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I, Jennifer H. Webster , hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Criminal Justice.

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A Meta-Analytic Review of the Correlates of Perceived Stress among Police Officers

Student's name: **Jennifer H. Webster**

This work and its defense approved by:

Committee chair: Lawrence Travis, PhD

Committee member: John Violanti, PhD

Committee member: James Frank, PhD

Committee member: Paula Smith, PhD

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A Meta-Analytic Review of the Correlates of Perceived Stress among Police Officers

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by

Jennifer H. Webster

B.A., East Tennessee State University, 2001

M.S., University of Cincinnati, 2002

Committee Chair: Lawrence F. Travis, III, Ph.D.

ABSTRACT

There appears to be widespread belief (among lay persons, academics, and police officers alike) that the occupation of policing is highly stressful (Kappeler et al., 2000). Furthermore, many believe that operational variables unique to policing are the primary causes of this stress (*e.g.,* Waters & Ussery, 2007). The near-dogmatic resiliency of this image of policing has helped create a popular culture where all matters related to the profession are approached with these underlying assumptions. It has also given rise to the tendency among stress researchers to focus on the operational or organizational demands facing officers without giving due consideration to the process of cognitive appraisal - and the many influences on that process - which shape the evaluation of those demands. This atheoretical approach in combination with variability in methodological quality across studies, including gross inconsistencies in the choice and measurement of the independent variables (*i.e.,* stressors), and even in the measurement of the dependent variable of interest itself (stress), has given rise to a body of research that has been characterized in multiple narrative reviews as contradictory and inconclusive.

The current study is an effort to take stock of the research on perceived stress among police officers by quantitatively synthesizing the available empirical literature on the subject via the use of meta-analysis. The research plan proposed to first compare individual correlates of perceived stress in order to draw conclusions about their relative strength and stability. Unfortunately, the 103 studies which met the inclusion criteria for the meta-analysis were so fraught with missing data there were not enough effect size estimates for individual correlates to allow for meaningful comparisons at that level. However, the systematic documentation of the depth and breadth of missing data is an important contribution of the current study, and should help guide future research in this area.

The current study also proposed a model of stress and coping as an interactive process between an individual and his or her environment. Although the large amount of missing data did not allow for meaningful comparison of individual predictors, collapsing correlates into predictor domains that mirrored the proposed model of stress and coping did allow for a preliminary analysis of some of the constructs in that model. While the broad confidence intervals generated for each domain do urge caution in interpretation, the findings at least suggest that each domain contributes to the perception of stress and that knowledge in this area might best be advanced by recognizing the importance of each in shaping an interactive process of stress and coping rather than attempting to rank individual correlates. In short, the data do not allow definitive conclusions that personal characteristics or job characteristics, for example, are more important than others in shaping stress perception among police officers. Clearly, these findings are limited by the degree of missing data, but it may be that questions about what is *most* important in shaping police stress have remained unanswered because the variables of interest make *equally* important contributions to a complex process.

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CHAPTER 1:
STATEMENT OF THE PROBLEM

There exists a widespread belief (among lay persons, academics, and police officers alike) that the occupation of policing is highly stressful (Malloy & Mays, 1984; Kappeler *et al*., 2000). Furthermore, many believe that operational variables unique to policing are the primary contributors to this stress (*e.g.,* Waters & Ussery, 2007). In fact, this image of policing has taken on a near-dogmatic resiliency, with many in the public, the media, academia, and the police occupation approaching all consideration of police matters with the underlying assumption that there exists a unique type of stress within policing that, in combination with the stressors common to all manner of work life, produces a higher degree of stress within the profession. Terry (1985) has even gone so far as to suggest that police officers have adopted this emphasis on police stress, irrespective of its validity, as a means of gaining professional legitimacy and prestige[1]. However, as Webb & Smith (1980) point out, whether or not policing is more or less stressful than other occupations is probably not a particularly useful question to be asking in and of itself. When one takes into account the role of police in society and the potential for public harm if and when officers are operating under distress[2], the issue of stress in policing might be viewed as *uniquely important*, regardless of where stress in policing ranks in relation to other occupations (Toch, 2002), and this should re-frame our discussion of the topic (Copes, 2005). Yet it is difficult to ascertain the degree to which *any* assumptions about police stress might be true because research findings on the topic, though abundant, are not consistent.

[1] Arguably, this emphasis on stress is necessary as a means of gaining legitimacy because of the impossibility of meeting their manifest function of controlling crime in a democratic society, as discussed by Manning (1978).
[2] The terms "stress" and "distress" are being used interchangeably for the purposes of this study. A discussion of the development (and popular usage) of the terms will follow.

The contradictory findings are not surprising considering police stress research has been largely "exploratory, disciplinary specific, investigative in nature, and lacking a theoretical foundation," (Abdollahi, 2002, p.16). Many writings which make the assertion that policing is uniquely stressful in some way are anecdotal in nature, and the reviews of the empirical studies that do exist are limited (Webb & Smith, 1980; Malloy & Mays, 1984; Abdollahi, 2002). In fact, in a 1978 article, Davidson and Veno noted that no "integrated analytic review of the existing data" in the area of stress as specifically related to police had been conducted (p. 187). More than thirty years later, it appears this is still the case. While Abdollahi (2002) and others have periodically conducted thorough literature reviews, no one has analyzed evidence on the issue in any more systematic way. **Therefore, the purpose of this dissertation is to identify and compare the key correlates of perceived stress among police officers via the use of meta-analysis.** The focus will not be to ascertain *how much* stress police officers experience in relation to members of other professions, but to ascertain the correlates of the stress that *is* experienced by officers. Identifying (and ranking) these correlates may provide guidance in the development of stress prevention and intervention strategies.

The remainder of this chapter will:

- Provide an overview of the historical development of police stress research
- Describe the evolution of stress as a concept, from its bio-physical origins in the 1930s to the more modern understanding of stress as an interaction between an individual and his environment via a complex process of cognitive appraisal
- Summarize the purpose of the current study

The Development of Police Stress Research

The notion that policing is uniquely stressful was given academic credence by some of the earliest and most oft-cited policing scholars, like Egon Bittner (1970), who emphasized the unique nature of policing by pointing out that the police are the only body (in the United States) authorized to use coercive force against its citizenry. This, he claimed, leads to public reliance on the police any time there is a situation which civilians cannot handle, but which must be handled immediately. In other words, when people do not know what to do or who else to call, they call the police; thus, the police must be available twenty-four hours a day, seven days a week, to resolve virtually any problem the citizenry is incapable of resolving – or unwilling to resolve – themselves. While Bittner's work was not about police stress, *per se*, his writings (and the writings of many of his contemporaries) certainly implied a belief that policing is a uniquely stressful occupation. For example, taken together, work by Skolnick (1966), Neiderhoffer (1967), Wilson (1968), Westley (1970), Van Maanen (1973), Lundman (1980), Crank (1988) and others supports the contention that police officers are united by a subculture of certain beliefs, values, and attitudes which are reinforced, if not created, by a combination of job characteristics that are unique to policing. The specific characteristics that have emerged as common to this body of work are: an inherent potential for danger, the unique authority to use coercive force against the citizenry, a propensity for social isolation, and responsibility for the safety of others.

Growing interest in the subculture of policing and concern about the "problem" of "police stress" led to an interdisciplinary symposium on the topic, sponsored by the National Institute for Occupational Safety and Health in Cincinnati, Ohio in 1975. In opening remarks to attendees of the symposium, Cincinnati Police Chief Carl Goodin called policing "one of the

most stress-filled jobs in the occupational picture" at that time. Chief Goodin's comments were largely anecdotal in nature, based on observations made during his own twenty years of experience in the field that police recruits begin their careers, as a requirement of the job, as healthy[3] young men (for the most part), but wind up suffering higher-than-average incidences of physical and mental health problems in the long-term. Though research in the intervening years has failed to confirm all of Chief Goodin's observations, evidence does indicate:

1) policing is frequently identified as *a* particularly stressful occupation (Brown & Campbell, 1994; Dantzer, 1987; Horn, 1991; Kroes, 1976; Kroes & Hurrell, 1975; Liberman *et al*., 2002; Raiser, 1974; Reilly & DiAngelo, 1990; Violanti & Marshall, 1983), and

2) there is a connection between stress and a host of negative outcomes among police officers (for reviews, see Abdollahi, 2002 and Kerley, 2005).[4]

Specifically, researchers have linked chronic job stress in police to:

- decreased organizational commitment (Jaramillo *et al*., 2005),
- negative attitude toward work (Oyefese, 1989),
- fatigue, slowed reaction time, tardiness, absenteeism, and use of aggressive tactics (Mulroy, 2000; Pederson, 2001; Vila *et al*., 2002),
- increased levels of burnout and cynical attitudes toward civilians (Stearns & Moore, 1993),
- higher rates of divorce (Violanti *et al.,* 1985),
- self-reported abuse of alcohol (Weng, 2002b; Oxley, 2006),

[3] In addition to good overall physical health, Reiser (1975) reported that police recruits are above average in intelligence, emotional ability, and desire to serve country.
[4] Kerley (2005) categorizes these negative outcomes as 1) on-the-job consequences, 2) physical and emotional consequences, and 3) family and relational consequences.

- use of violence (Kop *et al*., 1999) and excessive force (Kop & Euwema, 2001)

There is also evidence that the combination of "routine" (*i.e.*, daily or chronic) stressors (many of which might be organizational stressors not unique to policing) and exposure to traumatic or "acute" stressors (some of which *are* unique to policing, or to emergency service professions, at least)[5] may specifically result in physical, psychological, and/or behavioral problems (Everly & Smith, 1987; Jaffe, 1995; Quick *et al*., 1997; Violanti, 1981; Violanti, Marshall, & Howe, 1983) including:

- elevated mortality rates for some illnesses (Violanti *et al*., 1998),
- Post-Traumatic Stress Disorder (Liberman *et al.*, 2002; Violanti *et al*., 2007),
- burnout (Burke, 1993, 1994; Cannizzo & Liu, 1995; Hawking, 2001; Jackson & Maslach, 1982; Kop & Euwema, 2001; Maslach, 1982), and even
- suicide (Violanti, 1997).

Alarmingly, there is also evidence that the degree of mental ill-health symptomatology among officers may be worsening despite increased societal and organizational attention having been devoted to the issue since the 1970s (Collins & Gibbs, 2003) and that officers who report symptomatology of stress are more likely to suffer from depression and anxiety than those who do not (Olson & Surrette, 2004). These findings underscore Webb's and Smith's (1980) position that understanding and addressing the stress that is experienced by police officers are important goals, with comparisons to other professions only important inasmuch as they are useful in achieving those goals.

[5] Anshel *et al.* (1997) point out that "acute" stressors are characterized by sudden onset, relatively short duration, and immediate felt distress. However, not all acute stressors are of the operational sort that we tend to think of when considering police work (*e.g.,* exposure to extreme violence or death), but may include such things as experiencing a job transfer, new management, or technical/equipment failure.

Yet despite intense interest in, and numerous studies of, both the origins and outcomes of police stress over the past few decades, it is difficult to ascertain what we "know" about the subject because research findings are not consistent. For all the studies that support the contention there is something unique about the stress experienced by police officers, there are conflicting studies which show either 1) no significant influence of operational variables unique to policing in comparison with organizational variables common to other professions, or 2) no significant differences between police and various reference populations (*e.g.*, Bar-On *et al*, 2000; Brown & Campbell, 1990; Brown & Campbell, 1994; Dantzker, 1987; Gulle *et al*., 1998; Hart *et al*., 1993; Hart *et al*., 1995; Kappeler *et al*., 2000; Lefkowitz, 1975; Sigler & Wilson, 1992; Storch & Panzarella, 1996; Zhao *et al*., 2002) in the overall amount of stress experienced, which might be interpreted as evidence that operational stressors unique to policing have minimal impact on officers' experience of stress – both findings which fly in the face of the popular image of the profession described above. However, these contradictory findings may exist, in part, because many studies of "police stress" have not been conducted against the backdrop of a guiding theory of *stress*, generally.[6] This is unfortunate, as the fields of biology, medicine, and psychology have much to offer on this complex subject, and this is where we now turn our attention.

Defining "Stress"

In popular culture, "stress" has become a catchall term used to capture a variety of ills and frustrations from which everyone seems to suffer but very few can adequately define. In fact, it may seem to many of us that we have been "stressed-out" for so long that we do not remember

[6] Among primary research studies of police stress, there has been a heavy focus on the uniqueness of the demands facing officers. Such a focus has not provided clarity because it is not the particular characteristics of a situation, but the process of evaluating and coping with it, that determines whether stress will be experienced.

a time when the term "stress" was *not* a part of our daily vocabulary. Yet, use of the term in the behavioral and social sciences, despite its current ubiquity, is fairly modern.

The Bio-physiological Origin of "Stress"

It is likely the word "stress" ultimately derives from the Latin "*strictus*," which means "to narrow" or "to draw tight" (Stress, n.d.). However, the term as it is popularly understood today was not coined until the 1930s. Physiologist Walter Cannon (1932) used it in his publication on "stable states of the organism" to refer to external factors that disrupt homeostasis. But it was Hans Selye, a Canadian endocrinologist and contemporary of Cannon's, who began to use the term to refer not only to the "nocuous agents" that stimulate an organism, but also to the state or condition of the organism as it responds and adapts to its environment. Selye would later differentiate those "nocuous agents" as *stressors* and the state of the organism in response to those agents as *stress*, and it is this terminology that will be used in the current study.[7]

Selye's "General Adaptation Syndrome"

Selye (1936) described the process of an organism's response to "nocuous agents" (*i.e.*, stressors) as a "general adaptation syndrome," consisting of three stages. The "alarm" stage is first, and is a brief period of increased autonomic activity in response to the newly-identified or realized stressor. This is, in essence, the activation of Cannon's (1932) so-called "fight-or-flight" response and is described by Selye (1936) as "the expression of a general alarm of the organism when suddenly confronted with a critical situation." If the stressor persists, the organism moves into the "resistance" stage where there is an attempt to find some means of coping with, or adapting to, the demands of the environment. During the latter part of this stage,

[7] The terms "stress" and "strain" are sometimes used interchangeably in the behavioral sciences. However, as structural engineers would be quick to point out, the two are not the same. "Stress," as described above, is a condition or process. "Strain," on the other hand, is the [psycho-physiological] response to that condition (Strain, n.d.). This distinction will be recognized throughout the current study.

the organism's physiological responses may return to levels similar to those exhibited pre-alarm stage. However, if the stressor persists, the body's resources are eventually depleted and the organism will enter the "exhaustion" stage where the body is unable to maintain normal function. Early in this third and final stage, autonomic nervous system responses that characterize the alarm stage may briefly reappear – almost as if the body is making a "last ditch" effort to fight off or flee from the stressor. However, these responses will again disappear with persistent exposure to the stressor, and if the exhaustion stage is extended, long-term damage to the adrenal and immune systems may result. The impairment of these systems can, in turn, result in a variety of pathologies, both physical and mental.

Eustress vs. distress

During a research career spanning half a century, Selye would come to be recognized as not only the pioneer of research on the biological effects of exposure to stressful stimuli, but also one of the most prolific and influential on-going contributors to the field. It was in some of his later work that Selye (1974) refined the concept of "stress" by dividing it into "eustress" and "distress."

Eustress, according to Selye's (1974) model, exists when the stress condition, rather than being harmful to the organism, actually enhances function. Examples of eustress might include strength training or the successful completion of challenging work. On the other hand, persistent stress that is not resolved through coping or adaptation and that may lead to dysfunction, he termed *distress.* There is recognition among stress researchers that a complete absence of eustress can be as detrimental as high levels of distress (*e.g.*, Reiser, 1975). However, many, if not most, popular discussions of stress are, according to Selye's (1974) model, actually referring

to distress. Therefore, unless otherwise stated, "stress," as used in the current study may be assumed to refer to distress.

Selye's work was instrumental in helping researchers understand the process whereby stressful stimuli result in physiological symptoms – and in identifying those signs and symptoms of unresolved stress. However, the experience of stress is largely a psychological phenomenon, and no discussion of stress is complete without an acknowledgement of the crucial and complex role that individual perception plays in shaping appraisals of events as stressful or not.

Individual Perception and the Experience of Stress

It is an individual's perception of a situation that determines whether or not the event will be "stressful." Lazarus and Folkman (1984) outline a process whereby situations are cognitively appraised as potentially constituting a threat, harm or loss, as challenging (*i.e.,* manageable and potentially eustress-producing), or as benign. The process, which is, according to the authors, itself influenced by both person and environmental factors, begins with a "primary appraisal" that essentially addresses the question, "If left unaltered, will this situation or demand likely result in some negative consequence to me?"[8] The negative consequence might be a direct harm or loss or it might be missing out on some positive reward. If the situation or demand is appraised as anything other than benign, then at least one of two types of coping processes is triggered:

- "problem-focused" coping, which is directed at managing the problem itself, or

[8] This is not meant to imply that the appraisal takes place at a fully conscious level. To the contrary, the process of cognitive appraisal, though complex, may happen very quickly and at an entirely sub-conscious level.

