composite measure.

Health-Related Behaviors. This was measured using a composite made up of objective fitness data from a Garmin Vivosmart wearable device and self-reported indicators of diet

quality and substance use (e.g., alcohol, tobacco). These behaviors represent common maladaptive responses to stress and lack of physical activity that are important for understanding how OrgStress may indirectly affect health and performance through lifestyle factors.

Overall, the mediators – Fatigue & Poor Sleep, AdvEmo, and Poor Coping – are the expected pathways through which OrgStress impacts poor health and lack of well-being (PHLWB) and job performance. Including these mediators enabled us to test indirect effects and clarify the mechanisms by which OrgStress relates to behavioral, psychological, and physiological outcomes.

Dependent Outcomes. To capture the impact of OrgStress on officer outcomes, we assessed four broad domains: (1) PHWB, (2) PTSD, (3) OrgAtt, and (4) PWP. Each domain was operationalized using validated scales and objective indicators, again combined into composite measures as broader constructs (excluding PTSD symptoms measured by a single, well-accepted instrument). We reverse coded PHWB, OrgAtt, and PWP, such that higher scores represent worse conditions, which is why they are labeled as a) *"poor"* health and lack of well-being, b) *"lack of"* organizational attachment and c) *"poor"* work performance, whereas high scores on PTSD already are worse (represent greater stress and symptomology).

Poor health and lack of well-being (PHWB). This construct was measured using multiple validated measures to capture physical, psychological, emotional, and cognitive dimensions of functioning. Our composite measure had an Omega reliability coefficient of 1.01.

Physical health was measured using the *Physical Health Questionnaire* (PHQ – Schat, Kelloway, & Desmarais, 2005) and the *Health Perceptions Questionnaire* (HPQ – Ware, 1976), which assess general physical health and subjective health perceptions. The reliabilities obtained for these measures were as follow: PHQ ($\omega = .91$) and HPQ ($\omega = .94$).

Psychological well-being was measured using the *Psychological Well-Being Scale* (PWB – Diener et al., 2009), while burnout (not reversed) and compassion satisfaction (CS) were assessed using the *Professional Quality of Life Scale* (ProQOL – Stamm, 2012). Burnout is not a diagnosis, but rather a psychological syndrome characterized by overwhelming exhaustion, cynicism, detachment, and feelings of depersonalization and reduced personal accomplishment (Maslach et al., 2001, p.) and per Stamm (2005), "...reflect the feeling that your efforts make no difference, or they can be associated with a very high workload or a non-supportive work environment" (p. 5) in the helping professions. Compassion satisfaction (CS) refers to the pleasure and satisfaction derived from helping others on the job (Stamm, 2012). The reliabilities for these measures were as follow: PWB ($\omega = .91$), Burnout ($\omega = .89$), and CS ($\omega = .95$).

Work-Family Conflict was assessed using the *Work Interference with Family* (WIF) subscale of the multidimensional measure of work-family conflict (Carlson et al., 2000) along with sick leave (in number of hours) served as indicators of functional impairment or PHWB. WIF is part of work-family conflict, which has been described as conflicting demands of family and work roles (Byron, 2005), reflecting spillover effects of work-related stress into personal life, which is a marker of overall well-being and work-life balance. The Omega coefficient for WIF also demonstrated the reliability of the scale ($\omega = .93$). Sick leave usage provides an objective indicator of health-related absenteeism. Because reliability is a property of a measurement instrument, objective measures like sick leave, injuries, etc. do not require psychometric reliability calculations individually; but composites including them do.

Post-Traumatic Stress Disorder (PTSD symptoms). Post-traumatic stress symptoms were measured using the *PTSD Checklist for DSM-5* (PCL-5 – Weathers et al., 2013), a widely used and psychometrically robust instrument for assessing trauma-related symptoms. This

measure is particularly relevant in policing contexts, where exposure to critical incidents is common and may interact with OrgStress to exacerbate psychological strain. According to the National Institute of Justice (NIJ) solicitation for this grant project, "... this routine work stress may be a stronger predictor of psychological distress and post-traumatic stress disorder (PTSD) in officers than the effects of exposure to traumatic events" (NIJ, 2020).[16] According to some studies, trauma from experiences prior to employment such as those from childhood) may be exacerbated by OrgStress and increase symptoms of PTSD (e.g., Violanti et al., 2021). The Omega for the PCL 5 also demonstrated strong reliability (ω = .97).

Lack of Organizational Attachment (OrgAtt). This composite comprises organizational commitment (OC – Meyer & Allen, 1984) and turnover intentions (TI – Shore & Martin, 1989). These scales reflect officers' emotional connections and intentions to stay with their current organization. Lower scores on organizational commitment indicate weakened organizational attachment, which is a critical outcome of chronic stress. Higher scores on turnover intent indicate a likelihood of leaving the organization in the near future. Lack of OrgAtt represents low organizational commitment and a greater intention to leave the organization. The reliabilities for each are as follow: OC (ω = .87), TI (ω = .90), and for the composite OA (ω = 1.06).

Poor Work Performance (PWP). PWP was assessed using a combination of self-reported and administratively documented indicators, including numbers of mishaps (mistakes, near misses, and self-reported collisions), times one lost temper, administratively filed complaints, number of self-reported injuries (on and off duty), and total injury days reported by the department. This dual-source approach provided a more comprehensive and objective assessment of performance outcomes reflecting both officers' experiences and observable

[16] To support this, NIJ cited Liberman et al. (2002); Gershon (2009); & Maguen et al. (2009)

organizational data. PWP was also highly reliable (ω = 1.0).

Ambulatory Biomarker Tracking. Social, cultural, environmental, and economic factors are widely recognized as critical determinants of human behavior and health. However, few policing studies have examined these influences in relation to objective physiological measures. Consequently, little is known about the mechanisms through which these factors "get under the skin" to affect well-being. Recent guidance from the National Institutes of Health emphasizes the need for multimethod, interdisciplinary approaches that integrate biomedical and social-behavioral sciences (Brown et al., 2019; Grippo, 2017).

The growing availability of consumer wearable devices (e.g., Fitbit, Garmin, Apple) has allowed for passive, low-cost, and scalable measurement of physical activity, sleep, and other health indicators (Daskivich et al., 2019). These devices enable non-invasive, continuous data collection from participants during daily activities. Evidence suggests that consumer-grade wearables provide reliable estimates of physical activity and sleep quality compared to research-grade devices and controlled laboratory studies (Evenson et al., 2015; de Zambotti et al., 2018; Lee et al., 2018).