- "emotion-focused" coping, which is directed at managing the negative emotions associated with the problem[9]

The selection of coping strategies is tied closely with the "secondary appraisal." This is the part of the cognitive appraisal process whereby the individual evaluates the adequacy of the resources available to cope with the problem identified through the primary appraisal. The outcome of the secondary appraisal may, in turn, alter the primary appraisal. If resources are adequate, then the situation may be "re-appraised" as challenging or benign. On the other hand, if resources are inadequate, an otherwise-challenging or benign event might be reappraised as stressful. In other words, perception of an event as stressful is made in light of not only the characteristics of the event itself, but also the availability of resources to cope with it (either in a direct, "problem-focused" or an indirect, "emotion-focused" way).[10]

In the field of occupational stress, Karasek (1979) adds the importance of "decision latitude," (alternatively coined "authority" or "control") in shaping cognitive appraisals. Specifically, an individual may not have (or may not perceive having) the *authority* to alter a given situation regardless of the adequacy of resources available to do so, and this, too, can result in stress.

Coping

As described above, "coping" plays a pivotal role in the cognitive appraisal of potentially stressful stimuli. There is also the possibility that coping strategies may become a source of stress themselves, as "coping" merely refers to one's attempts to manage a situation, but does not necessarily imply a positive outcome (Kleinke, 2002). For example, excessive drinking or drug

[9] Siegrist (1996) points out that the development of the negative emotions is also not necessarily a conscious process, especially if the circumstances giving rise to them (which he attributes to an effort-reward imbalance) are "chronically recurrent everyday experience[s]." (p. 31)

[10] Aldwin (2007) asserts that coping is also flexible in that the individual generally evaluates the effectiveness of a particular coping strategy on the situation and will change strategies if the desired effect is not being achieved.

use may be utilized as emotion-focused coping strategies, but they are likely to create an entirely new set of stressors while still not alleviating the circumstances which were the source of stress in the first place. Clearly, perception about the adequacy of coping resources and the selection of coping strategies are central to the development of perceived stress; therefore, individual differences in coping must also be considered in any thorough attempt to understand stress.

Summary of the Stress Appraisal Process

McGrath (1976) draws on the work of the authors mentioned above and others to provide perhaps the most succinct and comprehensive working definition of stress:

> There is a potential for stress when an environmental situation is *perceived* as presenting a *demand* which threatens to exceed the person's *capabilities and resources* for meeting it, under conditions where he *expects* a substantial differential in the *rewards and costs* from meeting the demand versus [*failing* to meet] it. (p. 1352, italics added)

It is this understanding of stress appraisal that provides the theoretical backdrop against which this dissertation is set. A more comprehensive discussion of models of occupational stress, specifically, will follow in Chapter 2.

The Current Study

As Cooper (1986) states:

> The process of appraisal puts the emphasis on *perceived* demands, *perceived* capability, and *perceived* consequences if demands are not met. Thus, no listing of objective, situationally-specific stress stimuli is likely to be satisfactory in itself because stress is the result of a situation having a certain meaning to an individual as well as a subjective evaluation of the resources for coping with it. (p. 26)

Thus, the questions of interest for the current study become:

1) "Among studies of police officers, which demands have been most *likely* to result in perceived stress?" and,

2) "What is the *relative strength* of specific individual, organizational, system, community, and macro-level *influences* on the stress appraisal process, as revealed by previous studies of police officers?"

To reiterate, it is the purpose of the current study to address these questions by categorizing and comparing the correlates of perceived stress among police officers via a meta-analytic review of previous studies of the subject. In the long-term, this may provide guidance in the development of prevention/intervention strategies.[11]

Summary and Outline of the Dissertation

The current chapter has presented the problem of an inconsistent and often contradictory body of police stress research. It has described the historical development of that body of research as well as the evolution of the concept of stress. Finally, it has stated the purpose of the current study. Chapter 2 will provide a detailed narrative review of the literature on police stress and propose a new integrative model of stress and coping as a theoretical background against which police stress research might be interpreted and future research might be conducted. Chapter 3 will describe the methodology by which the current meta-analysis was conducted. Chapter 4 will present the results of the current study. Finally, Chapter 5 will discuss the implications of the current study and suggest avenues for future research in the field of police stress.

[11] If patterns among correlates exist, they can direct future (perhaps more refined) research. The long-term implication may be that stress management programs can better be tailored to certain individuals or limited resources may be directed to areas where they can have the greatest positive impact.

CHAPTER 2:
LITERATURE REVIEW

The current chapter will introduce an original model of stress and coping, drawing on theoretical work from the field of occupational stress. The limitations of the research in the field of police stress, largely due to the lack of any such guiding model, will then be discussed. Next will follow a discussion of the common correlates of police stress (organized by the individual, organizational, system, community, and macro-levels) as identified by the extant literature. The evidence concerning each correlate will be prefaced with a statement about how we would expect it to be incorporated in the integrative model of stress and coping presented earlier in the chapter.

Models of Occupational Stress

Unfortunately, a limitation common among many studies of police occupational stress is that they have been conducted without the benefit of a clearly-stated theoretical framework (Abdollahi, 2002).[1] That said, several studies have at least indirectly been informed by one of three models of occupational stress (each of which has received substantial attention and empirical support in that broader field). They are: the person-environment fit model (French *et al.*, 1982), the demand-control-support model (Karasek, 1979; Johnson & Hall, 1988; Karasek & Theorell, 1990), and the effort-reward imbalance model (Siegrist, 1996). A brief description of each will follow as an introduction to a new, integrative model being proposed here.

Person-Environment Fit

French *et al.* (1982) describe occupational stress as the "lack of accommodation [fit] between the demands of the employee and those of their organization" (p. 1). Muchinsky and Monahan (1987) extended the work of French *et al.* by identifying two different forms of fit:

[1] There are exceptions, such as Lawrence (1984), but these are notable for their rarity.

complementary and supplementary. Complementary fit refers to the environment apart from its inhabitants and has most often been assessed as the fit between demands and abilities or needs and satisfaction. Measures of demand-abilities fit tend to be objective, focusing on specific job tasks and the knowledge, skills, and abilities of the employee to meet them. Needs-satisfaction fit utilizes subjective measures, as it focuses on the degree to which employees' needs, desires, or preferences are met by the jobs they perform. Supplementary fit defines the environment according to the people who inhabit it, and has most often been assessed using measures of similarities among or between individual employees and their co-workers, supervisors, or the organization as a whole along dimensions of demographics, values/beliefs, or goals.[2] Regardless of the type of measure used, P-E fit emphasizes the degree of compatibility between an individual and a work environment. According to this model, the less the compatibility, the more likely the individual will experience stress.[3]

Demand-Control-Support

In 1979, Karasek introduced a model of job strain[4] that attempted to draw upon and clarify the often-contradictory findings in the disparate job demands-strain and job decision latitude-strain literatures. Using nationally representative data from workers in both Sweden and the United States, including longitudinal data from the Swedish subset, Karasek presented evidence that mental strain results from the interaction of job demands and decision latitude. His most consistent finding was that low decision latitude and heavy job demands predicted mental strain. Karasek's study was particularly influential for several reasons: it was a well-designed study that included nationally-representative samples from two industrialized countries and some longitudinal analysis; it used both objective and subjective outcome measures; and it found a

[2] For a fairly recent meta-analytic review of P-E fit, see Kristof-Brown *et al.* (2005).
[3] This is very similar to Festinger's (1957) explanation of "cognitive dissonance."
[4] Karasek's use of "strain" is synonymous with "stress" as we have been using the term here.

strong relationship between job dissatisfaction and overall life dissatisfaction. However, the study was also limited in some important ways. Specifically, Karasek failed to consider the impact of social relations at the group and organizational level and the impact of individual differences in perception of job demands. Johnson and Hall (1988) extended the model to account for the impact of social support. The resulting demand-control-support model allows for the possibility that inadequate social support (often termed "isolation") can interact with demands and control to produce more negative outcomes (*i.e.,* stress). On the other hand, the strong social support of colleagues can be a resource that acts to buffer job demands. According to this model, individuals experiencing high demands under conditions of low control and low social support are the most likely to experience job stress.

Effort-Reward Imbalance

Siegrist (1996) introduced his effort-reward imbalance model in an attempt to address what he saw as limitations of the two models described above. Specifically, if an individual is "misfit" with his/her work environment, why not simply adapt by altering either the situation itself or the individual's response to it? The answer, Siegrist claimed, was related to the definition of the "control" element of the demand-control-support model. By treating "control" primarily as an objective measure of scope of authority/resources, the model failed to take into consideration individual differences in perception and motivation that might preclude an individual from being able to either alter a situation or adequately cope with it. According to Siegrist's model:

> [T]he work role in adult life defines a crucial link between self-regulatory functions such as self-esteem and self-efficacy and the social opportunity structure. In particular, the availability of an occupational status is associated with recurrent options of contributing and performing, of being rewarded or esteemed, and of belonging to some significant group (*e.g.,* work colleagues). Yet these potentially beneficial effects of the work role on emotional and motivational self-regulation are contingent on a basic prerequisite of

> exchange in social life, that is, reciprocity. Effort at work is spent as part of a socially organized exchange process to which society at large contributes in terms of rewards. Societal rewards are distributed by three transmitter systems to the working populations: money, esteem, and status control…The model of effort-reward imbalance claims that lack of reciprocity between costs and gains (*i.e.,* high-cost/low-gain conditions), define a state of emotional distress with special propensity to autonomic arousal and associated strain reactions. (pp. 29-30)

Siegrist identified two sources of effort: extrinsic (*i.e.,* the objective requirements of the job) and intrinsic, which he describes as "the motivations of the individual worker in a demanding situation" (p. 30). These motivations, he proposed, arise from "those personal characteristics that influence the perception of and the search for control" (p. 29). In related work, Matschinger *et al.* (1986) and Siegrist and Matschinger (1989) define the concept "need for control" - later termed "overcommitment" by Siegrist *et al.* (2004) - as a distinct individual pattern of coping with work demands based on Type A behaviors which had already long been associated with stress vulnerability in the medical field (Friedman & Rosenman, 1959). In the effort-reward imbalance model, perception regarding the ability of the individual to produce the amount of effort required to elicit the expected reward may be systematically influenced by the individual's need for control (*i.e.,* personality characteristics).[5]

An Integrative Model of Occupational Stress and Coping

Each of the three models described above makes unique and valuable contributions to the conceptualization of the stress and coping process.[6] Furthermore, empirical evidence has been found in support of elements of each model.[7] Therefore, it is expected that a more holistic model which integrates the unique elements of each of these three models would provide the most

[5] This model draws on a long history of psychological research that recognizes individual differences in motivation (*e.g.,* McGregor, 1960).
[6] "Stress and coping" is intentionally treated as one process here, given that stress is appraised in light of coping resources.
[7] For reviews see: Ahmad, 2010 (person-environment fit); van der Doef & Maes, 1999 (demand-control-support); van Vegchel *et al.*, 2005 (effort-reward imbalance).

comprehensive platform from which to understand the existing body of police stress research (as examined here via meta-analysis) and from which to guide future inquiries.[8]

The Environmental Situation

Most conceptualizations of the stress and coping process start with what researchers call a "stressor" or "demand." However, to automatically label a given environmental situation as constituting a demand is to make the *a-priori* assumption that the cognitive appraisal process will evaluate the situation as such. Yet, cognitive appraisal might result in the situation being classified as "benign," and thus, not a demand at all. Therefore, it is more appropriate to avoid value-laden labels at the start and simply acknowledge that any given "environmental situation" has the potential to present a demand. A true demand, then, would be anything in an individual's environmental situation that, if not altered, has the potential to result in a direct harm or loss to the individual or in the lost opportunity for reward.

Cognitive Appraisal

Primary Appraisal. The process of cognitive appraisal begins with the primary appraisal, which evaluates the environmental situation in light of two questions, the first of which is: Would failure to alter the situation result in a negative (harm/loss)? [9] This is a fairly straightforward acknowledgement of the negative consequence element of the process of cognitive appraisal presented by Lazarus and Folkman (1984) except that "threat" is not listed as a separate potential consequence. The argument made here is that "threat" is implied in the need

[8] Though the focus of the current study is police stress, the proposed model describes the process of evaluation and appraisal of any situation and could be applied to any occupational or non-occupational subject.

[9] For simplification, the model is set up based on "yes-no" responses to a series of questions. However, the author does not mean to imply these are discrete variables. Rather, these are continuous variables, with responses based on evaluation of the answers as *more or less likely*. Also, it is important to note these evaluations often (if not usually) take place on a sub-conscious level.

for a cognitive appraisal. It is the *threat of* harm or loss that is being evaluated. Any harm or loss that has already been sustained is part of the situation being evaluated.

The second question simultaneously being addressed during primary appraisal is: Would failure to alter the situation result in a lost opportunity for reward? This question deals with both the "challenge" element of the cognitive appraisal model as presented by Lazarus and Folkman (1984) and the implied effort-reward calculation element of Siegrist's (1996) model. An environmental situation would be labeled a "challenge" – something with the potential to result in eustress – if the effort-reward calculation leads to an expectation that a reasonable expenditure of effort on the part of the individual would likely lead to some reward desirable enough to have made the effort worthwhile.

If the answer to both of the above questions is "no," then the environmental situation will be evaluated as benign (*i.e.*, there is no demand after all). If the answer to either or both of the above questions is "yes," then the environmental situation constitutes a demand and a secondary appraisal occurs.

Secondary Appraisal. This process evaluates both the "capabilities and resources" included in McGrath's (1976) working definition of stress. It begins with the question of control: Do I have control adequate to meet the demand? This question might be answered objectively or subjectively. Objectively, laws or rules may deny an individual the *authority* to exercise control over a given situation. This refers to the "decision latitude" element first introduced by Karasek (1979) and later incorporated in the "control" portion of the demand-control-support model (Johnson & Hall, 1988; Karasek & Theorell, 1990). Subjectively, an individual might not perceive the *ability* to influence the situation to the degree necessary to affect the desired change - irrespective of the individual's objective scope of authority. This perception might exist for a

number of reasons. First, the individual might not (objectively) possess the skills which would be necessary to control the situation. Several studies of the demand-control support model have begun to measure "control" along these two distinct dimensions – decision latitude as mentioned above and skill discretion. Yet it is argued here that skill discretion is to some degree subjective (in that even an individual who possesses adequate skills might not perceive himself as doing so). It is further argued that this assessment is really one of resource availability, as discussed below.[10] A second reason an individual might not evaluate himself as having adequate control is because he possesses personality characteristics which systematically shape appraisal in a negative way. In the field of personality psychology, several characteristics have been linked with increased stress vulnerability. These include: external locus of control, certain dimensions of Type A behavior pattern (specifically, the dimensions of aggression, hard-driving, and eagerness-energy),[11] and certain of the so-called "Big Five" personality traits (specifically, Neuroticism). It is argued here that individuals who possess these specific personality characteristics or traits are more vulnerable to stress because they are either less likely to believe they posses control over life's circumstances generally or because they have a need for control to such a high degree that it consistently outweighs available resources (as discussed below). However the question of control is evaluated (*i.e.,* objectively, subjectively or both), if the answer is "no," then emotion-focused coping becomes the only method of coping available.

The second question – Do I have the resources adequate to meet the demand? – evaluates the availability of resources for both problem- and emotion-focused coping. Resources might include those internal to the individual, such as perceived knowledge, skills, or abilities gained

[10] While questions of control and resource adequacy are clearly related (and likely take place almost simultaneously), it is possible that conflicting findings related to the "control" element of the job demand-control-support model exist because of this lack of specificity (van der Doef & Maes, 1999).

[11] For a recent, longitudinal analysis of the impact of Type A dimensions of a variety of outcomes, including work stress, see Hintsa *et al.*, 2010.