To monitor stress-related indicators in real-time, physiological data were continuously collected to assess stress responses during routine duties. We used passive, non-invasive devices (smart watches) to capture four primary measures: sleep amount, sleep quality, physical activity, and stress levels. As shown in Exhibit 5, each device captured four primary measures: sleep amount, sleep quality, physical activity, and stress levels. Importantly, the devices we selected were capable of both recording sleep activity and classifying sleep quality, providing a reliable measure of restorative processes (Stevens & Siengsukon, 2019).

Exhibit 5

Summary of Activity Conditions

Measure	Description
Sleep Quantity	Mean # of hours of sleep/night
Sleep Quality	Average # of hours spent in deep, light, and REM sleep per 24 hours
Physical Activity	Average # of steps/day
Stress Levels	Mean # of hours/day in stress state, including low, medium, and high stress; mean stress level/day

When integrated with contextual data such as self-reports and administrative records, these biometric measures create a comprehensive framework for examining OrgStress. To support efficient and rigorous data collection, RTI developed the *Wearables Research and Analysis Platform* (WRAP)**,** which standardizes device integration, data capture, and analysis in a streamlined, evidence-based, and cost-effective manner.[17] The platform incorporates periodic monitoring to detect participant non-compliance and identify device errors or failures. Using a configurable dashboard, we tracked data quality in real time and conducted both individual-level and population-level analyses, ensuring timely insights and proactive issue resolution.

Participants and Other Collaborating Organizations

Our initial site, which also served as the pilot site, was a large law enforcement agency (LEA)[18] in the Pacific Northwest region. We also included two large sheriff's agencies—one in the Mountain West region and one in the Southeastern region. Four police departments participated—one in a large county in the Mid-Atlantic region, a mid-sized department in the

[17] The WRAP technology stack enables easy data acquisition and processing through downloaded wearable device data manufacturer portals into a program interface that flows into the WRAP data center. Researchers configure data dashboards to easily monitor and download user enrollment information, population and individual data, and study compliance, in real time.

[18] We are relying on the convention of a small LEA consisting of < 50 sworn officers, a mid-sized agency being one with 50 – 249 sworn, and a large one having ≥ 250 sworn personnel.

Upper Midwest region and another mid-sized department in the Northeast region, and one small to mid-sized department in the Mid-Atlantic region. All of the agencies allowed us to capture survey data from officers. We requested a subset of agencies to allow for some of their participating officers to be included in the smartwatch data collection effort. Administrative data (collisions, complaints, injury leave, and sick leave) were only obtained from three of the agencies based on timing, availability, or other reasons.

Participants

Individually tailored feedback reports. As part of recruitment, participants were informed that they would receive detailed feedback reports at the conclusion of the study as a mechanism for debriefing and as a motivator (at least for some officers). Those reports covered several key variables and provided within-agency benchmarks and individual output (scale scores, etc.), along with a generalized interpretation as well as a more comprehensive overall explanation of the findings of the overall study. This information was designed to help officers understand some of their responses and what they may mean in terms of the impact of stress.

Focus Groups

After the results were compiled, we conducted two remote focus groups made up of officers (at multiple levels), to identify and explore specific steps agencies and their personnel can take to mitigate the ill-effects of OrgStress, and where possible, reduce stressors. We shared our preliminary findings and solicited suggestions and context surrounding our findings about OrgStress and its sources. For the qualitative data collected from focus groups, we identified themes, specific recommendation, and sources of OrgStress by reviewing meeting transcripts and notes. We reviewed, consolidated, and interpreted the comments to provide context and strategies for mitigating the harmful effects of OrgStress.

Analytical Plan

Comprehensive modeling was necessary to understand the patterns of relationships among the variables. Accordingly, to estimate the independent and interactive relationships of these measures to administrative performance and other outcomes, we relied upon structural equation modeling (SEM). The use of SEM with cross-sectional data poses some limits on causal inference but still provides unique insight into complex relationships between variables and can account for measurement error.[19]

Analysis. Our analytical approach was multi-faceted to include examination of relationships among variables (correlations) and the estimation of potential pathways using structural equation modeling, associated techniques like confirmatory and/or in some cases exploratory factor analysis (CFA/EFA), and regression.

Physiological data and self-report instruments were integrated to produce a filtered and processed data set for each participant for statistical analysis. Adherence to the study protocol was analyzed by determining the number and type of missed or incomplete data points. Participant monitoring was conducted on the Garmin device to identify challenges participants may have had with the study protocol or use of the device.

Table 1 includes a list of primary analytical variables in our models.

[19] See e.g., Wendorf, 2002; Bullock et al., 1994; and Kwok et al., 2018.

Table 1

List of Variables in Our Models

Variable Type	Full Name	Abbreviation	Description
Exogenous Latent Construct	Organizational Stress	ORG_STRESS	Composite measure of organizational stressors experienced by law enforcement officers (z-scored)
Control	Sex (Female)	female	Binary indicator for female (0 = male, 1 = female)
Control	Race (Other)	race_other	Binary indicator for race other than White or Black (0 = no, 1 = yes)
Control	Race (Black)	race_black	Binary indicator for Black/African American race (0 = no, 1 = yes)
Moderator	Internal Procedural Justice and Support	IPJS	Composite of perceived organizational justice and social support (z-scored); moderates paths from predictors to mediators PCOPE_B and ADV_EMOT
Mediator	Adverse Emotional States or Reactions	ADV_EMOT	Composite of adverse emotional states and/or reactions including anger, anxiety, irritability, and negative affect (z-scored)
Mediator	Poor Sleep and Fatigue	PS_FATG	Composite of sleep difficulties and fatigue symptoms (z-scored)
Mediator	Poor Coping and Unhealthy Behaviors	PCOPE_B	Composite of coping efficacy, resilience, mindfulness, and unhealthy behaviors (z-scored)
Outcome / Endogenous	Poor Physical Health and Well-being	PH_LWB	Composite of physical health problems and lack of well-being (z-scored)
Outcome / Endogenous	PTSD Symptoms	PTSD	Standardized measure of post-traumatic stress disorder symptoms (z-scored)
Outcome / Endogenous	Poor Work Performance	PWORK_P	Composite of work performance, e.g., crashes, complaints, mistakes (z-scored)
Outcome / Endogenous	Lack of Organizational Attachment	LORG_ATCH	Composite of lack of organizational attachment (lack of commitment and turnover intentions) (z-scored)

Variable Type	Full Name	Abbreviation	Description
Interaction	Organizational Stress x Internal Procedural Justice & Support	ORG_STRESS x IPJS	Interaction term testing whether IPJS moderates the effect of Organizational Stress on mediators
Notes:	Standardization	z-scores	All composite measures are standardized (z-scored) to have mean = 0 and SD = 1 for interpretability and comparison
Model Info	Model Structure	Parallel Mediation	Four separate models with identical predictor/mediator structure but different outcomes (PH_LWB, PTSD, PWORK_P, LORG_ATCH)
Model Info	Estimation Method	MLR	Maximum Likelihood estimation with Robust standard errors (Huber-White)
Model Info	Missing Data	FIML	Full Information Maximum Likelihood for handling missing data
Model Info	Model Paths	Mediation	Predictors, Mediators, Outcomes; Direct paths from predictors to outcomes also estimated
Model Info	Moderation	Conditional Effects	IPJS moderates paths from ORG_STRESS, female, and race variables to ADV_EMOT and PCOPE_B mediators

End of Table 1

Outcomes

Results & Findings. Based on our four Structural Equation Models (one for each outcome), all models demonstrated excellent global fit (see Table 2) and local fit (see Table 3). Four total iterations of the models were required to get to the final model results reported herein.

Table 2

Global Fit Indices Across All Four Outcomes

Outcome	Absolute Fit		Incremental Fit *(Robust)*		Approximate Fit
	χ^2 (df), *p* *(scaled)*	**SRMR**	**CFI**	**TLI**	**RMSEA 90% [CI]**
PTSD Symptoms	7.22 (8), $p = .51$	.011	1.00	1.01	.00 [.00, .06]
Poor Health/ Lack of Well-Being (PHWB)	4.06 (7), $p = .77$	.007	1.00	1.02	.00 [.00, .04]
Lack of organizational attachment (OrgAtt)	7.05 (7), $p = .42$	.010	1.00	1.00	.00 [.00, .06]
Poor work performance (PWP)	6.19 (8), $p = .63$	.011	1.00	1.02	.00 [.00, .05]

Table Notes:
Statistic: χ^2 chi-square, df degrees of freedom
Fit: SRMR standardized root mean square residual, CFI comparative fit index, TLI Tucker-Lewis index, RMSEA root mean square error of approximation CI = confidence interval
Excellent fit is reflected by CFI/TLI ≥ .95, RMSEA ≤ .05–.06, and SRMR ≤ .05–.08 (Hu & Bentler, 1999; MacCallum et al., 1996; Kline, 2016).

These final solutions provided the best fit indices and an absence of data suggesting the need for further modifications. In each subsequent iteration, we reviewed global fit indices and local fit by examining residuals, and modification indices, which we interpreted (with the aid of suggestions derived from artificial intelligence). In Table 3, we also provide factor loadings for the direct relationships between OrgStress and all outcomes, as well as all mediators to the outcomes.

Table 3

Local Fit: Explained Variance, Standardized Factor Loadings, and Residuals Across Models

Outcome	Variance Explained	Factor loadings Min. to Max				Residuals (std.)
		Org. Stress	Poor Coping/ Resilience	AdvEmo	Fatigue/ Poor Sleep	Across all
	R^2	β	β	β	β	(ε)
PTSD Symptoms	.642	.36***	.04 (ns)	.51***	.10 (ns)	< .09
PHWB	.601	.11*	.11*	.41***	.16***	< .05
Lack of OrgAtt	.393	.12 (ns)	-.06 (ns)	.16*	.15*	< .07
PWP	.218	.38***	.09 (ns)	.15***	.19***	< .10

Table Notes:
R^2 = proportion of variance explained
β = standardized path coefficient
ε = residual/error variance
* p < .05; ** p < .01; *** p < .001
Residuals of < .10 are reported to be demonstrative of strong local fit (e.g., Kline, 2016; Schumacker & Lomax, 2016).

To demonstrate the pathways for each model, we examined the direct pathway between OrgStress and each study outcome (each represented as one model, Exhibits 6 – 9), as well as pathways through the three mediators. The reported values are the path coefficients—standardized regression weights (β) for directional paths or correlation coefficients (r) for non-directional associations. Single-headed arrows indicate hypothesized directional influences between mediators, whereas double-headed arrows represent covariances or non-directional associations between variables.

For each composite outcome, the R^2 represents the total variance accounted for by the model as a whole. "Poor health and lack of well-being," the model accounted for 60% of the variance as shown in Exhibit 6. For the outcome "PTSD," the model accounted for 64% of the

variance as shown in Exhibit 7. For the outcome "Organizational Attachment," the model accounted for 39% of the variance as shown in Exhibit 8. For the final outcome "Work Performance," the model accounted for 22% of the variance as shown in Exhibit 9.

Sex and race were included as covariates in all models. Although several direct paths from sex and race to specific mediators and outcomes reached statistical significance, the standardized effects were small. Overall model fit indices and explained variance were driven primarily by organizational stress, mediators, and IPJS, indicating that sex and race did not contribute meaningful incremental explanatory power beyond the core model predictors.

Exhibit 6

SEM Results for Health and Well-Being

Exhibit 7

SEM Results for PTSD Symptoms

Exhibit 8

SEM Results for Organizational Attachment

n.s. = not significant

Exhibit 9

SEM Results for Work Performance

Direct Relationships between OrgStress and Outcomes. As shown in Exhibits 6-9, OrgStress directly and significantly impacted three of the four outcomes: a) PH-LWB ($\beta = .11$, $p \leq .05$, see Exhibit 6); b) PTSD symptoms ($\beta = .36$, $p \leq .001$, see Exhibit 7); and c) PWP ($\beta = .38$, $p \leq .001$, see Exhibit 9); but not OrgAtt ($\beta = .12$, ns, see Exhibit 8).

Relationships between OrgStress and the Mediators. As displayed in Table 4 and the exhibits above, OrgStress was significantly associated with each of the three mediator variables: a) poor coping ($\beta = .14$, $p \leq .05$), b) AdvEmo ($\beta = .45$, $p \leq .001$), and c) fatigue/poor sleep ($\beta = .43$, $p \leq .001$).

Relationships Among Mediators. The three mediators were specified as correlated exogenous variables, indicating shared variance among the mediating constructs. Across all outcomes, poor coping showed a strong positive correlation with AdvEmo ($r = .38$, $p < ,001$) and a smaller correlation with fatigue/poor sleep ($r = .16$, $p < .001$). AdvEmo also had a significant

relationship to fatigue (r = .26, p < .001). [20] These correlations indicate that the mediators share variance but were not modeled as exerting direct effects on one another and thus do not imply directional or reciprocal causal influence.