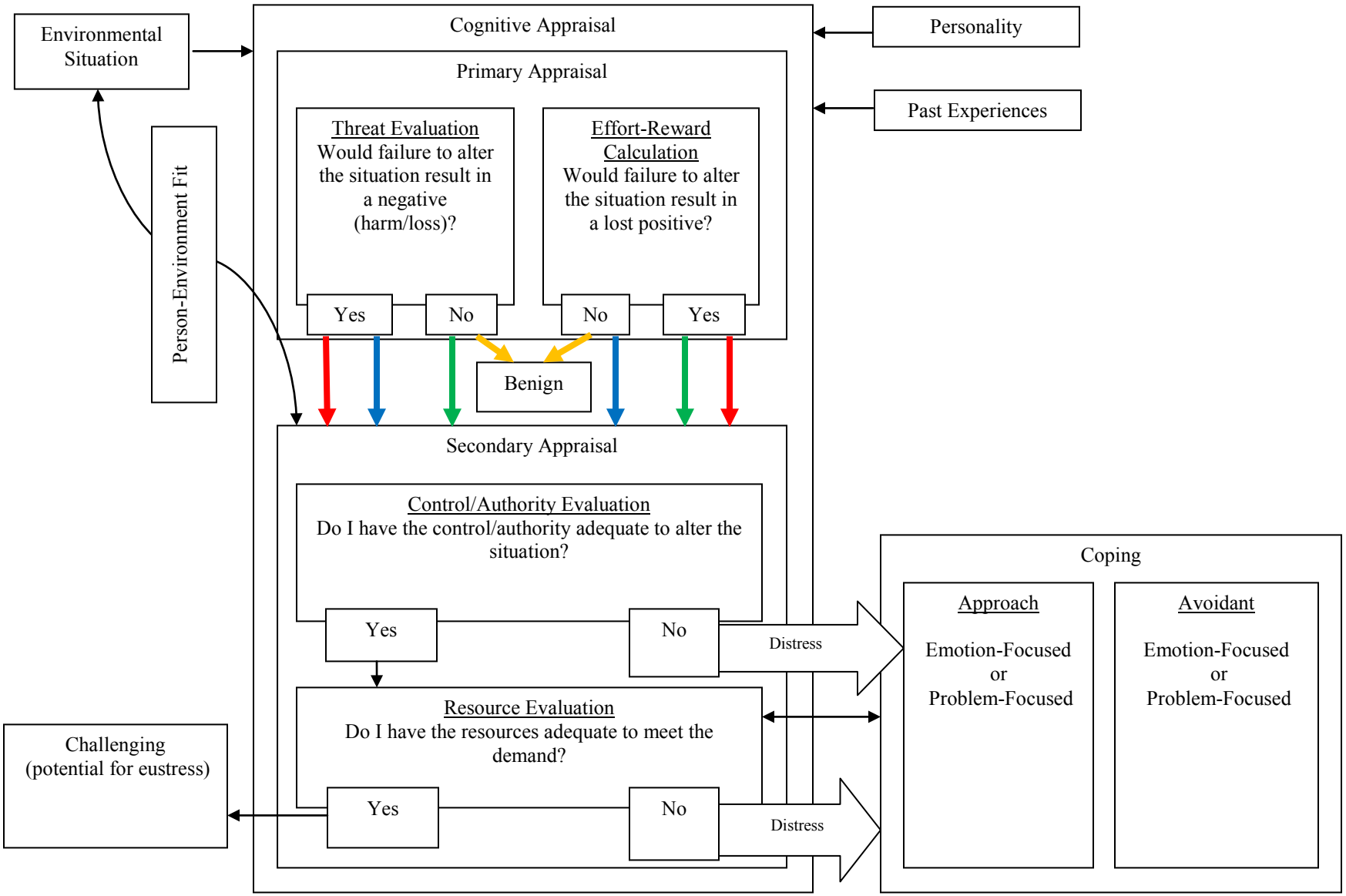
through the benefit of education, training, or previous experience. They might also include those external to the individual (either tangible or not) such as equipment, supplies, or social support. Regardless of the type or source, if the individual perceives having adequate control, but inadequate resources, then stress occurs. Alternatively, if the individual perceives having adequate resources to employ problem-focused coping, but no authority to do so, stress will also occur. It is only when the individual perceives having both the control and the resources adequate to cope with the demand that it will be appraised as challenging (with the potential for eustress) or re-appraised as benign.

Coping. In addition to being classified according to focus (problem vs. emotion), coping strategies can be classified as "approach" or "avoidant."[12] Approach strategies are generally considered healthy, as they attempt to address problems or emotions head-on. Avoidant strategies are not generally considered healthy[13], as they are used to simply escape problems or emotions, sometimes to the point of denying their existence. The selection of coping strategies (and the degree of success realized through their utilization) can alter the primary appraisal of the demands which initially gave rise to the coping or can create new demands. Further, some argue that tendencies toward the selection of certain styles of coping are themselves shaped by personality traits (see Lazarus & Folkman, 1984, for a discussion of this issue).

Person-Environment Fit. Clearly, the appraisal process is heavily influenced by personal characteristics and experiences which shape perception, as described above. The degree to which the capabilities and expectations of the individual allow for meeting the demands and expectations of the organization (and *vice-versa*) is a measure of the person-environment fit

[12] For an excellent review of the history and development of the "coping" concept, see Lazarus & Folk man (1984).
[13] Some argue that avoiding a problem can be a healthy way of coping, especially if there are no other means of dealing with it. However, avoiding the negative emotions associated with a problem is not considered healthy, except in those rare situations where the psyche is too fragile to deal with them, in which case denial or suppression might be a necessary defense mechanism.

Figure 2.1. An Integrative Model of Occupational Stress and Coping



(French *et al*., 1982). To the extent that individual characteristics and experiences systematically influence the individual's perception of his or her capabilities and/or resources as inadequate, regardless of objective measures, the individual will not be a good fit with the organization (or at least his or her specific assignment within the organization). To the extent that the demands of the organization are driven by operational requirements (and thus, unalterable), the individual may not be a good fit with the occupation as a whole, particularly if the act of meeting those demands does not fulfill some need or desire within the individual. However, if the individual's perceived capabilities or access to resources or rewards can be altered through awareness or training, the misfit may be addressed.

Limitations of Prior Police Stress Research

Collectively, the extant body of police stress research suffers from several limitations, including: lack of theoretical guidance, inconsistency in measurement of outcome and predictor variables, over-reliance on null-hypothesis significance testing for interpretation of data, and poor methodological rigor (with most studies being cross-sectional and non-experimental in design). A more in-depth discussion of these issues follows.

Atheoretical Approach

Reviews of studies of police occupational stress reveal that many have been conducted without the benefit of a clearly-stated theoretical framework (Abdollahi, 2002) such as that presented above. Zhao *et al.* (2003) state, "To the authors' best knowledge, there has not been a unified theory that is developed to explain police stress. Instead, multiple theories derived from different disciplines (*e.g.,* management and psychology) are commonly used to generate hypotheses and develop measures for testing the utility of these predictors." The authors then go on to say that literature on police socialization and social support would "likely suggest that there could be a

differential impact" of the independent variable they chose to study (marital status) on police occupational stress (pp. 28-29). The problem with these atheoretical studies is they too often fail to treat stress as a transactional construct - an ongoing interaction between the objective environment and the person's subjective experience of, and response to, that environment (McGrath, 1970; Toch, 2002; Zhao *et al.*, 2002). Rather, "researchers have assumed that stressful demands [are] common to all individuals experiencing the event," (Anshel *et al.*, 1997). This, in spite of the fact it has been theorized that certain dangerous aspects of the work which have been assumed to produce distress may actually be sought after by officers as noble and/or stimulating aspects of the profession (Jermier *et al.*, 1989; Gist & Woodall, 2000; Dunning, 2003; Newman & Rucker-Reed, 2004; Storch & Panzarella, 1996) or that challenging events may be viewed as potential for mastery and achievement (Alexander *et al,* 1993), thus producing eustress as opposed to distress. This assumption - that "stressfulness" rests largely in the nature of circumstances themselves – coupled with the prevailing notion that the occupation of policing is uniquely characterized by such stressful circumstances, has led researchers to emphasize potential sources of police stress while ignoring individual differences in stress vulnerability and in coping styles.[1]

As such, the bulk of the extant police stress research in recent years has focused on comparing the relative strength of those stressors that have been classified as "organizational" with those that are "operational" (Hart, Wearing, & Headey, 1993; McCreary & Thompson, 2006; Buker & Weicko, 2007). According to this dichotomy, organizational stressors are related to the work environment and are stressors which might be found in a variety of organizations. They include such things as shift work, working long hours, and having little input in decision-

[1] This criticism is not unique to research in policing. In a discussion of occupational stress research, generally, Hintsa *et al.* (2010) point out that "individual differences in work stress are largely ignored because work stress is considered to originate mainly from work." (p. 6).

making (*e.g.,* Slate, Johnson, & Colbert, 2007). Many such stressors have been identified (Berg *et al*., 2005; Biggam *et al*., 1997a; Collins & Gibbs, 2003; Deschamps *et al*., 2003; Noblet *et al*., 2009b; Violanti & Aron, 19995) and categorized (Brown & Campbell, 1994; Violanti & Aron, 1995), revealing strong support for the independent and additive effects of job demand, control, and support on stress levels among police officers (Morash *et al*., 2006; Mostert & Rothmann, 2006; Noblet *et al*., 2009a; Violanti *et al*., 1985).[1] Operational stressors – those stressors that are considered unique to the operation of policing – have also been identified and are oft-cited by police officers themselves as highly stress-inducing (if rare in occurrence). These include such things as:

- having to fire a weapon or investigate the victimization of a child (Huddleston, Stephens, & Paton, 2007; Malach-Pines & Keinan, 2007),
- coping with the death or injury of a fellow officer in the line of duty (Finn & Tomz, 1997; Gershon, Lin, & Li, 2002; Jermier, Gaines, & McIntosh, 1989; Violanti & Aron, 1994) and
- responding to the threat of terrorism (Dowling *et al.,* 2006; Paton & Violanti, 1997; Paton & Smith, 1996).

While both organizational and operational stressors have been identified in policing, the bulk of research indicates organizational stressors are more prevalent than operational stressors (Biggam *et al*., 1997a; Brough, 2004; Brown & Campbell, 1990; Brown, Cooper, & Kirkcaldy, 1996; Davidson & Veno, 1980; Gershon *et al*., 2009; Hart, Wearing, & Headey, 1993).[2] This suggests most of the *commonly-occurring* events perceived as distressing by police officers are,

[1] This finding is consistent with Karasek's and Theorell's (1990) model of stress and with research in various non-police populations (De Lange *et al.*, 2003; Grosch & Sauter, 2005; Hurrell & Aristeguieta, 2005; Murphy & Sauter, 2004; Quick, Quick, Nelson, & Hurrell, 1997).

[2] In fact, his review of the extant literature led Toch (2002) to state, "…it has become painfully obvious that stress-related concerns of police officers are disproportionately organizational…"

in fact, *not* unique to the occupation, despite the tendency to emphasize stress as a definitive feature of the profession (Terry, 1985).[3] However, there is a need to take into account both intensity and frequency when considering the impact of job stressors, both within and across the operational/organizational categories (Speilberger *et al.*, 2003). Haddock (1988), for example, found "exposure to dead or battered children" the highest ranked job stressor among police officers when ranked by intensity alone; however, when weighted by frequency of occurrence, "dealing with family disputes and crises situations" emerged as the highest ranked stressor (p. iv). More recent studies (*e.g.,* Berg *et al.*, 2005) have found similar disparities in outcomes in the ranking of stressors when considering intensity versus frequency measures. Biggam *et al.* (1997a) also suggest the issue of chronicity may be confounding the entire organizational/operational distinction. Yet, despite these findings, many studies still fail to consider the impact of intensity versus frequency measures on study outcomes.

This narrow focus on an organizational/operational dichotomy – including all the challenges therein - has limited our understanding of police stress by largely ignoring (or at least not attempting to directly test) any guiding theory of stress and the individual differences in perception such a theory would likely emphasize. As a result, these studies have added in quantity to an already large, and often conflicting, body of research without meaningfully advancing the field.

Inconsistency of Measurement

Largely due to the lack of guiding theory, "stress" as an outcome has been measured a variety of different ways. For example, some studies have used frequency measures of exposure

[3] Crank and Caldero (1991) found that police officers themselves overwhelmingly reported organizational over operational sources of stress when asked the open-ended question, "what do you think is your greatest source of stress and why?"

to specific events as proxy measures of stress itself, again, completely ignoring individual variations in perception. However, most often, researchers have used one of two approaches to measuring stress: 1) directly, via *self-reported perceptions of stress* or 2) indirectly, via *other outcomes theoretically attributable to stress*. Those who have taken the latter approach have used a variety of proxy measures, including physiological outcomes (*e.g.*, blood pressure, heart rate, breathing rate, sweating), health outcomes (*e.g.*, heart disease, high blood pressure, diabetes, obesity, gastrointestinal illnesses, sleep disorders), emotional outcomes (*e.g.*, anger, anxiety, depression, fear, emotional exhaustion, job satisfaction), behavioral outcomes (*e.g.*, alcoholism, drug abuse, domestic violence, smoking, eating patterns), and job performance outcomes (*e.g.*, use of force, citizen complaints, absenteeism).[4] Some researchers have even used measures of burnout, Post-Traumatic Stress Disorder (PTSD), and suicide ideation as proxies for stress. However, Selye's General Adaptation Syndrome would indicate some of these proxy measures (*e.g.*, physiological outcomes) may or may not be in evidence depending on the phase during which measures are taken.[5] Further, many others of these proxy measures are only *potential* outcomes that *may* appear if the stressful conditions are not successfully attended to over the long-term.[6] Finally, while there are clearly links between the experience of stressful conditions and the experience of many of these outcomes, job stress is by no means their only potential cause. Therefore, one cannot conclude with confidence that studies of stress which utilize the two different types of measures (direct vs. indirect) are actually measuring the same construct. Furthermore, even among studies of one category or the other (*i.e.*, perceptions versus

[4] For a fairly recent review of the literature, see Abdollahi (2002).
[5] For example, Witteveen *et al.* (2010) report an inconsistent association between traumatic exposure and cortisol production among police officers.
[6] This statement is not intended to imply that there are not good proxy measures of stress; rather, that there is a variety of proxy measures which ought not necessarily be combined in one meta-analytic study because they may not be consistently present across subjects and time.

physiological reactions), no single measurement instrument has emerged as standard, and many of those that are used were created and validated using predominantly White male samples. [7] Also, much of the research has not determined the sources of stress and the experience of stress in the same study (*i.e.,* they have asked officers about the stressfulness of specific events without ensuring the officers had actually experienced those events).[8] Thus, rating scales of work stress have often been implied rather than actually measured (Glowinkowski & Cooper, 1985). Finally, some studies (*e.g.,* LeBlanc *et al.*, 2008; Arnetz *et al.,* 2009) have measured exposure and outcomes in the same study, but exposure was only to *simulated* incidents.

Influences. In the absence of a theory of *police stress,* specifically, the selection of independent variables for study "often appears to be based on personal knowledge and hunches about policing rather than on empirical methods…or on deduction from organizational or psychological theory" (Morash & Haarr, 1995, p. 116) or because they are "variables of interest to scholars of police [fill in the blank with any sub-discipline]" (Crank *et al.,* 1995, p. 156). As a result, many of the "commonly accepted police stressors" (Buker & Wiecko, 2007, p. 292) have been identified by other (also atheoretical) police stress studies. This has also given rise to a common assumption that the independent variables under study have linear relationships with outcome measures despite substantial evidence from the field of general work stress research (*e.g.,* War, 1990; Fletcher & Jones, 1993; De Jong & Schaufeli, 1998; Rydstedt *et al.*, 2006) that this is not always the case.

[7] See Daly & Chesney-Lind (1988) and Morash & Greene (1986) for criticisms of this fact within the field of criminal justice and criminology, generally.

[8] Gudjonsson & Adlam (1985) contend this is a limitation of stress research because it introduces an element of error by asking individuals to predict how they would respond to certain events instead of measuring actual responses. On the other hand, as Cullen *et al.* (1983) point out, it is not always actual exposure to [dangerous] events, but the perception that there is always the (largely unpredictable) potential for them to occur, that creates stress.

The inclusion of too many predictors – which often happens when researchers are not guided by a specific theory, but are taking a "let's throw it all against the wall and see what sticks" approach, also increases the likelihood of the confounding of variables, especially if measurement instruments lack precision, which is often the case when scholars use instruments created for or validated on populations other than the population they are studying. In fact, Antoniou (2009) argues that stress and coping research needs to use organization-specific context measures, a position supported by the work of Sparks and Cooper (1999) and Berg *et al.* (2005). Yet many studies of police stress either use measures created for non-police organizations or a measure modified or uniquely created for the specific study, but often not one that is then validated and refined through continued use by other police researchers.

Over-reliance on Null-Hypothesis Significance Testing

The near-total reliance on null-hypothesis significance testing (NHST) for the interpretation of data means that many police stress studies treat only "significant" findings as "important" findings and imply, at least, that relationships which obtain higher levels of significance are substantively more important or larger in magnitude than relationships which fail to obtain significance at a certain level of probability (*e.g.,* .05, .01, .001).[9] This distinction is more than merely semantic; NHST does not provide the magnitude of a result nor any information regarding the precision of the estimation of the effect size. It is, as Gendreau and Smith (2007) state, "an atavistic, dichotomous (yes-no) form of reasoning, which is uninformative." As its name indicates, the null hypothesis test was created as a test of the null hypothesis – not the research hypothesis. What we, as researchers, want to know is, given our data, what is the probability that the null hypothesis is true? (This is, in fact, what many

[9] For specific examples of this within police stress studies, see Morash, Haarr, & Kwak (2006); Slate *et al.* (2007); and especially Zhao *et al.* (2002).

researchers believe NHST will tell us). In reality, NHST tells us the probability of obtaining our data (or more extreme data), given that the null hypothesis *is* true (Cohen, 1994). These are two very different things. Add to this the fact that most researchers carefully design their studies in hopes of finding significance for their research hypotheses (confirmatory studies), as opposed to directly testing the null hypothesis (debunking studies), and we realize that the null hypothesis is rarely true. Therefore, the NHST is rarely capable of giving researchers the information we seek.