Table 4

Structural Path Coefficients: Organizational Stress → Mediators

Ind. Var. to Mediator	Mediator	Type	Std. β	SE	z	p	95% CI
Org Stress	Poor Coping	Latent	.14	0.062	2.430	.015	[0.029, 0.272]
Org Stress	AdvEmo	Latent	.45	0.052	8.566	.000	[0.342, 0.545]
Org Stress	Fatigue/Poor Sleep	Latent	.43	0.062	6.871	.000	[0.306, 0.551]

Table Note. Std. β = standardized path coefficient; SE = standard error; CI = confidence interval; z = Critical Ratio (CR) or unstandardized estimate divided by the SE.

Pathways between Mediators and Outcomes. As previously shown in Table 3, each mediator was associated with multiple outcome variables, demonstrated by four separate models, one for each outcome. In Table 5, we provide more detail on these pathways, e.g., the standard errors, z values, and confidence intervals. For the first mediator – poor coping – only one pathway to the outcomes was significant, and that was for poor health and lack of well-being or PHLWB (β = .11, p < .05), although the small beta of .09 for poor work performance was approaching significance (p = .057).

For the second mediator – AdvEmo – there were significant pathways across all four outcomes. Specifically, the coefficients were as follow: for poor health/lack of well-being (β = .41, p < .001), PTSD (β = .51, p < .001) or AdvEmo, lack of organizational attachment or OrgAtt (β = .16 p < .05), and PWP (β = .15, p < .001).

[20] For the PWP model, the relationship between AdvEmo and Poor Sleep and Fatigue was slightly higher at .27.

For the final mediator – fatigue/poor sleep – three of the pathways were significant across the four outcomes, specifically: for PHLWB ($\beta = .16$, $p < .001$), for OrgAtt ($\beta = .15$, $p < .05$), and for PWP ($\beta = .19$, $p < .001$), while not significant for PTSD.[21]

Table 5

Structural Path Coefficients: Relationship between Mediators and Outcomes

Mediator	Outcome	Type	Std. β	SE	z	p	95% CI
Poor Coping	Poor health & lack of well-being (PH-LWB)	Latent	.110	.043	2.518	.012	[0.024, 0.190]
	Lack of Organizational attachment (ORG-ATT)	Latent	-.064	.062	-0.993	.321, ns	[-0.184, 0.060]]
	Poor Work performance (WK-PERF)	Latent	.090	.045	1.904	.057, ns	[-0.003, 0.173]]
	PTSD	Observed	.037	.043	0.838	.402, ns	[-0.049, 0.121]]
Adv. Emot. State & Reactions	PH-LWB	Latent	.405	0.046	9.036	.000	[0.326, 0.506]
	ORG-ATT	Latent	.157	0.072	2.216	.027	[0.018, 0.302]
	WK-PERF	Latent	.150	0.026	3.999	.000	[0.053, 0.155]
	PTSD	Observed	.508	0.063	8.403	.000	[0.403, 0.648]
Fatigue/ Poor Sleep	PH-LWB	Latent	.158	0.047	3.396	.001	[0.068, 0.252]
	ORG-ATT	Latent	.151	0.063	2.405	.016	[0.028, 0.276]
	WK-PERF	Latent	.186	0.056	3.269	.001	[0.073, 0.292]
	PTSD	Observed	.102	0.057	1.845	.065, ns	[-0.007, 0.215]]

Table Note. Std. = standardized; ns = not significant; SE = std. error; z = critical ratio (CR); CI = confidence interval

Overall, these findings highlight that OrgStress is most strongly linked to AdvEmo and fatigue/poor sleep mediators, but only weakly linked with coping. The former two also have stronger and/or direct relationships with the adverse outcomes.

[21] This relationship ($\beta = .10$) was approaching significance at $p = .065$.

Role of the Moderator between OrgStress and Mediators. We predicted that IPJS would serve as a moderator between OrgStress and two of the three mediators – Poor Coping and AdvEmo. However, the effect of the moderator between OrgStress and Poor Coping was not significant, despite the fact that IPJS directly impacts coping. In other words, there is no change in the relationship between OrgStress and Poor Coping regardless of the amount of perceived justice and support, indicating no moderation.

At the same time, IPJS does serve as a moderator such that at higher levels of IPJS, OrgStress is less likely to result in adverse emotions and reactions, as anticipated. The conditional effects of IPJS are displayed in Table 6. This demonstrates that when officers experience a low level of IPJS, OrgStress is likely to lead to worse emotional states and reactions (aggravation, anger, anxiety), whereas those experiencing high levels of IPJS feel less burden of OrgStress; a buffering effect of IPJS. The difference between low and high IPJS represents roughly a 34% reduction in the impact of IPJS – a moderate to high effect size.

Table 6

Conditional Effects of OrgStress on AdvEmo States/Reactions at Different Levels of IPJS

IPJS Level	Std. β	SE	z-value	p-value	95% CI
Low (-1 SD)	.551	.069	7.715	< .001	[.396, .666]
Mean IPJS	.445	.052	8.490	< .001	[.339, .543]
High IPJS (+ 1 SD)	.339	.055	6.416	< .001	[.244, .459]

Table Note. Std. = standardized; SE = standard error; z-value = critical ratio (CR), CI = confidence interval

While not predicted or tested, the exploratory finding from the relationship between OrgStress and Fatigue/Poor Sleep suggests a protective effect of IPJS, where higher IPJS reduces fatigue/poor sleep ($\beta = -0.159$, $p < .01$). Overall, the data from the moderation analysis demonstrates that if officers perceive their organization as fair, and feel supported by their peers,

supervisors, organization and community are much more likely to be shielded from the adverse emotional toll of organizational stress.

Changes in Approach from Original Design and Justification

Measures

While numerous measures were captured in the officer surveys, some of the measures were eliminated prior to or during modeling due to either insufficient reliability, small correlations between them and other measures in the conceptual model, or because they made an insignificant contribution. By removing these irrelevant or unreliable measures, we were able to increase parsimony by removing the number of parameters and thereby increase the statistical power of our models. Specifically, if a measure was included in a composite but its inclusion did not contribute incrementally to the overall construct reliability or was redundant with another indicator with greater reliability, it was removed from the model.

Adaptive-Maladaptive-Adaptive Coping. First, the adaptive and maladaptive coping instrument was not sufficiently reliable, so we did not include it in the Poor Coping Mediator, although we did retain a few maladaptive behavior questions (i.e., alcohol use, poor diet).