Another problem with the use of NHST is that the test focuses heavily on controlling for Type I errors (rejecting the null hypothesis when it is, in fact, true), but fails to control for Type II errors (retaining the null hypothesis when it is false). This is a fact that many researchers misunderstand. The misconception is often that if the level of significance is set, for example, at $p < .05$, then the error rate is 5%. However, that refers to the Type I error rate. Empirical studies have shown that when the Type II error rate is added, NHSTs have an average error rate of 60% (Sedimeier & Gigerenzer, 1989). As Hunter (1997) points out, this means that a person who flips a coin will be right more often than a person who conducts a study using NHST! No wonder traditional reviews of primary studies have found conflicting results. These facts can severely hinder knowledge accumulation in any given field (Schmidt, 1992; 1996), and have done so in the field of police stress.

Researchers could address the problem of a high Type II error rate by appropriately applying power analyses and designing their studies accordingly. However, power analyses are rarely to be found in primary studies of police stress (perhaps because so many researchers do not understand the need for them when using NHST), and even if the "magic" sample size were calculated, many researchers simply would not have the resources to collect the sample needed,

which leads us to a discussion of the following limitation common among studies of police stress: poor methodological design.

Variable Rigor of Methodological Design

Most of the research on police stress has been cross-sectional and non-experimental in design. Many studies have relied on small sample sizes (often due to low response rates), usually taken from within one organization, and often with little variability in theoretically-important factors. Also, samples have most often been of currently-active police officers, which may mean we are studying only those who have been most successful in coping with the stress of the job. Including those who have left the job would likely be informative, yet this has not been done. Finally, several studies (*e.g.,* LeBlanc *et al.*, 2008; Arnetz *et al.,* 2009) have measured responses to simulated events only, which some authors (*e.g.,* Lazarus and Folkman, 1984; Larsson *et al.,* 1988) argue is an inferior approach because the consequence of failure is such an important factor in shaping stress appraisal.

Organizing Police Stress Research

Given the lack of theory common to most studies of police stress and the inconsistent methods of selecting variables for study, a review of the extant research reveals a plethora of variables that have been analyzed as potential influences on police stress; the following section will review only those correlates most theoretically-relevant and commonly included in the extant research. The discussion will be organized according to individual, organizational, system, community, and macro-levels of influence. For each correlate, a statement about how it would be expected to influence stress appraisal according to the integrative model presented earlier will be provided. Yet, before proceeding with that discussion, a note about operational violence is necessary.

The contention that policing is uniquely stressful and the subsequent focus on comparing operational versus organizational sources of stress rests in the notion that day-to-day police duties consist of violence (Terry, 1981; Malloy & Mays, 1984), as defined by Lennings (1997):

> …involvement in any activity where physical harm eventuates, where there is ill-will and an intention to harm, or where the police officer is exposed to gruesome and emotionally powerful circumstances where harm has come to others…occupationally related violence is conceived of as constituting a stressor in that even if it does not cause direct physical harm to an officer, it has an adverse (distressing) impact on the officer. The impact of violence can further be understood in terms of, first, exposure to actual situations of physical or psychological harms, and, second, perceptions of probability of exposure to violent situations…(p. 556)

No doubt, most individuals would feel some degree of stress at the experience of – or the ever-present potential of experiencing – violence. It would therefore be foolish to claim that the operational duties of policing are not stress-producing. Yet, there is clearly variation in the degree of stress those duties produce, both between individuals and in comparison with other demands, and there is even the possibility that they sometimes produce eustress (Jermier *et al.,* 1989) or mitigate some of the stress caused by organizational variables (Crank & Caldero, 1991). Therefore, operational demands will be discussed not as a *separate* issue, but as they compare and interact with other influences on perceived stress.

Individual-Level Influences

Some individual-level variables – mostly sociodemographics or those related to assignment, rank, and tenure - have long been included in studies of police stress as control variables, if not variables of primary research interest. However, a deeper understanding of the subjective nature of stress combined with the increasing diversity of police personnel and the trend toward multivariate analysis has led stress researchers to begin to more explicitly investigate the impact of individual characteristics on perceived stress. These individual-level

variables tend to cluster in four general categories: sociodemographics, differences in personality and coping styles, past experiences (especially related to previous trauma), and current situation (both occupational and extra-occupational).

Sociodemographics

Race/ethnicity and gender. Though policing is becoming increasingly more diverse, it is still an occupation dominated by White males (Bureau of Justice Statistics, 2010). In any organization, and perhaps even more so in an organization where the members must rely on each other for their physical safety, being identifiably outside of the norm can give rise to certain challenges. These challenges may include (actual or perceived) differences in experiences or in access to social support. Therefore, inasmuch as an officer's race/ethnicity or gender[10] constitutes a "misfit" with the police subculture, we might also expect differences in perceived stress (Walker, 1985; Martin, 1994; 2004). While these demographic variables are commonly included in police stress research (when there is enough variation in the sample under study to warrant doing so) the samples are often small with limited representation of *different* minority groups, and evidence concerning their impact on stress among police officers is mixed.

Several studies have found no significant differences in the overall amount of stress reported by police officers of different races (*e.g.,* Morash & Haarr, 1995) and some studies have found only low to moderate overall levels of stress among samples of minority officers (*e.g.,* Rodichok, 1995). Most studies have also found that the stress that officers experience tends to originate from similar sources, regardless of race. However, some studies do report evidence linking race/ethnicity to stress vulnerability via workplace climate. In fact, several studies have found that racial/ethnic minorities experience different workplace problems than their White counterparts (*e.g.*, Morash & Haarr, 1995; Haarr, 1997; Peak, 1997; Haarr & Morash, 1999, 2004;

[10] Sexual orientation would theoretically be included in this statement, but has rarely been studied in policing.

Bolton, 2003; Dowler, 2005) and that those differences result in increased occupational stress (Morash & Haarr, 1995; Greene & Carmen, 2002). Specifically, in some studies, racial minorities have been more likely to report feelings of social distance (Haarr, 1997), a shared perception that their opportunities for career advancement and longevity are limited (Bolton, 2003), that other officers shove work off on them (Garcia *et al.,* 2004), that they receive inadequate departmental support (Violanti & Aron, 1995), are exposed to racial slurs and harassment (Bolton, 2003), and are criticized by their peers (Dowler, 2005). On the other hand, some studies have found that White officers are *more* likely to report stress than their non-White counterparts (*e.g.,* Gershon, 2000), though the reasons for this remain unclear.

The evidence concerning sex and stress vulnerability among police officers is similarly mixed. While some studies have found that female officers do experience higher levels of stress than male officers (*e.g.,* Gershon, 2000; Burke *et al.*, 2006), several studies report no significant differences in the overall *amount* of stress experienced by gender (Koenig 1978; Frye & Greenfield, 1980; Davis, 1984; Morash & Haarr, 1995; Gershon, 2000; Laufersweiler-Dwyer & Dwyer, 2000; Garcia *et al.*, 2004; McCarty *et al.*, 2007; Burke *et al*., 2009[11]), but that female officers have *different* workplace experiences than males (Wexler & Logan, 1983; Berg *et al.*, 2005; Dowler & Arai, 2008; Kurtz, 2008; Sousa & Gauthier, 2008; Hassell & Brandl, 2009), including greater levels of sexual harassment (Gershon, 2000; National Center for Women and Policing, 2002; Collins, 2004; Wells *et al*., 2005) and other negative social interactions on the job (He, Zhao, & Archbold, 2002)[12]. Some studies (*e.g.,* Bartol *et al.*, 1992; Brown & Fielding,

[11] However, the authors did report gender differences in the selection of coping strategies, consistent with evidence from the larger body of stress research, generally (*e.g.,* Bellman, *et al.,* 2003), and with other studies of police officers, specifically, (*e.g.,* Burke *et al.*, 2009).

[12] Though evidence is scant because the subject has been so rarely studied, some research suggests that openly gay, lesbian, and bisexual officers also experience differential treatment on the job (Burke, 1994; Buhrke, 1996; Hassell & Brandl, 2009).

1993) also indicate that female officers report more stress originating from operational sources than from non-operational, though their overall level of stress is not substantially higher than that of their male counterparts. Brown and Fielding (1993) provide evidence that these differences may be related to differences in exposure (*e.g.,* males and females may be systematically assigned to duties that would result in differential exposure to certain operational stressors) or that males and females simply cope differently.[13] On the other hand, Jermier *et al.* (1989) suggest males may be more likely than females to attach a measure of positive excitement (*i.e.,* eustress) to those operational tasks with a potential for violence because such tasks affirm the stereotypically masculine police image. Finally, there is also some evidence that women may experience greater (or at least different) work-family conflict than men (He, Zhao, & Archbold, 2002; Antoniou, 2009), though again, this is not always the case (*e.g.,* Cooper & Grimley, 1983; Janzen *et al.*, 2007). Yet, in spite of the evidence that there are differences in correlates of stress by gender, several studies (*e.g.,* Bartol *et al.,* 1992; Morash & Haarr, 1995; Dowler and Arai, 2008) have found that male and female officers, in common, report job-related problems at the organizational (*e.g.,* lack of influence over day to day operations) and/or system (*e.g.,* leniency of the courts) levels as their "most important" stressors.

When considering the interaction of race/ethnicity and gender, several studies indicate the *combination* of minority and female status may be especially detrimental in shaping workplace climate (Martin, 1994; Dodge & Pogrebin, 2001; Texiera, 2002; McCarty *et al.*, 2007; Kurtz, 2008; Hassell & Brandl, 2009). Collectively, these studies seem to indicate that "token"[14] social statuses (*i.e.* being in the minority in the workplace with regard to race and gender), separately,

[13] The fact that males and females share similar job performance and evaluation measures, despite self-reported differences in the intensity of felt stress resulting from operational tasks (Bartol *et al.,* 1992), does lend credence to the notion that coping processes may mask differences in stress experiences between male and female officers.
[14] This terminology was coined by Kanter (1977) in writings about work organizations, generally.

and in combination, may indirectly influence stress by creating a more negative workplace climate. The workplace climate may then become a source of increased demands itself or may limit effective coping strategies[15] by creating feelings of isolation or a lack of social support. However, the impact of these characteristics is not always in the direction expected (*e.g.,* Gershon, 2000) and may be relatively small compared with other influences in the overall experience of stress (*e.g.,* He, Zhao, & Ren, 2005; Morash, Haarr, & Kwak, 2006; Buker & Weicko, 2007).

Age. Insofar as a person's age influences cognitive appraisal we would expect differences in perceived stress. Several studies have reported a relationship between age and the experience of stress, though the nature of that relationship is not clear. O'Brien and Reznik (1988) and Westernik (1990), as examples, found that younger officers suffered more severe psychological and physical disturbances (as self-reported) than older, more experienced officers (a finding which mirrored previous work by White *et al.*, 1985), with the highest incidence and severity of stress experienced in the first year of duty. However, these findings might be explained by the close relationship between age and experience (both in terms of years on the job and type of job assignment). For example, Berg *et al.* (2005) found that non-managerial and younger police officers experienced a greater frequency of exposure to serious operational tasks than other officers. This differential exposure to environmental situations which might place greater demands on the individual could explain these findings. On the other hand, repeated exposure to such demands as would be expected for older, more experienced officers, might act as a "buffer" to stress (as suggested by the findings of Larsson *et al.,* 1988) due to either an increase in knowledge, skills, or abilities or due to learned effective coping (but see Gershon *et*

[15] Haarr and Morash (1999) found that officers' overall stress-levels depended on the coping strategies used; further, the selection of coping strategies varied systematically by gender and racial group.

al., 2002, who found older officers were more likely to engage in unhealthy, avoidant coping strategies).

Many of the findings discussed above imply a negative, linear relationship between age and stress. Yet, other studies have found a positive, linear relationship. Medina (2007), for example, found that older officers (aged 50 and over) were more likely to experience stress (when measured as emotional exhaustion) than their younger counterparts. Still other studies have provided evidence that the relationship between age and perceived stress is curvilinear, with younger and older officers reporting less stress than their middle-aged counterparts (Violanti & Aron, 1995; Chen, 2009). Again, these findings may be related to differences in exposure to demands, both internal and external to the job. It has been theorized, for example, that middle-aged workers may experience more general life stress than their younger or older counterparts, with greater family demands and more felt responsibility, creating more work-family conflict. Within the occupation, middle-aged officers may be more likely to hold positions where exposure to organizational (*i.e.,* supervisory) demands are great, but decision latitude is still relatively low. There has been at least some empirical evidence supporting this explanation, with Violanti and Aron (1995) reporting greater perceived stress stemming specifically from organizational demands for middle-aged officers. Similarly, White *et al.* (1985) found that younger officers were more likely to experience stress related to physical and psychological threats than their middle-aged or older counterparts, but the middle-aged group was more likely to experience stress stemming from a lack of support. While the nature of the relationship between age and perceived job stress is not entirely clear, there seems to substantial evidence to suggest that age does impact stress perception (but see *e.g.,* Laufersweiler-Dwyer & Dwyer, 2000).

Level of Education. To the degree that a person's level of education influences cognitive appraisal, we would expect differences in stress perception. There has been surprisingly little work assessing the relationship between education and stress directly, though level of education is often included in studies of police stress, minimally, as a control. Dantzker (1990) is one of few researchers who has investigated the relationship directly, and has found a "roller-coaster" relationship between level of education and perceived stress. Specifically, officers with only a high school education reported the highest levels of perceived stress, those with an associate degree much less, those with a bachelor degree more than the associate degree category, but still less than the high-school only category, and those with a master's degree the least of all. Dantzker's analysis suggests that education, generally, gives individuals a broader variety of tools with which to cope with occupational challenges.[16] However, organizational and systemic limitations associated with the quasi-military nature of police organizations may be especially frustrating for those officers who have the ability to critically examine a problem and the creativity to solve it, but lack the resources or the authority to do so. In other words, the conflict between the ideal of what could be and the reality of what is may be especially frustrating and/or disappointing to these individuals, resulting in higher levels of perceived stress. Those with a master's degree, on the other hand, may have the added benefit of extra maturity and experience in dealing with the conflict between those two ideals. They may also, in part because of their education, be in positions which allow greater latitude in decisionmaking, thus allowing them to put their education into practice in satisfying ways. Chen's (2009) study of Taiwanese officers is generally concurrent with this analysis, as he found a curvilinear relationship between level of education and job stress, with those officers having a mid-level education reporting higher levels

[16] This analysis might also extend to coping with general life stress, as Cullen *at al.,* (1985) found that greater education helped mitigate overall felt Life Stress among police officers.

of perceived job stress than those with less or more education. On the other hand, work by Laufersweiler-Dwyer and Dwyer (2000) suggests a negative linear relationship between education and perceived stress, with those officers having attained higher levels of education reporting less overall stress. However, their study highlights differences in the sources of stress experienced by officers with higher levels of education. Specifically, the authors found that officers with a college degree were more likely than others to: have false expectations about being promoted, feel a lack of input in policy and decisionmaking, and feel discontent with supervisors.

Marital Status. Since marital status impacts the availability of social support and other coping resources, we might also expect it to influence stress perception. However, while marital status is frequently included in multivariate analyses of police stress, it has rarely been studied as a variable of primary research interest. Even the few studies that *have* examined the relationship between marital status and stress directly (*e.g.,* Zhao *et al.*, 2003) have not included strength or quality measures of the marital relationship, though we would expect the direction and degree of its impact to depend on the quality of the relationship (Maynard & Maynard, 1982; Elliott *et al.*, 1986). Therefore, it is not surprising that the evidence generated from these studies is mixed. Zhao *et al.* (2003), for example, found when measuring perceived stress along the dimensions of anxiety, depression, and somatization that police couples (two officers in a primary relationship with each other) reported less anxiety than non-police couples or single officers, but non-police couples reported less depression than the other groups, while no differences in somatization were reported between groups. When compared with other theoretically stress-inducing (*e.g.,* destructive coping, work-family conflict, negative work exposure) and stress ameliorating (*e.g.,* camaraderie) factors, the authors concluded that marital status "inserts marginal effect on

reducing police stress and as a whole, is a far less significant predictor of police occupational stress [than other factors]" (p. 36). Other studies (*e.g.,* Chen, 2009) have found no significant impact of marital status in multivariate analyses of perceived stress, while still others (*e.g.,* Collins & Gibbs, 2003; Janzen *et al.*, 2007) have found that singlehood[17] is associated with greater levels of general distress.

Personality & Coping

Perhaps no other researcher sums up the importance of personality quite as succinctly as Lawrence (1984), who states, "The demands of police work are not equally stressful to all officers. Police perception and response to job stressors is differential, explainable in large part by individual differences in personality," (p. 257). This statement was supported by his own research, which found that a large portion of the variation in officers' stress response was accounted for by personality factors.

Personality variables are important in shaping perception, through both primary appraisal and secondary appraisal via the selection of coping strategies. Research in the broader field of personality psychology shows that having a Type A personality (Glass, 1977) and an external locus of control can be detrimental to one's health and well-being (*e.g.,* Kirkcaldy *et al.,* 1999; Kirkcaldy *et al.* 2002). In fact, in a large-scale, cross-national study of nurses, Glazer *et al.* (2004) found that being Type A and having an external locus of control was the "most common and detrimental personality combination affecting job stress" (p. 645). Early research on police populations was consistent with that in the broader field (*e.g.,* Kirmeyer & Diamond, 1985; Lester *et al.*, 1985; Cooper *et al.,* 1994). More recent research has begun to test the impact of the different dimensions of Type A personality on perceived job stress and have found that the

[17] Specifically, in an analysis of work-family conflict and general psychological distress among a sample of Canadian police officers, Janzen, *et al.* (2007), found being single and having greater levels of perceived strain-based work-to-family conflict were both associated with greater psychological distress.

dimension of leadership may actually buffer job stress, but the dimensions of aggression, hard-driving, and eagerness-energy appear to have a positive association with perceived job stress (Hintsa *et al.* 2010).

While the combination of Type A personality and external locus of control has received much attention, there is evidence that an individual's perception of job stressors is directly influenced by his or her locus of control alone (Tyson, 1981; Lester, 1982, among police officers). More recent research by Berg *et al.* (2005) continues to support this assertion among police officers by providing evidence that officers with an external locus of control reported experiencing more frequently than others a lack of social support, more exposure to serious operational tasks, and more work injuries. They also perceived lack of support more severely than those with an internal locus of control. These authors suggest those with an internal locus of control may rely more on their own abilities to resolve situations, thus finding lack of social support less stressful.

Evidence concerning the "Big Five" personality traits (as ultimately derived from the work of Eysenck and Eysenck, 1963) and job stress tends to cluster around the traits of Extraversion as a buffer of job stress and Neuroticism as a contributor to it.[18] Kaczmarek and Packer (1997) suggest this is because Extraversion is related to more positive, active coping whereas Neuroticism is related to more negative, avoidant strategies. This explanation has received empirical support from a number of police studies, including: Thompson and Solomon (1991) who reported a consistent relationship between Neuroticism and psychological distress and who found Extraversion to have a protective effect on officers who had been involved in body recovery efforts; Berg *et al* (2005), who found that Extraverts tend to react positively to

[18] There is also evidence that Neuroticism is a moderator in the relationship between perceived stress and a number of stress-related outcome measures, such as physical ailments, burnout, and dissatisfaction with the job (Hills & Norvell, 1991).

situations that require an active response, thus they report those situations as being less stressful than do individuals with Neurotic personality traits; Lau *et al.* (2006), who found that officers with a combination of high values on Extraversion and low values on Neuroticism reported lower perceived stress than other combinations (and that personality type was related to selection of coping strategies); Shakespeare-Finch (2006), whose work suggests that people high in Neuroticism use ineffective coping strategies that lead to increased levels of distress; and Burke *et al.* (2006) who found a positive association between Extraversion and using social support as an instrumental coping mechanism among police recruits, suggesting that when officers perceive a lack of work social support, their ability to cope effectively with job stress may be impaired (Lord, 1996).

There is even some evidence that Extraversion is overrepresented in police when compared with the general population (see Thompson & Solomon, 1991; Burke *et al.*, 2006, but comparison was between Australian police recruits and U.S. adult population).[19] Thompson and Solomon (1991) also found lower levels of Neuroticism in police officers. If Extraversion is linked to hardiness and Neuroticism to vulnerability and if police recruits are more likely to be Extraverts and less likely to be Neurotic, then police, generally, might be more resilient to stress than the general public.

On the other hand, there is a great deal of research on coping among police officers that suggests most officers are not utilizing positive coping strategies (but see Larsson *et al.*, 1988). Evans and Coman (1993), for example, found that police officers have shown a general tendency to be unsentimental, emotionally detached, and to refuse to share their emotional reactions to job stressors with non-police personnel, all of which are avoidant coping styles, as described by

[19] It has also been suggested that Type A behaviors might be overrepresented in the profession of policing, but the evidence in regard to that supposition is decidedly mixed *(e.g.,* Davidson & Veno, 1977; Hurrell, 1977; Robinson, 1981; but, *e.g.,* Huang *et al.*, 1983; Evans *et al.* 1992).

Krohne (1996). Also, in their review of the literature on nonmedical drug and alcohol use among police officers, Dietrich and Smith (1984) found that use of those substances was not only prevalent but was "very much accepted as a way of coping with the tensions and stresses" of the job (p. 304). Burke (1993; 1998) also found that officers reported high use of alcohol, drugs, cigarettes, and physical isolation from others as strategies for coping with job-related stress. Several studies have also found that policing as a profession is associated with increased risk of problem drinking (for a good review, see Obst *et al.,* 2001). This is particularly disturbing, as multiple studies (*e.g.,* Aldwin, 2007; LeBlanc *et al.*, 2008; Gershon *et al.,* 2009) found that maladaptive/avoidant coping strategies tend to intensify rather then reduce perceived stress and Hurrell (1986) found that officers who engage in maladaptive coping strategies are more likely to experience chronic, long-term stress and mental ill-health symptomatology (Collins & Gibbs, 2003; Pasillas *et al.*, 2006) than officers who do not engage in those forms of coping. None of this may be news to officers themselves, as some studies (*e.g.,* Graf 1986; Alexander & Walker, 1994) have found officers to report a lack of self-confidence and effectiveness in coping with work-related problems.

Finally, it may be important to note that there is evidence of systematic differences in personality (Lynn & Martin, 1997; Costa *et al.,* 2001) and coping styles (*e.g.,* Bellman *et al.,* 2003) by gender, with women consistently exhibiting higher scores on Neuroticism than men – a pattern that has held across studies of police officers, specifically (*e.g.,* Burke *et al.*, 2009); however, gender differences are small relative to individual variation within genders and men and women score higher on different dimensions of Extraversion (Costa *et al.*, 2001). That said, Haarr and Morash (1999) found differences in coping strategies among police officers by both gender and race and that stress levels were directly tied to coping strategies used. Unfortunately,

while some studies have specifically analyzed the influence of personality on perceived stress, personality measures are not included in all police stress studies as a matter of routine.

Past experiences

There is some evidence that perceived controllability may change in light of previous success or failure in similar situations (Drumheller *et al.*, 1993). Therefore, inasmuch as a person's past experiences buffer or exacerbate the cognitive appraisal of present demands we might expect differences in stress perception. Past experience variables typically include such things as prior work experience (usually in policing, the military, or other emergency service professions), pre-employment exposure to trauma (*e.g.,* Huddleston, Paton, & Stephens, 2006), the experience of a duty-related injury or other trauma (in prior work experiences or in the current job), and the experience of negative life events (*e.g.,* divorce or death of a loved one).

Past experiences may be theoretically important in one of two ways – exposure may have an additive effect on stress or may have a "dampening" effect through increased hardiness. Several authors within the field of police stress research, specifically (*e.g.,* Stephens *et al.*, 1999; Violanti & Paton, 1999; Carlier *et al.*, 2000) and in stress research generally (*e.g.,* Tedeschi & Calhoun, 1995; Carver & Antoni, 2004) have suggested that either or both may be true depending on the interaction with personality and coping styles and the specific circumstance. For example, Leonard and Alison (1999) found that previous negative life events can significantly impact officers' future stress vulnerability to traumatic or acute stressors. On the other hand, Tedeschi and Calhoun (1995) argue that trauma exposure can act as a catalyst for positive adaptation and growth for some individuals. There is evidence among studies of police officers that both may be true. Burke *et al.* (2006) found that police recruits who had suffered previous traumatic events reported higher overall levels of symptomatic distress than recruits

who had not; however, they also reported positive posttraumatic growth, suggesting their previous exposure to traumatic events, while creating some negative outcomes, may have also increased their resiliency to future stressors. LeBlanc *et al.* (2008) found that police recruits who had prior experience in emergency services reported *lower* baseline levels of anxiety than those who did not, however, style of coping utilized was a stronger predictor of traumatic symptomatology following exposure to simulated critical incidents than was this factor. Research of this type has led to continued efforts at increasing resiliency in police officers by including exposure to simulated critical incidents as part of recruits' training, a strategy that has so far met with some success, as measured by emotional, physiological, and performance outcomes (Arnetz *et al.,* 2009).

Current Situation

This category of variables includes those factors both internal and external to the occupation which may presently impact the individual's occupational experience. Those related to the work organization, but not necessarily unique to policing, include time on the job, shift assignment, workload, and supervisory status (Dhillon, 1989; Kirkcaldy & Cooper, 1992). Research in the broader field of general work stress has identified these factors as common contributors to stress across a variety of professions. Inasmuch as policing is like any other work organization, we would expect those findings to hold. However, there are also individual-level influences unique to the operation of policing, including, for example, specific job assignment (*e.g.*, undercover work[20]) which we might expect to influence stress perception.

Career Stage. Inasmuch as a person's career stage (usually measured as length of tenure on the job) shapes his/her expectations (Van Maanen, 1973) or selection of coping strategies, we might expect differences in stress perception (Violanti, 1981, 1983; Stotland, 1986); there is

[20] See Arter (2005).

some evidence in support of this. For example, Anshel *et al.* (1997) found that years of experience as a police officer influenced the extent of officers' beliefs that they could cope with stressful events. This suggests a connection between previous experiences and perceived controllability (Drumheller *et al.,* 1993) but also between previous experiences and the selection of coping strategies. Burke *et al.* (2009) found changes in the selection of coping strategies early-on in officers' careers, with new officers increasingly using Acceptance (an emotion-focused approach strategy) as they moved from training to operational status during their first twenty months on the job. This may reflect changes in expectations or in perceived control, but either way, it also suggests that officers' selection of coping strategies can and do change over time. Unfortunately, researchers have used different criteria to categorize career stage (*e.g.,* compare Cooper, 1982; Burke, 1989; Kaslof, 1989; Anshel *et al.*, 1997), making it difficult to generalize findings even within this subset of the police stress literature. That said, several studies have reported variation in perceived stress by tenure, but the relationship is not consistent. As with age (which may be confounded with length of tenure in many studies), outcomes are different when overall job stress is measured versus job stress stemming from specific categories of demands. For example, Chen (2009) found a curvilinear relationship between stress and tenure among Taiwanese officers, with those having 11-20 years on the job reporting more overall stress than those with less or more tenure. On the other hand, White *et al.* (1985) found that officers with the most time on the job (over 16 years in their study) were more likely than those with less tenure to experience stress related to inefficiencies and unfairness in the judicial system and to their department's promotional system, while Stotland *et al.* (1989) found that stress decreased with tenure, but among supervisors only. Violanti and Aron (1995) found that officers with 6-10 years on the job reported the highest levels of stress overall, and officers with

21-25 years reported the least stress overall, but officers with 11-15 years reported the highest stress from organizational sources. Laufersweiler-Dwyer and Dwyer (2000) also found that officers with 6-10 years on the job reported higher levels of stress stemming from a variety of factors, including lack of organizational support, work overload, role conflict, and job changes. This is similar to Garcia *et al.'s* (2004) more recent analysis, which found that officers with the least time on the job (less than 5 years) reported the most stress from operational sources, officers with 5-10 years on the job reported the most stress overall, officers in the middle of their careers (16-19 years) reported the most stress from organizational sources, and officers with the most tenure (20 years or more) reported the least stress overall. It is likely that length of tenure is closely related to not only age, but also rank and, in some cases, job assignment, making it all the more important for the unique contributions of these variables to be carefully analyzed. It is also unclear whether time on the job changes the appraisal and coping responses of individuals[21] or simply results in those individuals least successful in meeting the demands of the job dropping out (Evans *et al.*, 1992).

Rank. Inasmuch as an officer's rank differentially impacts exposure to demands and access to resources, we might expect differences in stress perception. When measuring overall job stress, Kaufman and Beehr (1989) found that police supervisors experienced less job stress (and more instrumental social support) than frontline officers. Similarly, Chen (2009) found that non-supervisors reported more stress than supervisors (among Taiwanese officers). If operational demands contribute most to overall stress, as some suggest, then these findings might reflect differential exposure, with front-line, non-supervising officers most likely to be exposed to such demands than their supervisors. (On the other hand, such findings are not consistent; see,

[21] This is not to imply that more time on the job always results in the selection of healthier coping strategies. On the contrary, much of the work related to the development of a unique police personality suggests unhealthy coping is common (see, for example, Neiderhoffer, 1967) and perhaps even definitive of the police subculture.

for example, Perrott and Taylor, 1995, who found no difference in overall experience of stress between Canadian constables and their supervisors). That said, most studies that analyze job stress by source do, in fact, report differences according to rank. For example, in a study of Indian sub-inspectors and constables, Joseph (1989) found no difference in the overall amount of stress experienced by rank; however, there were differences in the sources of stress, with Sub-Inspectors (the highest rank in the study) reporting more stress from "responsibility for others" and Head Constables and Constables (each of lesser rank, respectively) reporting more stress from issues related to a lack of job control and lack of status. Similarly, in their study of a large police department in New York state, Violanti and Aron (1995) found that line sergeants, detective investigators, and especially desk sergeants in charge of substations perceived organizational stressors as most intense when compared with officers of other ranks. More recently, Laufersweiler-Dwyer and Dwyer (2000) found in a study of multiple American police departments that sergeants reported more stress than other officers from factors related to work overload, organizational inefficiency and organizational changes. Garcia *et al.* (2004) also found that overall stress diminished with increase in rank, but when analyzed by source, detectives and sergeants reported the most stress from organizational sources, while patrol officers reported the most stress from operational duties and extra-occupational factors. Clearly, the extant research suggests a correlation between sources of perceived stress – and perhaps overall amount of perceived stress – and rank. Larsson *et al.* (1988) suggest this may be due not only to differences in job demands but also to differences in coping, with higher-ranking officers having access to more resources and more authority to use them in a problem-focused way, while line-level officers have to rely more on emotion-focused strategies.

Job assignment. Inasmuch as an officer's job assignment differentially impacts exposure to specific demands, we might also expect differences in stress perception. We would expect front-line officers and those in specific assignments such as S.W.A.T. or undercover work more likely than others to be exposed to actual physical danger and violence as job demands (Kroes *et al.,* 1974) and to the constant and unpredictable[22] *threat* of danger, which some authors (*e.g.,* Cullen *et al.*, 1983; Walker, 1983; Jermier *et al.*, 1989) have suggested is equally or more important in shaping stress perception.[23] Certain other units, such as child exploitation and various types of special victims units, may also be exposed on a regular basis to a degree of human suffering and vulgarity arguably more intense than that experienced by less specialized operational or by administrative units (Krause, 2009). Much of the extant research does, in fact, support these contentions. White *et al.* (1985), for example, found that officers in the Field Operations Bureau reported more stress stemming from threats to physical or psychological harm than did officers in the Administrative, Services, or Investigative Bureaus. No doubt this was the result of differential exposure to operational demands. Similarly, research by Biggam *et al.* (1997a) found that desk officers reported lower levels of operational stress but similar levels of organizational stress as line officers and Garcia *et al.* (2004) found that officers assigned to headquarters reported less stress overall, but more stress from organizational sources, than officers assigned to patrol or special units. However, most police stress research has been conducted either on patrol officers or specialized groups; less often have these populations been compared in the same study. Also, recall that within groups, operational variables such as

[22] Posner and Leitner (1981) argue the more predictable an event is, and the greater the degree of control the individual has over the event, the more likely the event will produce eustress as opposed to distress. This high degree of unpredictability may contribute more to perceived stress among police officers than actual events themselves.

[23] As evidenced by Cullen *et al.* (1985) who found that perceived dangerousness had a significant positive relationship with work stress.

"dangerous and uncontrollable duties" are often not the strongest predictors of job stress (*e.g.,* Davey *et al.*, 2001).

Shift assignment. There is a long history of research investigating shift work and stress. Shift work is thought to contribute to stress in different ways. First, it is thought to disrupt circadian rhythms, creating physiological strain on the body, especially when the individual changes shifts or has work-related obligations occurring outside of the regular work shift, as for example, the police officer who works an overnight shift but must testify in court during the day. Second, it is thought to conflict with most routine social and family obligations, creating more work-family conflict. Finally, among police officers, it may represent different operational demands – more perceived danger and/or more boredom, paradoxically. Though the specifics may include any or all of these things, the commonality is that shift work may influence perceived stress via both an increase in demands and a decrease in coping resources; and there is evidence among studies of police stress that this is the case. For example, Garcia *et al.* (2004) found that officers working 11pm to 7am reported the most stress overall and the most stress related to both operational duties and external factors (such as family demands), while officers working day shift reported more stress from organizational sources. On the other hand, work by Laufersweiler-Dwyer and Dwyer (2000) and Davey *et al.* (2001) contradicts the conventional wisdom regarding shift work. The former found no relationship between rotating shifts and perceived stress and the latter found that shift work was not predictive of job stress, though "working long hours" was. Interestingly, in a study by Collins and Gibbs (2003), officers *reported* shift work as stressful, but there was no association between working any particular shift and any of the mental health outcomes measured in the study.