Shift Schedule. Next, there were a limited number of responses regarding the shift worked (day, evening, or midnight). Accordingly, we combined day and evening as one level of the proposed moderator, and night/midnight as the other, something that is also grounded in the literature demonstrating that the night shift is most detrimental to health and wellness. Because there was no effect, we removed this moderator to increase parsimony and reduce complexity across the models.

Personality. Past research has demonstrated a somewhat limited role of personality in potentially mediating the relationship between OrgStress and various outcomes. For example,

neuroticism—the tendency to frequently and intensively experience negative emotions—has been associated with anger, anxiety, and hostility, and negativity (Chu et al., 2015). At the same time, many of the others have demonstrated much smaller relationships, but we did include them in the survey of officers. For the "Big 5" (as they are known) personality traits (John & Srivastava, 1999) typically measured by the International Personality Item Pool or IPI (Goldberg, 1999), we relied upon the use of the shorter form, Mini-IPI (Donnellan et al., 2006), consisting of four items for each trait: (1) Extraversion (ω = .82), (2) Agreeableness (ω = .78), (3) Conscientiousness (ω = .65), (4) Neuroticism (ω = .72), and (5) Openness to Experience (ω = .67).

The neuroticism dimension was excluded because many of the items making up the scale overlapped with other items, such as anger, anxiety, irritability, and negative affect (as measured by the Distressed Personality Scale) all of which were sufficiently reliable and may or may not be long-standing traits. Also, the reliabilities for all but one dimension were below .80 rendering them not as reliable as expected. By emphasizing anger, anxiety, irritability, and negative affect, we decided to exclude all of the Big 5 due to the need to increase power and simplify the model. Although personality often implies longstanding characteristics or traits of individuals, anger, anxiety, irritability, and negative affect may also be considered emotional states or reactions that better represent fleeting emotions associated with exposure to stressors, as opposed to rigid, long-standing personality characteristics. Extraversion, perhaps above all others, has been established as a very stable characteristic of individuals, and thus is unlikely to change over time. That was the primary reason for excluding it from our analysis.

Overtime. Another change from the original plan was related to long work hours, i.e., overtime. Unfortunately, and unbeknownst to the research team at the outset, most agencies did

not have a means for differentiating between voluntary and mandatory overtime. Accordingly, we excluded this variable because the extent to which officers perceive long work hours as a stressor is likely to vary based on choice, i.e., whether it was chosen or mandated by the agency. This does not mean excessive overtime does not contribute to physiological stress, fatigue, sleep problems, poor health, lack of well-being, or poor performance on the job, however, it does underscore that the perceptions of stress are likely influenced by the desirability of overtime.

Sleep hygiene. We initially expected sleep hygiene—behaviors and conditions that support high-quality sleep—to moderate the relationship between poor sleep, fatigue, and outcomes. This was not supported, so it was excluded from the final model to maintain parsimony.

Support. We originally envisioned lack of social support as a form of organizational stress, but due to the transactional nature of support, we re-examined this and combined it with organizational justice (or internal procedural justice); another cultural factor that we anticipated would buffer the impact of OrgStress on AdvEmo, and on coping (in essence, allowing individuals to better cope with the stress). Accordingly, this new Internal Procedural Justice and Support was changed to a moderator early in our evaluation. This approach was consistent with literature suggesting the important role of organizational and/or social support in reducing the impact of stress (e.g., Campos et al., 2023; Drew et al., 2024; Hansen et al., 2022).

Agencies

Our project design originally focused on the inclusion of one large police department and one large sheriff's office operating a jail or a correctional facility. While several agencies expressed interest in participating in this study, the COVID-19 pandemic placed considerable strain on agencies, leading several interested agencies to refrain from participating in the study.

This contributed to significant delays in being able to engage new sites. While our original plan was to include two large agencies, this became too challenging over time, and so we allowed for small and mid-sized agencies to participate, thereby increasing the number of participating agencies. However, due to various ongoing and unique difficulties and challenges, some agencies that had established MOUs and data sharing agreements with the NPI withdrew from the process after agreeing to participate or even very late in the process of data collection, with one failing to provide sufficient data, which unfortunately resulted in substantial time loss and unrecoverable costs. In total, we had originally engaged about two dozen agencies, but after discontinuation by many for various reasons, our final agency count was seven.

Limitations of the Study

A primary limitation of this study is that it was cross-sectional and largely exploratory. It would not have been feasible or practical to explore a broader, more comprehensive examination of organizational stress in policing through an experimental design, as random assignment of officers to different levels of organizational stress would be both impractical and unethical. While a causal model (experimental or longitudinal) was not possible, we employed SEM analysis, which is a rigorous alternative. SEM provides certain advantages for researchers attempting to understand complex relationships among many related concepts. For example, it allows for the inclusion of latent constructs (reducing measurement error), especially when models are exploratory and there is an ability to collect a large sample size. However, it does not allow causal inferences.

We were also limited by the timing of the study which began during the period of the Covid-19 pandemic, limiting access to agencies that were overburdened with unique circumstances. Our inability to secure cooperation from very large agencies during that time also

created a more complex recruitment and implementation process that extended the timeline substantially and resulted in higher costs associated with recruitment and multi-site implementation. This seven-site study, while allowing for a more diverse array of agencies by type, size, and region, meant that data were not all collected at the same time across agencies.

Finally, the fact that officers and agencies volunteered for the study means that there could be characteristics of either that influenced participation and may similarly influence the outcomes we reported. This selection bias may compromise external validity, but was necessary in order to include willing agencies, and to comply with Human Subjects Protections, in particular, informed consent. We have attempted to minimize sampling bias by including a diverse array of agency types, regions, and sizes.

Moreover, selection bias can lead to systematic bias that can be misleading or result in overinterpretation. This, along with the limitations of the research design are why we emphasize caution in interpreting the results by inferring causation. We suggest that additional research be conducted in order to replicate findings, and further explore the role of internal justice and support in mitigating harmful effects, specifically strategies that may increase IPJS.

Discussion

Overall Findings

Organizational stress exhibited direct and significant relationships with three of the four outcomes. Specifically, it showed medium-to-large effects on work performance ($\beta = .38$) and PTSD symptoms ($\beta = .36$). In contrast, its association with overall health and well-being was small ($\beta = .11$), and no significant relationship was observed with organizational attachment, resulting in support for three of the four proposed hypotheses. As hypothesized**,** organizational stress was also significantly associated with all three proposed mediators, and each mediator

demonstrated unique relationships with the health, well-being, and performance outcomes. Specifically, organizational stress had direct moderate-to-large associations with both adverse emotional states or reactions ($\beta = .45$) and fatigue/poor sleep ($\beta = .43$), but only a small relationship with coping, resilience, and related behaviors.

At the model level, the SEMs accounted for substantial variance in the primary outcomes, including physical health and well-being ($R^2 \approx .60$), PTSD symptoms ($R^2 \approx .64$), organizational attachment ($R^2 \approx .39$), and work performance ($R^2 \approx .22$), indicating strong overall explanatory power. The relatively high proportion of variance explained in health and well-being and PTSD outcomes likely reflects the use of latent constructs and the inclusion of theoretically proximal mediators, which together reduce measurement error and enhance explanatory power. The inclusion of sex and race as covariates did not meaningfully increase the proportion of variance explained beyond organizational stress and procedural justice factors. Together, these findings suggest that the models capture a coherent and theoretically meaningful structure underlying stress-related health and performance outcomes.

Poor Coping

The least influential mediator of the relationship between organizational stress and adverse outcomes appears to be poor coping (as broadly measured here). While poor coping was significantly associated with poor health and lack of well-being, the strength of that relationship was small ($\beta = .11$, $p < .05$), suggesting that individuals with lower resilience, coping self-efficacy, and/or unhealthy behaviors experience only modest reductions in physical and psychological health. In contrast, paths between poor coping and organizational attachment, work performance, and PTSD symptoms were not significant, although the association with work performance approached marginal significance and was weak in magnitude ($\beta = .09$, $p =$

.057). Notably, poor coping was significantly associated with the other mediators, indicating that its influence on outcomes may occur indirectly through stronger emotional and fatigue-related pathways. Taken together, poor coping appears to play a limited direct role in linking organizational stress to adverse outcomes, exerting its influence primarily through associations with stronger mediators rather than through independent effects.

Adverse Emotional States (AdvEmo)

Adverse emotional states emerged as the most powerful mediator across outcomes. Negative emotional states and/or reactions (e.g., anger, anxiety, depression, irritability, and negative affect) had moderate to strong relationships with physical health and well-being ($\beta = .41$, $p < .001$) and PTSD symptoms ($\beta = .51$, $p < .001$), effects that were approaching large or large in magnitude. Adverse emotional states were also significantly, though more modestly, associated with organizational attachment ($\beta = .16$) and work performance ($\beta = .10$), suggesting that emotional dysregulation affects not only health outcomes but also workplace functioning. Overall, adverse emotional states appear to serve as the key proximal mechanism through which organizational stress is associated with adverse health, well-being, and performance outcomes.

Fatigue and Poor Sleep

Fatigue and poor sleep exhibited modest, yet nontrivial relationships with poor health and lack of well-being ($\beta = .16$, $p = .001$), organizational attachment ($\beta = .15$, $p = .016$), and work performance ($\beta = .19$, $p = .001$), although these effects were smaller than those observed for adverse emotional states. Although the path to PTSD symptoms did not reach statistical significance ($\beta = .10$, $p = .065$), the confidence interval suggested a possible trend toward a positive association. Collectively, these findings suggest that inadequate sleep quality and persistent fatigue may erode both personal health and workplace functioning, underscoring the

importance of organizational practices that support adequate recovery within and between shifts. Thus, while fatigue and poor sleep represent meaningful pathways linking organizational stress to adverse outcomes, their effects appear secondary to those of adverse emotional states.

Integrative Interpretation

Although several standardized path coefficients fell below conventional thresholds for medium or large effects, these estimates must be interpreted within the context of structural equation modeling. Cohen's (1988) benchmarks were developed for observed-variable correlations, whereas SEM estimates relationships among latent constructs that are corrected for measurement error. Consequently, path coefficients in SEM may appear smaller while still reflecting substantively meaningful associations. Within this framework, the observed effects (β = .10–.52) reveal a coherent pattern in which adverse emotional states emerge as the dominant pathway linking organizational stress to adverse outcomes, fatigue and poor sleep contribute secondary but meaningful effects, and poor coping plays a more limited, largely indirect role.

Taken together, these findings underscore the central role of emotional processes in translating organizational stress into adverse health, well-being, and performance outcomes, highlighting organizational stress reduction and emotional regulation as critical targets for intervention.

Mitigation and OrgStress Reduction

Three approaches are generally considered for mitigating and/or reducing OrgStress. The first involves organizational-level interventions that involve attempts to reduce job stress by changing the working conditions, job design, organizational policies, or social or organizational environment. These are most likely to address root causes, such as poor supervision, role ambiguity, and workload. The second approach involves individual interventions that emphasize

the ways officers can manage stress within their existing environment (without changing it) and can be achieved by providing them with skills in mindfulness, resilience, and/or coping. The third approach involves psychological interventions (such as employee assistance programs, counseling, or treatment for sleep disorders) that focus on helping employees overcome or address their emotional reactions, mindset or thought patterns.

Research traditionally emphasized coping, which some considered to be the most impactful approach to mitigating the impacts of organizational stress (e.g., van der Klink et al., 2001). More recent research, however, has demonstrated that the most efficacious approach is organizational; specifically, changes that reduce the stressors themselves (Cartwright & Cooper, 1997; Kompier & Kristensen, 2001; Weinberg et al., 2010).

The findings of our study are consistent with prior evidence suggesting that organizational-level interventions (especially adjusting work hours and improving psychosocial work environment), are often more effective than individual ones for reducing the harmful effects of OrgStress by improving employee health and reducing burnout (e.g., Aust et al., 2023). Among the organizational interventions suggested in the extant literature and by participants in our focus groups are:

- Adapting leadership styles
- Creating greater transparency regarding changes in policy or practices by making sure the rationale is provided to all personnel at all levels whenever possible to improve buy-in and increase confidence and trust in leadership.
- Improving work schedules (perhaps by making them more flexible, or by capping the amount of allowable work hours per week)

- Improving internal communication regarding changes in policy or practices by making sure the changes are communicated down the line. (Some officers reported that they hear things from the media before they hear from their agency.)
- Improving organizational justice in promotional practices
- Increasing fairness and transparency in internal investigations and disciplinary actions
- Increasing job autonomy
- Increasing staffing
- Providing greater role clarity
- Reducing workload
- Shortening the period of Internal Affairs investigations, especially for more minor offenses, and/or those the officer admits to (e.g., when there is a clearly spelled-out disciplinary matrix and the punishment is clearly defined).

Despite the importance of organizational interventions, research also has demonstrated moderately effective results for psychological interventions, such as counseling, cognitive behavioral therapy, and organizational programs depending on the specific program (e.g., Arnetz et al., 2013; Christopher et al, 2021), especially for reducing symptoms of stress and burnout when underlying stressors cannot be removed.