Workload. Inasmuch as work load impacts the ratio of available resources to situational demands, we might expect differences in stress perception. Within policing, there is limited support for this contention. For example, Deschamps *et al.* (2003) found "excessive" work load was related to symptoms of job stress in police officers, which is in-line with work by Davey *et al.* (2001) who found that "working long hours" and "working overtime" were highly predictive of job stress. In fact, they found the more hours officers worked, the higher the level of job stress. On the other hand, when operationalizing workload as the average number of crimes each officer in a particular precinct/shift group had to deal with, Stotland and Pendleton (1989) found no difference in the overall amount of stress reported by low and high workload groups. However, they did find differences in sources of stress by group. Those in the low workload group reported more stress arising from interpersonal demands, both in and outside of the department. The high workload group, on the other hand, reported more stress from operational demands on the street and from departmental policies and regulations as they negatively impacted the officers' abilities to meet those demands. These officers appeared to appraise other organizational and interpersonal concerns as irrelevant or benign. It may also be that workload itself, like overall stress, is only perceived as "excessive" when compared with a lack of social and tangible support resources. Work by Collins and Gibbs (2003) for example, seems to support this notion, as various measures of heavy workload, time constraints, impingement on home life, and a lack of organizational support were ranked by officers as among the most stressful of all work-related demands.

Some research suggests that too little work (often termed work underload) can be as stressful as too much work (*e.g.,* Reiser, 1975). In this situation, the demand may be dealing with boredom or feelings of uselessness. Recent work by Noblet *et al.* (2009a) supports this

notion; they found a curvilinear relationship between workload and stress, where excessively low and high levels of work were more likely to predict lower levels of officer well-being than mid-range levels.

Related to workload is the perception of always being "on call." Similar to our discussion of actual danger versus the threat of danger, the feeling that one must always be available at a moment's notice and that one cannot predict when he will be called back to duty might be characterized as part of the workload. Suresh and Anantharaman (2001) found this – always being "on call" - to be the number one ranked stressor as self-reported by a sample of Indian police officers. Clearly, workload can be a source of stress itself, but actual workload and constantly feeling "on call" can also contribute to work-family conflict as a unique source of stress.

Work-Family Conflict. Inasmuch as work demands take resources away from family demands, and *vice-versa*, we would expect perceptions of work-family conflict to influence perceptions of job stress. There is, in fact, evidence that higher levels of work-family conflict are associated with greater levels of general distress among police officers (Brock *et al.*, 2002; Tomei *et al.*, 2006[24]; Janzen, Muhjarine, & Kelly, 2007) and that individuals with children under the age of 18 – regardless of gender or marital status – report higher levels of work-family conflict (Winslow, 2005). There is also evidence that police officers themselves rank variables related to work-family conflict (*e.g.,* "lack of time to spend with family") well above a host of operational and organizational stressors (Suresh & Anantharaman, 2001; Brock *et al.,* 2002; Collins & Gibbs, 2003; Garcia *et al.*, 2004). Given these findings, it is discouraging that many

[24] Who found that separated or divorced women with children reported higher stress scores at the end of their work shift when compared with the beginning than any other group in their study of Italian municipal police officers.

studies of police stress do not include measures assessing work-family conflict and most do not assess parental status, specifically.

Current Negative Life Experiences. Inasmuch as current negative life experiences (*e.g.,* illness or injury of self, illness or death of a loved one, financial strain, problems in intimate relationships, *etc.*) impact the availability of coping resources, we might expect to see differences in stress perception. Furthermore, we would expect this relationship to be reciprocal, as evidenced, for example, by Stotland and Pendleton (1989) who found that stressful life events appeared to more negatively impact officers in a high workload group than those in a low workload group, leading the authors to speculate that the officers with a high workload may have been using so many of their resources to cope with occupational demands that they had little left over to deal with demands from any other source.

Organizational-Level Influences

Our discussion so far has focused on influences which can vary from one officer to another, even within the same organization or work group. However, there are higher-level influences which are thought to impact individuals throughout an organization in systematic ways (Brandt, 1993). A number of studies have investigated the impact of factors related to organizational structure and climate on the experience of stress by police officers within the organization. Recently, particular attention has been paid to *changes* at the organizational level and the impact such changes have had on individual employees. For example, Noblet *et al.* (2009a) argue "there is growing evidence that managerialist reforms have fundamentally changed working conditions for police and other public sector employees, especially in relation to demands faced by members and the control- and support-based resources they have to deal with those demands" (p. 113). Some researchers (*e.g.,* Davey *et al.,* 2001; Scott, 2004) have

specifically looked at factors related to organizational change and have found change itself highly predictive of job stress among police officers. The following section will discuss the extant evidence concerning specific variables related to police organizations.

Organizational Structure

The Metropolitan Police Force of London, established in 1829, has served as a model after which most modern police organizations in the United States and much of the Western world have, more or less, been patterned. As such, modern police organizations have tended toward quasi-military, centralized, hierarchical structures with relatively high divisions of labor, particularly between bureaucratic layers (Angell, 1971). In such organizations, individuals at lower hierarchical levels (*e.g.,* street or line officers) tend to have little decision-making control/authority. Rather, there is an attempt to limit discretion by developing written "policies, procedures, rules and regulations designed to standardize…conduct" (Cordner, 1978).

Development of such directives usually occurs with little to no input from lower-level members of the organization, yet adherence to them is expected and punishment for non-obedience is emphasized. When rules and regulations are excessive, they can become overwhelming, and even contradictory, leaving an employee unsure of what is expected, yet equally certain that failure to comply will result in harm or loss. Even when the rules are understood, they may become so overbearing as to leave the employee believing that the organization values adherence to them over the actual effectiveness or efficiency of the employee's work. Critics of such structures among police organizations contend they are unsuitable for the profession because policework is highly complex and variable in nature, requiring a great deal of discretion at the lowest levels in order to be carried out effectively (Bittner, 1970; Angell, 1971; Cordner, 1978; Kuykendall & Roberg, 1982; Manning, 1992).

According to the model of stress and coping presented earlier, we would expect this combination of broad, complex job demands and a structure which systematically limits decision-making authority while simultaneously fostering a punishment-centered philosophy to correlate with increased stress among police officers. There is, indeed, evidence in support of this expectation, with studies of police officers over several decades having consistently revealed overall level of bureaucratization (*e.g.,* Coman & Evans, 1991; Brown & Campbell, 1994; Zhao *et al.,* 2002; Buker & Weicko, 2007)[25], generally, or low participation in decisionmaking, more specifically (*e.g.,* French, 1975; Noblet *et al.,* 2005, 2009; Morash *et al.,* 2006), as being positively correlated with stress levels. In fact, Laufersweiler-Dwyer and Dwyer (2000) found that organizational policies and structure were *most* predictive of job stress in officers across multiple police organizations *and* this was specifically related to the degree of decision-making/control authority within the organization, with "stress levels tend[ing] to increase as levels of control over the environment [were] perceived to decrease" (p. 459). The officers in this study also cited excessive rules as leading to feelings of uncertainty and confusion about what was expected (or allowed) of them in the process of carrying out their duties, making officers less efficient and effective. However, as Langworthy (1986) has empirically demonstrated, the degree of bureaucratization varies considerably among police organizations. Also, the spread of a community-oriented policing philosophy has led to reform efforts in recent years which aim at decentralization and the dismantling of excessively hierarchical structures (Lord, 1996). Therefore, inasmuch as the degree of bureaucratization varies from one police organization to another, we might expect to see differences in perceived stress experienced by members of different organizations. That said, there is some evidence that structural changes such as those aforementioned have often resulted in increases in the individual's span of

[25] But see Crank *et al.* (1995) for an opposite finding among police executives.

responsibility (*i.e.,* increased job demands), but not in level of decision-making authority (Dixon *et al.*, 1998; Butterfield *et al.*, 2004); therefore, disaggregated measures of these organizational characteristics related to overall bureaucratization may be more informative than a single-factor measure.

Organizational Size

While size is not a direct measure of complexity, there is evidence that larger organizations tend to be more bureaucratic in structure (Langworthy, 1985; Crank & Wells, 1991). Therefore, we might expect organizational size to correlate with perceived stress, as discussed above. However, the findings on this issue are mixed. Brooks and Piquero (1998) found department size *was* correlated with police officer stress in a study of American police departments, with officers in larger departments reporting higher levels of stress. On the other hand, Winfree and Taylor (2004) and Buker and Wiecko (2007) found the opposite in their studies of the New Zealand and Turkish national police forces, respectively. The explanation for the differential findings may lie in the fact that the American departments were autonomous, while the New Zealand and Turkish departments were part of a centralized organizational structure. To date, it is unclear whether organizational size contributes to perceived stress beyond other structural measures.

Organizational Support

Many public sector agencies throughout the industrialized world have undergone changes in recent years (Fleming & Lafferty, 2000; Vickers & Kouzmin, 2001), and many of these reforms have focused on efforts to improve efficiency (a "do more with less" mentality) that has resulted in a loss of resources (people, time, and budgetary support) (Boyne, Poole, & Jenkins, 1999; Brunetto & Farr-Wharton, 2005). Some authors (*e.g.,* Buker & Wiecko, 2001; Chen, 2009)

claim these changes, coupled with shifting public attitudes that place greater emphasis on accountability and service, have led to a substantial increase in the demands faced by police and may have increased the complexity of the tasks they are asked to perform (Buker & Wiecko, 2007). In such situations, where support resources are disproportionate to increasing job demands, we would expect increases in perceived stress, and there is, in fact, some evidence of this. For example, Laufersweiler-Dwyer and Dwyer (2000) found that inadequate resource allocation compared with workload was the second strongest predictor of perceived stress among police officers across multiple departments, behind only lack of decisionmaking authority/control. These authors also found that policies and practices which undermined efficiency and effectiveness (*e.g.,* excessive paperwork) were particularly stressful to officers in their study. Davey *et al.* (2001) found that organizational support, which included a measure of the sufficiency of equipment available to perform job tasks as well as measures of social support from management, peers, and the public, was highly predictive of job stress, with lower levels of organizational support predicting higher levels of job stress. Similarly, Noblet *et al.* (2005) found that lack of human resources was highly predictive of stress among Australian public-sector employees. Furthermore, as Butterfield *et al.* (2004) point out, a lack of human resources can not only undermine the ability of officers to undertake operational duties but also opportunities for officers to seek and receive social support as a coping resource.

Social support. According to House (1981), social support is best defined as "an interpersonal transaction involving one or more of the following: (1) emotional concern (linking, love, empathy), (2) instrumental aid (goods or services), (3) information (about the environment), or (4) appraisal (information relevant to self-evaluation)," (p. 39). Depending on the type of social support being utilized, it can function as an emotion-focused or a problem-focused coping

strategy (Lazarus & Folkman, 1984). Social support could arise from any social relationship, but within work organizations, emphasis has primarily been on support stemming from peer and supervisory relationships. A number of studies have investigated one or more dimensions of work social support among police officers, and there is ample evidence of both main (*e.g.,* Cullen *et al.,* 1985; Kaufmann & Beehr, 1989; Patterson, 2003) and interaction (Kaufmann & Beehr, 1989; Patterson, 2003; Thompson *et al.,* 2005) effects of social support on perceived stress. In fact, a number of studies over several decades and across several different countries have found that the perceived social support of colleagues and supervisors is an important predictor of stress among police officers (*e.g.,* White *et al.,* 1985; Graf, 1986; Kroes *et al.*, 1974; Lord, 1996; Berg *et al.,* 2005; Oginskar-Bulik, 2005). In fact, in a study of South Korean officers, Morash *et al.* (2008) found that the strongest predictor of stress was perceived ridicule and set-ups by superiors and co-workers, while "support from supervisors was an important coping resource linked to low levels of stress" (p. 236). Similarly, in a study of Australian police officers, Noblet *et al.* (2005) found that the perception of social support at work was the most important predictor (among several variables related to job demand, job control, and measures of both work and non-work social support) of not only psychological health, but also job satisfaction and organizational commitment.

However, seeking social support does not always lead to lower levels of perceived stress, as one might expect. Recall that coping strategies are merely attempts to deal with stressful situations – they are not always effective. Seeking social support as a coping mechanism may certainly buffer the experience of stress when the result is an increase in resources (either tangible or intangible) which can be used to alter the situation itself or the negative emotions associated with it. However, seeking social support may have a "reverse buffering effect"

(Kaufmann & Beehr, 1989) or may become a source of stress itself (Kirkcaldy & Furnham, 1993; Kirkcaldy *et al.*, 1995) when, for example, the "moral support" of fellow officers manifests itself as commiseration-turned-"bitch" session, where negative emotions are emphasized, but not dealt with in a psychologically healthy way. Therefore, the source and type of social support may predict the impact it will have on perceived stress, yet even more recent studies (*e.g.,* Patterson, 2003) have not specified social support in such a way. There is also evidence that the number of individuals in an officer's support system may impact perceived stress (Graf, 1986), but operationalizations of social support typically do not include such quantitative measures.

It is not surprising that a perceived inadequacy of organizational resources would be considered stressful. Whether materialized as a lack of manpower which creates excessive workload, as inadequacy/unreliability of equipment resulting in an increased potential for danger[26], or as insufficient instrumental or emotional support of peers or supervisors, a lack of resources adequate to meet the demands being presented to the individual officer lies at the very heart of the cognitive appraisal process.

Organizational Culture

Dick's (2000) qualitative study suggests organizational culture influences stress perception through the shaping of the beliefs underlying those perceptions by "normalizing" or "pathologizing" emotional responses based on their fit with the culture. Adams and Buck (2010) found that psychological stress was influenced by the experience of disrespectful, rude, or condescending behaviors from individuals both external and internal to the organization and that the relationship was mediated by surface acting (*i.e.,* modifying displayed behavior to fit with

[26] In several studies, police officers have reported "equipment failure" as a source of stress. The position taken here is that the provision of adequate equipment (in terms of both quantity and reliability) is a measure of instrumental social support, in that it is the responsibility if the organization to provide equipment sufficient to perform the job tasks assigned employees of the organization.

audience expectations), a strategy which requires a great deal of emotional labor and can result in emotional dissonance. Earlier research by van Gelderen *et al.* (2007) had found that emotional dissonance mediated the relationship between emotional demands and psychological strain. Furthermore, officers experienced emotional dissonance as an energy-related resource loss and risked higher levels of stress due to their lack of coping resources (Hobfoll, 2001). Taken together, this extant research suggests that experiencing emotional responses which do not "fit" with the organizational culture's expectations will be stressful either because displaying them may result in a denial of social support from peers or because hiding them through the use of surface acting taxes emotional (coping) resources. In this sense, it is not necessarily the content of the organizational culture (*i.e.,* a unique "police" subculture) that is important, but the degree of solidarity that exists among members of it, as this determines the social environment in which individual officers will – more or less – "fit." In accordance with the model of stress and coping presented earlier, a lesser degree of fit, particularly in the absence of adequate coping resources, is likely to result in higher levels of perceived stress.

Organizational Fairness

There is a small but growing body of research which suggests perceptions of organizational fairness (sometimes called "organizational justice") make a unique contribution to perceived job stress. Citing Colquitt (2001), Noblet *et al.* (2009b) describe "organizational fairness" as:

> [P]erceptions [that] are multi-dimensional and relate to people's subjective evaluations of the extent to which outcomes such as pay, promotions, work roles, and workloads are distributed fairly (referred to as distributive fairness), the perceived fairness of the procedures that authority figures use when deciding who should receive these outcomes (procedural fairness), the level of respect and dignity people feel they receive during and after fairness-related decisions are made (interpersonal fairness) and the extent to which employees receive timely and accurate information about the decision-making processes, or the outcomes of those processes (informational fairness). (p. 615)

While "perceptions" are inherently subjective (and thus, rightly assessed at the individual-level), organizational-level policies and practices can systematically create a culture where the individuals within it develop similar perceptions of the fairness of the organization as a whole, and that is why it is being included in this part of the discussion. Within the model of stress and coping presented earlier, we would expect perceptions regarding organizational fairness to shape perceived stress via the effort-reward calculation of the primary cognitive appraisal process. In an organization where policies are fair (and fairly applied), individuals are able to predict with more confidence the reward they can expect from a specific expenditure of effort. However, in an organization where policies are unpredictably applied (or predictably applied in unfair ways), individuals may be more likely to make unrealistic effort-reward calculations or to believe that no amount of effort will result in a just reward - a circumstance which can become a source of stress itself.

Within policing, only a few studies have sought to measure organizational fairness, and the ones that have (*e.g.,* Kop *et al.,* 1999; Adebayo *et al.,* 2008) have tended to measure individual-level perceptions of it as a global construct without specifically assessing the relative contribution of its different dimensions (Noblet *et al.,* 2009b). Likely because of these differences in approaches to measurement, the extant research on organizational fairness within policing provides mixed results. For example, work by Noblet *et al.* (2005) found that perception regarding the fairness of pay was one of the most important predictors of perceived stress among Australian public-sector employees. On the other hand, in perhaps the most direct and comprehensive study of organizational fairness in policing to date, Noblet *et al.* (2009b) found that only the dimension of interpersonal fairness was predictive of job stress. While no consensus has emerged regarding a standard measure of organizational fairness (*i.e.,* as

individual-level perceptions or as objective measures of the content and application of policies at the organizational-level), there is evidence that perceptions of fairness can contribute to variations in perceived stress above that accounted for by the more-commonly used organizational stress measures of job demand, control, and support, and further attention to this issue is warranted.

System-Level Influences

System-level influences are those outside the control of the organization, but within the criminal justice system, that can have high impact on the organization and its members. In several early studies of police stress, officers themselves reported frustrations with the criminal justice system as significant sources of stress (*e.g.,* Kroes *et al.,* 1974). Research at this level has tended to cluster around issues of justice and efficiency. Specifically, officers may find themselves tasked with an "impossible mandate" (Manning, 1978) of controlling crime in a democratic society where due process oversight by the courts and even the Constitution itself may be perceived as constraints upon the ability of the police to maintain order and enforce the law (Walker, 1983). According to the model of stress and coping presented earlier, we would expect this ever-present conflict between the ideals of due process and crime control (Packer, 1968) to influence perceived stress by limiting the decision-making authority of individual officers, many of whom may believe their primary role to be that of crime fighting. However, we might also expect this conflict to shape stress perception via the effort-reward calculation of the cognitive appraisal process. Specifically, officers may feel robbed of the satisfaction they feel at "getting criminals off the street" by the inefficiency and/or leniency of the courts and correctional sub-systems, ultimately leading to the belief that no amount of effort will produce a sufficiently meaningful reward. This cynicism toward the judicial process has been evidenced

among studies of police officers (Weichman, 1979) and may only be exacerbated by a citizenry that may seem unsupportive or even hostile in the face of flat or rising crime rates (Stratton, 1986).

Situational (Community)-Level Influences

Bliese and Jex (2002) assert that "social context is likely to impact all aspects of the occupational stress process…" (p. 267). In studies of police stress, the social context variables of interest that have emerged through both theoretical work (*e.g.,* Skolnick, 1966) and because they were identified by police officers themselves in early studies as being of particular relevance (*e.g.,* Kroes *et al.*, 1974; Spielberger *et al.*, 1981), are those related to: the relationship between the police and the public, crime rates in the community of service, and urban/suburban/rural location.

Police-Community Relations. When asked to inventory or rank stressors, police officers have often identified negative relations with the public and the media as sources of stress (*e.g.,* Kroes *et al.,* 1974; Garcia *et al.,* 2004). Certainly, inasmuch as criticism from the community constitutes a withdrawal of social support resources, we would expect this to be true.[27] Yet this hypothesis has rarely been studied empirically, and the few studies that have investigated the relationship have provided mixed evidence. Zhao *et al.* (2002), for example, found little or no association between a perceived lack of public respect and five indicators of psychological stress in a study of American police. On the other hand, several studies in other countries, though still few in number, have generally been consistent, suggesting this variable may be more influential in some cultures than others. For example, Weng (2002b) found a strong negative relationship

[27] This discussion could be included under individual-level influences, as perception of the state of police-community relations can vary from officer to officer; however, the argument made here is that the objective state of police-community relations is likely experienced in similar ways by officers throughout a given organization.

between social support for policemen and perceived job stress among officers in Taiwan, and Morash *et al.* (2008) reported similar findings in a study of South Korean officers.

Crime rate. It has been hypothesized that crime rate might impact perceived stress via workload or an increased exposure to the potential for danger. However, studies which have investigated this relationship directly have found very little evidence in support of such a relationship. Garcia *et al.* (2004) actually found that officers working in the highest violent crime areas reported only low to moderate levels of stress, but that, even during a period of decreasing crime rates, officers still ranked "concern for a fellow officer being injured or killed" as their top stressor, which was consistent with research conducted during periods of higher crime rates (Speilberger *et al.*, 1981; Violanti & Aron, 1995). Morash, Haarr, & Kwak (2006) reported no significant relationship between violent crime rate and stress, but high property crime rate was related to low levels of stress, unexpectedly. These authors hypothesize that crime rates do not significantly impact police stress since officers may self-select into the profession because they have the capacity to cope with violence and disorder. A more recent study of the Turkish National Police (Buker & Weicko, 2007) found no significant influence of jurisdictional crime rates on officers' reported level of stress.

Location. Crank and Caldero (1991) point out that most police stress research (and, in fact, most police research, generally) has been conducted on larger, urban agencies. Yet, there is reason to believe that smaller, suburban and rural departments may have different experiences in terms of workload (related to both crime rate and size of force), job complexity (with fewer specialized divisions), and organizational structure (with smaller forces tending to be less bureaucratic). Therefore, much of the research on police stress may not be generalizable to suburban and rural departments. Indeed, the few studies that have investigated this issue directly

have found evidence that location does influence perceived stress. For example, Biggam *et al.* (1997a) found that urban officers in Scotland reported higher levels of both organizational and operational stress than officers working in other locations. Davey *et al.* (2001) found that rural officers in Australia had significantly lower levels of job stress than did their metropolitan, suburban, or regional city based counterparts. Similarly, Berg *et al.* (2005) found that officers working in large (more urban) communities in Norway reported more stress than those working in smaller (more rural) communities. However, in that study, police in rural districts reported experiencing more job pressure and serious operational tasks than their urban counterparts. It may be that officers in rural areas are responsible for a larger variety of tasks due to the smaller force size. Officers in rural areas may have the added pressure of being "known" to members of the public in both a personal and professional capacity, increasing the feeling of always being scrutinized (Alkus & Padesky, 1983). Clearly, across national cultures, rural versus urban location impacts perceived job stress among police officers, though whether this is via increased exposure to and/or complexity of specific demands, decreased availability of coping resources, or both, is not yet known.

Macro-level (Ecological) Influences

Research in the field of cross-cultural psychology has yielded some evidence that individuals' tendencies toward certain personalities and behaviors are influenced, in part, by the cultural values endorsed by their dominant culture (Hofstede, 1984; Schwarzer & Frensch, 2010). Further, in a study of over forty nations, Schwartz (1999) identified seven distinct culture value types and rank-ordered nations according to their degree of endorsement of each.[28] Inasmuch as dominant national cultural values (Schwartz, 1994; 1999) systematically shape individuals'

[28] These types are Affective Autonomy, Intellectual Autonomy, Mastery, Hierarchy, Conservatism, Harmony, and Egalitarianism. The United States, specifically, was found to be a highly Autonomous culture with tendencies toward Mastery and Hierarchical values.

tendencies toward those personality characteristics associated with increased stress vulnerability, we would expect a correlation between the country of study and perceived job stress. As Glazer *et al.* (2004) state in their cross-national study of nurses, "[T]he personality-job stress relationship is expected to be in the same direction across each country, because personalities are expected to be partially in-born, but the magnitude of the relationships will differ, because of cultures' influence" (p. 646). (This was, in fact, evidenced in their own findings). Several other studies of non-police populations (*e.g.,* Parsons & Schneider, 1974; Harari *et al.*, 1988; Kirkcaldy & Cooper, 1992b; Smith *et al.,* 1995; Glazer *et al.*, 2004) also lend support for the existence of such a relationship in that they have reported differences in mean locus of control scores by country, with those countries classified according to Schwartz's (1994) scale as more Hierarchical (*e.g.,* the USA, the UK, and Israel) having higher internal locus of control scores but those classified as more Harmonious or Egalitarian (*e.g.,* Hungary and Poland) having the opposite. Of course, in the field of psychology, it is generally agreed that personality is, to some large degree, in-born. In those cases where an individual's personality does *not* "fit" with the values endorsed by the national culture, we might expect perceived stress to be higher (Glazer *et al.,* 2004).

Unfortunately, most police stress studies are not cross-national and do not allow for direct comparisons of stress across culture value types. However, police stress studies have been conducted in several different nations. By including these studies in one meta-analysis and accounting for nation of study, we can examine whether differences in perceived job stress exist by nation and whether those differences (if any) systematically vary in accordance with Schwartz's (1999) cultural value types.

Summary

Identifying the factors that are most likely to influence stress among police officers generally- and identifying which officers may be particularly vulnerable to stress because, for example, they lack support and/or adequate coping skills (Dewe & Guest, 1990; Gershon *et al*., 2009; He, Zhao, & Archibold, 2002; Latach & Havlovic, 1992; Thompson, Kirk, & Brown, 2005; Violanti, 1992; Violanti, Marshall, & Howe, 1985) or because pre-existing characteristics or prior life experiences may have predisposed them to greater stress vulnerability (Kirschman, 2006; Reese & Scrivner, 1994) – will yield information that can be used to guide the development of prevention and intervention strategies, and this is where we should focus our efforts. A great deal of work has already been done to this end, but the sheer volume of police stress studies, coupled with the wide variability in research methodology and the lack of a comprehensive, theoretically-grounded model of stress, generally, leaves us unable to reach firm conclusions about the relative strength of correlates of perceived stress among police officers, specifically.[29] Though some patterns have begun to emerge, the results from this large body of research remain largely ambiguous, underscoring the need for a systematic review of the subject. This is why we must turn to meta-analysis as a tool for organizing, analyzing, and making sense of stress research in policing. For those perhaps unfamiliar with meta-analysis, a discussion of the methodology follows in Chapter 3.

[29] The subjective and complex nature of stress perception precludes the possibility of perfect prediction. Yet, as with all inquiries in the behavioral sciences, researchers are perhaps most interested in identifying general truths, *i.e.,* which groups of people, under what circumstances, are most likely to respond in what ways? And what factors can be influenced to evoke the most positive outcomes among the most people in the most efficient way?

CHAPTER 3:
METHODS

As the previous chapter highlighted, research findings in the area of police stress, though numerous, are inconsistent. In fact, traditional narrative reviews generally lament the "overwhelming and inconclusive nature" of that literature (*e.g.,* Abdollahi, 2002, p. 1). As such, it is somewhat surprising that a meta-analytic review has not already been conducted on this body of work. The usefulness of meta-analysis in summarizing large bodies of research has been broadly recognized in other fields (*e.g.,* education, medicine, psychology). Yet the technique has been utilized with less frequency in the field of criminal justice. The meta-analytic reviews which *have* been conducted within the discipline have largely focused on the correctional literatures, specifically those related to prediction and treatment. Meta-analysis has even been used to review the literature on stress among correctional officers (Dowden & Tellier, 2004), in a manner very similar to that being proposed here. Yet meta-analysis has been little-used in studies of policing, an area where its use could have significant impact, given the number of primary studies across a wide range of topics within that field. The technique is especially appropriate for the current study, given the volume of research on the topic of police stress yet the overall inconclusiveness of that body of literature. A discussion of the goals and methods of the current study, including specifics regarding the application of meta-analysis, follows.

The Current Study

The purpose of the current study is to identify and compare the key correlates of perceived stress among police officers. It is believed that such information may be useful in guiding the future development of stress prevention/intervention strategies for police officers and of standardized stress measurement instruments specific to this occupational group. Additional

benefits to be gained from the proposed study include: 1) the systematic documentation of gaps and inconsistencies in the extant literature, including those related to research methodology, and 2) the creation of an organized database of information that can be updated as new primary studies of this literature become available.

Perhaps one reason meta-analysis has not already been applied to this body of literature – and more extensively used in policing altogether[1] - is the all-too prevalent tendency within the field toward conducting exploratory, multivariate studies without the benefit of guiding theory, coupled with a lack of enthusiasm for conducting replicative studies. The result has been very little standardization of methods or measurement instruments,[2] facts which complicate meta-analysis to some degree and may be off-putting to those who would otherwise try their hand at such a review. However, meta-analysis is as useful for highlighting the inconsistencies and gaps in a body of literature as for aggregating findings, and ought to be encouraged for the purposes of guiding future research, if for no other reason. The argument made here is that meta-analysis is the most appropriate method for meeting the goals of the proposed study. However, the meta-analytic method is not without detractors; therefore, a discussion of both its strengths and its most common criticisms will follow.

Meta-Analysis

The genesis of meta-analysis is generally credited as Gene Glass's 1976 presidential address to the annual meeting of the American Educational Research Association (Hunt, 1977).[3] In it, he used the term "meta-analysis" to refer to a higher level of scientific analysis which was,

[1] Though this trend may be changing – see Kochel, Wilson and Mastrofski (2011) for an excellent recent example of the use of meta-analysis in an historically-contentious area of policing research.
[2] This is unlike the prediction and treatment literatures, which are heavily based in psychology and very likely to focus on the refinement and standardization of measurement instruments.
[3] This, though similar work was almost simultaneously being conducted by Schmidt and Hunter (1977) and Rosenthal and Rubin (1978). "Meta-analysis" as generally understood today encompasses the work of all these researchers and others who engage in quantitative research synthesis.

in his own words, an "analysis of analyses." The purpose of such a tool would be to synthesize a given body of quantitative research by statistically standardizing and averaging effect sizes across individual studies. In this way, each study would become a data point in a larger "study of studies," allowing for the aggregation of results while simultaneously highlighting areas where further research might be needed. A year later, Smith and Glass (1977) published an applied demonstration of the technique in a now-classic review of the psychotherapy treatment literature. Since then, there has been an "explosive expansion" of publications of meta-analyses and issues related to the technique (Hunter & Schmidt, 2004). The shear degree of this interest is evidence that many scholars have embraced the strengths of the approach; yet, it is not without criticisms. An overview of each follows.

Advantages of Meta-Analysis

Perhaps the greatest strength of meta-analysis is its stated purpose - that it allows the researcher to synthesize findings and draw conclusions from a large body of quantitative literature by standardizing findings across individual studies. As Glass *et al.* (1981) point out, individual studies are no more "comprehensible without statistical analysis than the hundreds of data points in one study" (p. 12). The statistical aggregation of findings made possible by meta-analysis allows researchers to evaluate a body of empirical research *as a whole.* Yet there are several other advantages of this technique over traditional narrative or vote-counting reviews.

Precision of Estimates

Meta-analysis shifts the focus away from traditional null-hypothesis significance testing (NHST) by making use of point estimates and confidence intervals. Recall from Chapter 2, that NHST has been criticized because it does not provide information about the magnitude of a given result nor about the precision of the estimation of the effect size. Furthermore, the Type I

and Type II error rates associated with NHSTs are often misunderstood, even by those conducting the analyses (Hunter, 1997). Meta-analysis, on the other hand, emphasizes the use of point estimates and confidence intervals, which allow researchers to determine both direction and magnitude of effect. Confidence intervals also hold Type I and Type II errors at the same level, allowing for an easier interpretation of results. These are important differences, as studies have shown that the precision of estimates provided by meta-analytic reviews result in consumers drawing different conclusions than those drawn from traditional reviews of the same literature (*e.g.,* Cooper & Rosenthal, 1980).

Assessing the Impact of Study Characteristics

Because researchers can code for details related to study characteristics, meta-analysis can be used to determine the impact of those characteristics on outcome measures. Traditional reviews cannot account for study characteristics in a systematic way; therefore, their impact may be under-realized or overlooked altogether.

Transparency of the Process

Meta-analyses are conducted according to explicit and systematic processes. This transparency in the identification, selection, coding, and analysis of studies allows consumers of meta-analytic reviews to "assess the author's assumptions, procedure, evidence, and conclusions [for themselves], rather than take on faith that the conclusions are valid," (Lipsey & Wilson, 2001, p. 6). Such transparency also allows for easy replication of meta-analyses themselves.

Organization of Data

The meta-analytic process makes possible the systematic organization of large amounts of data. These data can then be updated with relative ease as new studies become available.

This, when routinely done and made available to others, can be a great boon to knowledge accumulation in any field.

Influencing Policy Decisions

If academics wish for the "people who count" (Gendreau & Smith, 2007) to make policy decisions according to an informed understanding of the research in any given area, then academics must take it upon themselves to communicate that research in the most easily digestible way. Meta-analysis, with its emphasis on point estimates, confidence intervals, and effect sizes, lends itself – especially when results are graphically displayed – to ease of interpretation. Furthermore, policymakers can give more credence to conclusions drawn from these quantitative summaries conducted according to standardized review processes than to traditional narrative or vote-counting reviews which are too-often contradictory, inconclusive, and even biased (Jackson, 1980).

Criticisms of Meta-Analysis

"Garbage In-Garbage Out"

The criticisms previously leveled against the extant police stress literature might lead some to argue that aggregation of flawed individual studies would amount to nothing more than a higher-level review of less-than-useful data – "garbage in, garbage out," some have accused. However, one of the advantages of meta-analysis is being able to code for variations of numerous types, including methodological quality. Thus, while meta-analysis cannot erase the limitations in primary studies, it can account for them in a systematic way, allowing the researcher to then test to see if differences in effect sizes are dependent upon methodological variables. If they are, then the meta-analyst can decide to either exclude significantly different studies or include them with the appropriate statistical corrections (Lipsey & Wilson, 2001).