Emerging research suggests synergistic effects when organizational interventions are combined with demonstrably effective individual-level interventions. For example, in a very recent meta-analysis of organizational interventions, Bes et al. (2023) found organizational interventions (e.g., participatory changes, workload reduction) were associated with a small but statistically significant reduction in "exhaustion" (a core component of burnout), with an effect

size of g ≈–0.30. Interventions targeting workload had slightly larger effects (g ≈ –0.44), and the same meta-analysis found that combined interventions (organizational plus individual-level) showed a larger reduction (g ≈ –0.54), suggesting synergy when structural change is paired with individual supports.

While resilience and coping-based interventions may provide a protective buffer, particularly when operational stressors cannot be eliminated, their effectiveness is limited. Accordingly, if OrgStress remains high, individual coping/resilience is the least effective as a standalone strategy (Britt et al., 2016; Ganster & Rosen, 2013; Joyce et al., 2018).

In the most recent review of 14 eligible studies of individual and organizational interventions (e.g., mindfulness, cognitive behavioral therapy, organizational restructuring) and their impact on burnout and occupational health, Bagassi et al. (2025) found that a new trend is emerging. Participatory organizational programs (sometimes called *participatory interventions*) refer to workplace improvement efforts in which employees actively take part in identifying stressors, generating solutions, and implementing changes—rather than changes being imposed solely from management or external consultants. The researchers found that participatory organizational interventions had relatively long-lasting positive effects compared to brief workshops and digital tools. Ultimately, the authors noted that combining individual and organizational strategies demonstrates the most robust evidence for burnout reduction—varying, of course, by quality of implementation. Importantly, the effectiveness of individual interventions alone was low.

Expected Applicability of the Research

This research is expected to have an important impact on scholarly pursuits going forward, as well as on law enforcement agencies that are concerned about officer health and

well-being, work performance problems (e.g., mistakes, collisions and near misses, injuries, and complaints), and officer turnover.

Much of the past research on OrgStress has been limited in scope, focused on narrower research questions, consisted of fewer key outcomes, and has lacked integration. From a research perspective, most of the recent literature relies on one primary theory, the JDRM, which is used across occupations despite it lacking the context-specificity and complexity of law enforcement organizations, e.g., culture, hierarchy, etc. Our findings will allow subsequent researchers to use a more context-specific, comprehensive, and inclusive model for examining their research questions within our empirically justified models.

For policy makers, police executives, sheriffs, and corrections leaders, a greater understanding of how various aspects of OrgStress impact officers' health, safety, wellness, and performance on the job, should facilitate evidence-based decision making and policy development (e.g., regarding hiring criteria, work hours including overtime policies, and promotional practices) and inform strategies (e.g., providing increased support, increasing fairness and organizational justice through greater feedback and transparency, and training). It should also provide mechanisms for addressing emotional states and reactions (e.g., anger, anxiety, etc.) such as interventions for emotional and mental health challenges. These may include providing training in sleep hygiene, access to sleep disorder treatment, or provision of rest periods, as well as providing access to psychological or other therapeutic interventions. However, most importantly, this research should help organizational leaders in potentially reducing OrgStress, as this has previously been established as the most effective mechanism for mitigating the harmful effects of stress, as compared to coping, resilience, and treatment.

This study has advanced scholarly knowledge about relationships between the causes and

outcomes of stress, inter-relationship between these variables, and the various factors accounting for health, safety, wellness, and performance outcomes including reduced attrition. Beyond this domain-specific contribution, the proposed research will contribute to such diverse fields as behavioral economics, I/O psychology (especially in the areas of burnout, performance, quality of life, and stress), and police and clinical psychology (e.g., addressing mental health and stress, with less emphasis on coping and resilience due to their nominal role in influencing the outcomes we explored), as well as public policy.

Activities/accomplishments

We implemented the study across seven agencies. Activities included the administration of surveys, distribution and monitoring of smart watches, providing feedback to agencies and officers, and conducting all analysis. We completed focus groups, made presentations, and are developing deliverables and a dissemination plan. We also generated and are preparing all three data sets for archiving.

Artifacts

We developed (or are currently developing) the following deliverables and scholarly products: a) this final research report per NIJ's requirements, b) complete codebooks and data sets, c) scholarly articles, and d) short practitioner-oriented products that focus on policy implications for police, sheriffs, and other related practitioners.

Data sets. Three separate data sets and associated dictionaries were produced for the self-report, administrative, and physiological measures. These are being stripped of identifiers and will be submitted for archiving to the Interuniversity Consortium for Political and Social Research (ICPSR) at the University of Michigan (The National Archive of Criminal Justice Data, NACJD), consistent with NIJ requirements.

Publications. Given the breadth of implications across disciplines, we plan to submit an article for peer review to at least one journal, starting with *Police Quarterly*, or as alternatives either a) the *International Journal of Stress Management*, or b) *Psychology, Public Policy and Law*. Additional publications may be produced and made available at a later date. We intend to create shorter, practitioner-oriented articles, blog posts, and other formatted information for distribution or posting and geared toward different audiences. This final project report will be posted on the NPI website and possibly on the RTI website. Thus far, we have developed the following two practitioner-focused publications:

- Building Resilience in Policing, Preventing Stress, and Supporting Officer Mental Health, *National Policing Institute series "In Focus,"* September 2025. https://www.policinginstitute.org/infocus/building-resilience-in-policing/
- Officer and Staff Wellness. *National Policing Institute series, "In Focus,"* January 2024. https://www.policinginstitute.org/infocus/january-officer-wellness/

Presentations. We made a number of presentations at conferences: NIJ (2023), American Psychological Association – APA (2023), and IACP (2023), and one webinar. However, none of these presentations included the full findings and implications of the study. The following are presentations completed to date:

- Adverse Impacts of Organizational Stress on Officer Health and Wellness: Causes, Correlates, and Mitigation presented at the *National Institute of Justice Evidence to Action National Research Conference*, May 2023.
- Organizational Stress Among Law Enforcement Personnel: Mitigating Negative Health and Wellness Impacts presented at the annual meeting of the *Psychologists in Public*

Service, Police and Public Safety Section of the American Psychological Association, August 2023. Remote presentation.

- Examining Organizational Stress in Law Enforcement" presented at the *International Association of Chiefs of Police Annual Conference*, October 2023.
- Organizational Stress: A Webinar for Law Enforcement and Corrections presentation (invited) from *Justice Clearinghouse*, November 2023.

About the Grantees

The National Policing Institute (NPI) is an independent, non-partisan, non-membership organization dedicated to improving policing through innovation and science. For over 55 years, we have successfully partnered with law enforcement, cities, states, universities, federal agencies, other NGOs, and private foundations to conduct rigorous research and translate findings into practice. Throughout our history, we have conducted high quality, innovative, experimental research on policing that has been published in numerous scholarly journals, in-house and distributed to libraries nationwide, and cited in criminal justice and policing textbooks, as well as in practitioner-oriented publications.

RTI International (RTI) is an independent, nonprofit organization dedicated to innovative, multidisciplinary research that improves the human condition. RTI has decades of experience conducting collaborative research to inform policy and practice and leads major research initiatives.[22] RTI is uniquely situated to collaborate on the proposed NIJ project due to past and current experience in distributing consumer and research grade wearable devices for

[22] For example, the Law Enforcement Core Statistics program.

large, longitudinal studies, including a pilot with police officers.[23]

About the Authors

Karen L. Amendola, Ph.D. is Chief Behavioral Scientist at the National Policing Institute where she has worked for over three decades. Dr. Amendola has focused her research and/or practice on applied industrial/organizational psychology in policing to include promotional assessment centers, community policing, early warning and intervention systems, ethics, eyewitness identification practices, organizational culture, organizational justice and internal procedural justice, shift schedules and long work hours, organizational and operational stress, training, and wellness.

Amendola has obtained and managed numerous grants (in excess of $12 million) from federal, local, and private sources, and has worked with law enforcement personnel from local, state, federal and international police agencies, and with both police officers and sheriffs' deputies in jails and in the field. Her work is published in peer-reviewed and practitioner focused outlets, and she has served as a peer reviewer for peer reviewed journals. In addition, Amendola has been invited to serve as a presenter at various conferences and meetings throughout the U.S. and has also been an accepted speaker at many others.

Dr. Amendola is a member of many professional organizations and has served in leadership positions for some, including President of the National Partnership for Careers in Law, Public Safety, Corrections, and Security and Chair of the Division of Experimental

[23] For example, the National Longitudinal Study of Adolescent to Adult Health and NHLBI's nuMoM2b Heart Health Study. For these initiatives, RTI created numerous protocols for configuring participant devices consistent with study/clinic case management requirements.

Criminology, American Society of Criminology. She has also been the recipient of several awards including the Outstanding Field Trial from the *Division of Experimental Criminology* of the *American Society of Criminology* for her work on the Shift Length Experiment (with her colleagues), and the Distinguished Alumni Award from George Mason University's *Society for Industrial and Organizational Psychology*.

Jenn Rineer, Ph.D., is an expert in the health, well-being, and performance of employees and organizations. As a director and research psychologist in RTI International's Center for Justice Systems Research, she applies her academic and applied experience in industrial and organizational psychology and occupational health to workplace and workforce surveys, qualitative studies, employee trainings, evaluations, and experimental research in criminal legal contexts. Her research focuses on worker health, job-related stress, engagement and inclusion, and organizational effectiveness. Dr. Rineer is dedicated to using research-generated knowledge to inform tools, guides, and recommendations that foster positive change in organizations. Her work is featured in podcasts, conference presentations, practitioner publications, and peer-reviewed journals.

Dr. Rineer led a Department of Justice (DOJ)-funded project to develop programs to reduce stress for law-enforcement officers across the United States. She was also the principal investigator on the NIJ-funded studies, *From Research to Reality: Recruiting More Women into the Policing Profession and Real-World Engagement and Turnover Analysis to Inform New Solutions (RETAINS): An Evidence-Based Policing Workforce Study*. Recently, Dr. Rineer led the *Advancing Service-Oriented Policing through Inclusion, Relationship-building, & Engagement (ASPIRE)* project, a training and technical assistance initiative funded by the Bureau of Justice Assistance. Dr. Rineer is a partner of Michigan State University's Police

Staffing Observatory and a core team member of the Society for Industrial/Organizational Psychology Policing Initiative, which partners with DOJ's Office of Community Oriented Policing Services (COPS Office) to integrate the science of the workplace into policing. Prior to joining RTI, Dr. Rineer was the Career Pathways Research Fellow at Catalyst, Inc., and the Director of Research at the Center for Parental Leave Leadership.

Maria Valdovinos Olson, Ph.D., is a Senior Research Associate at the National Policing Institute, where she leads and contributes to a diverse portfolio of federally and privately funded research projects focused on policing and corrections. With extensive experience in research design, project management, and stakeholder engagement, Dr. Valdovinos Olson plays a key role in advancing multi-year initiatives that address pressing issues in policing and the broader criminal justice system, driving evidence-based solutions and meaningful policy impact.

Her primary areas of expertise include police and corrections officer safety, health, and wellness; sources of stress within police and corrections organizations; measurement of procedural justice in police-community interactions; reentry policy and practice; qualitative research; field experiments; and survey methodology.

Dr. Valdovinos Olson's work has been published in both peer-reviewed and practitioner-focused outlets. She earned her Ph.D. in Sociology and Criminology from George Mason University.

Colby Dolly, Ph.D., is the National Policing Institute's Director of Science & Innovation. He oversees a diverse array of research endeavors, with a particular emphasis on topics pertinent to law enforcement practitioners, such as the integration of technology and the analysis of use of force.

Prior to his tenure at NPI, he held leadership positions within a multinational healthcare corporation and a large police department in the Midwest. In these capacities, Dr. Dolly's responsibilities encompassed developing policies, conducting data analytics, implementing procedural enhancements, and facilitating organizational transitions. Notably, Dr. Dolly was chosen as a participant in the prestigious 2020 LEADS Scholar Program by the National Institute of Justice.

Dr. Dolly's academic background includes a Ph.D. in political science from the University of Missouri, St. Louis, with a research focus on organizational change and methodological approaches. He is recognized as a Prosci® Certified Change Practitioner and holds accreditation in Lean Six Sigma methodologies.

Travis Taniguchi, Ph.D. is a senior research associate at the Washington State Institute for Public Policy where he oversees a variety of projects in policing and corrections research. He was previously employed by the National Policing Institute and RTI International as a Research Director and Scientist.

Dr. Taniguchi specializes in field experiments and large scale survey data collection. His research has focused on police strategies and effectiveness, officer health and wellness, and recruiting and retention in public service careers. Most recently, Dr. Taniguchi completed an implementation assessment of law enforcement assisted diversion in Washington and studies of bystander training in law enforcement, recruiting women into policing, among others.

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Appendix A

Statistical Output from R (Lavaan package)