This has the double advantage of providing a measure of confidence in aggregate findings while simultaneously highlighting research practices particularly in need of change.

"Apples and Oranges"

A second criticism of meta-analysis is that studies selected for inclusion may be so different with regard to their individual independent and dependent variables that to compare them would be akin to comparing "apples and oranges." Yet, as Glass (1978) points out, we *must* overlook differences between studies to a certain degree. If studies were *exactly* alike, they would have the same findings within statistical error, and there would be no need for a meta-analysis in the first place. Furthermore, the decision about which studies are appropriate to include in the same meta-analysis should be guided by the question(s) the researcher seeks to address. If we are interested in making generalizations about fruit, Glass says, then it is perfectly acceptable to include apples and oranges in the same analysis. On the other hand, if our concern is about apples only, then we must be more selective. Lipsey and Wilson (2001) also point out that advances in meta-analytic techniques now make it possible to statistically test for the homogeneity of studies. By analyzing the variance of effect sizes across study groupings, researchers can determine whether differences are more than would be expected from sampling error alone. This can also lead to discoveries about the sources of differences in study outcomes, important information in itself.

The "File Drawer" Problem

A third criticism often made against the use of meta-analysis is commonly referred to as the "file drawer problem." This is, essentially, an argument about publication bias. Specifically, in order to ascertain the true "state of the art" in a given field, a meta-analysis would need to include not only those studies which have been published (and, as such, may be biased toward

findings of significance), but also unpublished studies which may be more likely to provide evidence of the opposite sort, and have thus been relegated to the file drawers of researchers. This is a reasonable argument, *prima facie,* and, in fact, there is some evidence that unpublished theses and dissertations have smaller effect sizes than studies of the same topic from other sources (Rosenthal, 1984). However, other studies have found no significant differences between effect sizes from published versus unpublished sources (Glass *et al.,* 1981; Hunter & Schmidt, 1990). Furthermore, even if the assumption of publication bias is correct, there are two counterarguments to be made in favor of meta-analysis:

1) First, a diligent meta-analyst can make a concerted effort to locate unpublished studies. This can be done a number of ways, including reviewing the references of published studies for mention of unpublished works, searching dissertation databases, contacting authors of published studies to ask if they have or know about other studies on the topic which have not been published, and reviewing the programs of professional conferences for leads to unpublished works.
2) Second, the meta-analyst can conduct a "fail-safe *n*," a statistical procedure designed to calculate the number of contradictory studies that would be necessary to make the effect size calculated in the current analysis unlikely. This calculation can be considered a measure of the degree of confidence that can be placed in the results of the meta-analysis.

The "Independence" Problem

A fourth criticism of meta-analysis has been called by some the "independence problem." This refers to the fact that one empirical study may produce multiple effect size estimates, either because the study includes estimates of effects on multiple dependent variables or because

researchers have conducted multiple analyses on different subsamples (*e.g.,* males and females or supervisors and non-supervisors). Obviously, multiple effect sizes produced by the same study might not be independent of each other. However, there are different ways the meta-analyst can address this problem. The most common approaches include *either* using the average effect size for multiple estimates of the same construct *or* selecting only one effect size for inclusion in the meta-analysis according to some pre-determined criteria. However, the decision regarding which criteria to use might not be easily made (and might even unknowingly introduce researcher bias); it would also negate one of the advantages of meta-analysis by necessarily limiting the information ultimately derivable regarding differences in outcomes due to methodological variations. An alternative to creating independent effect sizes is to statistically model the dependencies among multiple effect sizes so that they may all be included in the analysis (Hunter & Schmidt, 2004), and alternative models have been created for doing so.[4]

Summary of Meta-Analysis as a Research Tool

Meta-analysis is a research tool. Like all tools, its usefulness depends on its proper application. To ignore the criticisms discussed above would be to undermine the effectiveness of the technique. However, each criticism can be rationally and adequately addressed with thoughtful planning. The following section will outline the specific plan that was followed for the proper application of meta-analysis in the current study.

Sample

To be eligible for admissibility in the meta-analysis, studies were required to meet the following criteria:

[4] Random and fixed effects models have been created based on different assumptions about the variability of population parameters.

- Research conducted between 1960 and 2011[5]
- Police officers as the sample under study
- The inclusion of perceived stress as an outcome measure[6]
- Sufficient statistical information available to convert the reported statistic into an effect size

Selection of the Outcome Measure

Given the subjective nature of perception and the crucial role it plays in shaping stress, operationalizing stress can be challenging, and researchers have done so in many ways. Recall from Chapter 2 that operationalizations of stress have included direct measures (*i.e.,* self-reported perceptions of stress) and indirect measures, with indirect measures using such variables as physiological outcomes, health outcomes, emotional outcomes, behavioral outcomes, and job performance outcomes as proxies for stress. Recall, too, that, according to Selye's General Adaptation Syndrome, some of these proxy measures may or may not be in evidence depending on the phase during which the measures were taken, and some of the proxy measures are only potential outcomes that may appear if stress is not successfully dealt with in the long-term – they are by no means inevitable for all individuals who are, in fact, experiencing stress. Finally, some of the proxy measures may be outcomes for conditions other than job stress. Therefore, it would not be appropriate to compare both types of outcomes in one meta-analysis because it is not at all theoretically clear that the two are measuring the same construct; indeed, there is evidence that very often they are not (*e.g.,* Cacciopo *et al.,* 1993). For these reasons, the current meta-analysis

[5] "Police stress" as a field of study did not truly emerge until the late 1960s through the 1970s. However, to provide a time "cushion" and ensure as much inclusivity as possible, 1960 was selected as an appropriate cut-off.
[6] Studies that do not specifically investigate police stress as the outcome measure of primary interest, but that include sufficient information to calculate an effect size will also be included.

includes only those studies that use *perceived stress* as the dependent variable. To summarize, this decision was made based on the following tri-point rationale:[7]

1) Perception is instrumental in defining stress according to Selye's General Adaptation Syndrome
2) Work by Cacciopo *et al*. (1993) shows that self-report and physiological measures do tap different aspects of affective experiences and these measurement scales are often uncorrelated
3) Though the argument could be made that self-report measures of stress are open to bias due to their inherently subjective nature, as Parker and DeCotis (1983) point out, "there appears to be no fully acceptable alternative that does not compromise the precision of the concept," (p. 163), a position supported by some of the most productive researchers in the field of work stress, generally (*e.g.,* Dewe, 1991; 1993).

Future meta-analyses of different dependent variables (*e.g.,* those using physiological measures) would allow us to determine whether the same correlates produce similar effect sizes across analyses, thus providing evidence as to whether or not the differently named measures are likely tapping the same underlying construct, and this is certainly one suggested avenue of further research.

Literature Search

The literature search began with a search of the following computerized databases: Criminal Justice Abstracts, Criminal Justice Periodicals, PsycINFO, PsycINFO Historic, PsycARTICLES, Psychology & Behavioral Sciences Collection, Social Science Index, Social Sciences Citation Index, Academic Search Premier, and Dissertation & Theses. Broad search

[7] Dowden and Tellier (2004) provide a similar rationale for excluding physiological outcomes measures in their meta-analysis of stress among correctional officers.

criteria which included roots for "resiliency" and "hardiness" were used in an attempt to locate all relevant studies. Specifically, the following search command was used:

(police OR law enforce*) AND (stress OR distress OR strain OR resilien* OR hard*)[8]

Search results were then exported to a citation management program (RefWorks) for easier organization, including the identification and removal of identical works.

Next, the references of the most recent narrative reviews of police stress (Abdollahi, 2002; Waters & Ussery, 2007), previously identified during the writing of Chapter 2, were searched to identify any additional studies perhaps not found via the initial database search. (The references of those studies eventually selected for inclusion in the meta-analysis were also checked for any relevant studies that might have been missed in these initial searches).

This broad search process initially produced 24, 176 cases for possible inclusion. This number was quickly narrowed to 818 studies by first removing duplicates, then screening abstracts and removing those articles that clearly did not include a study at all. Of the 818 studies that required closer screening, it was determined that an additional 410 did not meet inclusion criteria for the following reasons:

1. The article described a case study with only one subject (n = 31)
2. The article was qualitative or exploratory and did not provide quantitative data (n = 37)
3. The article was a meta-analysis of a subject related to police stress (n = 7)

[8] While the argument was made in Chapter 1 that "stress" and "strain" ought not be considered the same construct, very often in the extant literature those terms have been used interchangeably. Therefore, "strain" was included as a search term. "Burnout" was not be included, however, as it is generally considered a potential result of unresolved stress over a long term. Further, though these search terms should have captured all types of stress-related studies (*i.e.,* eustress and distress), virtually all the studies unearthed either explicitly or implicitly focused on distress. While some of those studies included a (usually brief) discussion of the positive aspects of stress, they did not explicitly study eustress nor did they attempt to identify different types of stress as experienced by officers.

4. The article described a study that included subjects other than police officers and for which data regarding sub-samples of police officers was not reported (n = 44)
5. The article described a study for which the outcome was something other than perceived stress (n = 291)

In an attempt to locate unpublished studies, the most recent convention programs of the American Society of Criminology (ASC), the Academy of Criminal Justice Sciences (ACJS), and the American Psychological Association (APA) were searched using the same key words as used in the database search. Authors of relevant studies were then contacted via email and asked for leads on any unpublished studies that fit the inclusion criteria for the current meta-analysis. The content of that email solicitation can be found in Appendix A. While this effort resulted in confirmation of some studies which had already been obtained, it resulted in no new studies that met the criteria for inclusion in the meta-analysis.

The remaining 408 articles were then coded using the coding sheet included in Appendix B. These efforts ultimately resulted in 103 unique studies eligible for inclusion in the current meta-analysis. From the 103 studies, 338 individual effect size estimates were calculated.

Description of Measures

Most studies did not report data for all of the following characteristics that were included in the current meta-analysis. However, as one purpose of meta-analysis is to highlight gaps and inconsistencies in the literature, systematic documentation of even their absence was considered useful information.

Study Characteristics

Per fairly standard meta-analytic protocol (Lipsey & Wilson, 2001), several pieces of information regarding the context of each study were collected. These included:

- Information related to the primary author (*e.g.,* name, contact information, affiliation, discipline)
- Information related to study sponsorship or funding
- Information related to the availability of the study (*e.g.,* publication status, publication source, year of authorship/publication)
- The country where the study was conducted, including regional information

Sample Characteristics

All available information regarding the size (n) and description of study samples was collected. This included information regarding location, type, and size of organization(s) the samples were drawn from as well as the overall racial/ethnic and gender composition of the samples (*e.g.,* primarily male or primarily White, based on an 80% threshold or "mixed"). This also included information regarding the age, educational attainment, marital status, token status, tenure, rank, supervisory status, and job assignment composition of the samples.

Effect Size Estimates

Effect size estimates were calculated, when possible, for a number of individual, organizational, system, and community-level characteristics. How these characteristics were coded depended largely on how they were measured in the primary studies. However, the following chart provides examples of independent variables and ways they were coded for the meta-analysis. The general approach used was to initially code variables at the most specific level of detail available. When appropriate, this would later allow for collapsing measures into broader categories. For each effect size estimate, the type of statistical information upon which it was calculated (*r*, ANOVA, Chi-square, descriptive statistic, *t* test, *p* value not otherwise specified) was recorded.

Table 3.1
Characteristics Included in the Meta-Analysis by Level of Measurement[9]

Variable/Characteristic	Measure
Individual-Level	
Race/ethnicity	80% threshold (white, black, Hispanic, Asian, native, other) or mixed sample
Gender	80% threshold (male, female) or mixed sample
Token Status	80% threshold based on self-identified status as being either a racial or gender "token" within the organization (yes, no) or mixed sample
Age	Mean age of the sample
Level of Education	Median education level (*e.g.,* less than high school diploma, high school diploma, some college, bachelor degree, some graduate, graduate degree) of sample or mean years of education of sample
Marital Status	80% threshold (married or cohabitating, single – never been married, single – divorced, single – widowed, single – not otherwise specified) or mixed sample
Personality Characteristics	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: global personality measure, Type A, external locus of control, Neuroticism, Extraversion, trait anxiety, self-esteem, control/compulsiveness, need for power
Coping	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: global use of coping strategies, global social support, social support (non-work sources), surfacing acting, religiosity/faith, leisure activities, active/approach coping, avoidant coping, alcohol use, tobacco use

[9] The 80% threshold used for several of the measures is a fairly rigorous standard within the practice of meta-analysis. While there is no hard "rule" for such thresholds, a higher standard allows for greater confidence in any generalizations made from the results of the analysis.

Hardiness/Resiliency	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: hardiness/resiliency and post-traumatic growth
Attitudes	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: attitude toward counseling and attitude toward job
General Health or Well-being and Life Satisfaction	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: general health or well-being, life satisfaction, and depression (when not used as a proxy for stress)
Past experiences	Percent reporting: previous experience of trauma (general), previous experience of on-the-job trauma, on-the-job injury in the previous year, military experience. Also mean number of sick days used in previous year
Career Stage	Median time on the job for sample (less than 5 years, 5-10 years, 11-15 years, 16-20 years, 21-25 years, more than 25 years) or mean years on the job for the sample
Rank and Supervisory Status	Percent reporting supervisory status and 80% threshold (police/line officer, sergeant, lieutenant, captain, chief, other) or mixed sample
Job assignment	80% threshold (operational – patrol, operational – other, administrative) or mixed sample
Shift assignment	80% threshold (day, evening, overnight, variable) or mixed sample
Workload	Type of measure (perceived/objective and dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and percent reporting over- or underload

Job Control	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for degree of control or influence over work activities
Job Satisfaction and Intention to Quit	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for job satisfaction and intention to quit
Reward Expectation	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for degree to which reward expectations have been met
Work-family conflict	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for work-family conflict
Negative Life Events	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: global negative life events. Also percent reporting recent serious illness, divorce, problems with children, death of loved one, financial difficulties
Felt or Experienced Operational Exposure (independent of the outcome measure)	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: global operational exposure, threat of death or injury to self, exposure to violence/suffering of others, inflicting harm on others, experience or fear of death or serious injury of colleague, mean crime rate of assignment area, mean violent crime rate of assignment area, mean property crime rate of assignment area
Stress Management Training	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for participation in stress management training
Organizational-Level Characteristics	
Number of Organizations	Number of organizations represented in the sample

Type of Organization	80% threshold (municipal, sheriff/county, state, federal, other) or mixed sample
Structure (Bureaucratic Complexity)	80% threshold (simple, moderate, complex) or mixed sample
Size	80% threshold (small, medium, large) or mixed sample as reported by author or median by number of full-time sworn officers (less than 10, 10-50, 51-100, 101-500, 501-1000, over 1000) or mixed sample
Organizational Support	The instrument or scale used, including the type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) and whether the measure was a subscale or separate measure was coded for: global social support (work), social support (supervisors), social support (peers), instrumental support
Organizational Culture	Type of measure (perceived/objective and dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for inclusiveness of organizational culture
Organizational Fairness	Type of measure (perceived/objective and dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for organizational fairness
Sexual/Gender Harassment	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for experience of sexual/gender harassment on the job
Racial/Ethnic Harassment	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for experience of racial/ethnic harassment on the job
System-Level Characteristics	
Effectiveness of the Criminal Justice System	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for perceived effectiveness of the criminal justice system
Justness of the Criminal Justice System	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for perceived justness of the criminal justice system
Community-Level Characteristics	
Number of Communities	Number of communities represented in the sample

Location	80% threshold (urban, suburban, rural) or mixed sample
Ratio Officers to Population	Mean ratio of officers to population in jurisdiction
Crime Rates	Mean overall, violent, and property crime rates for jurisdiction
Public Relations	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for perceived public attitude toward police
Media Relations	Type of measure (dichotomous, summed dichotomous, frequency/rate, intensity index, continuous) for perceived state of media relations with police
Macro-Level Characteristics	
Country of study	Specific country or mixed sample
Region	If United States, region (Northeast, Midwest, South, West) or mixed sample

Outcome Characteristics

Information coded regarding the outcome of "perceived stress" included:

- Whether or not the outcome was measured in response to a simulated (training) environment
- Type of measure (*e.g.,* dichotomous, summed dichotomous, frequency/rate, intensity index, continuous)
- Instrument (*e.g.,* a specific, more widely-used scale or an author-created scale for the current study)
- If a widely-used scale, whether or not it was modified from the original version
- Mean of the dependent measure

Methodological Characteristics

Methodological attributes were also recorded, allowing for the creation of an index of methodological quality ranging from zero to nine. This included information regarding:

- The presence or absence of a theoretical explanation for the selection of independent variables
- The adequacy of description of the sample
- The representativeness of the sample
- The adequacy of the description of the methods used to conduct the study
- The adequacy of the response rate (at least 60%)
- The assessment of the reliability of the primary outcome measure
- The adequacy of the reliability of the primary outcome measure (as determined by the study author)
- The assessment of statistical power
- The adequacy of statistical power (as determined by the study author)

Treatment of Missing Data

Missing data were coded as such. This is important for different reasons. First, it is a systematic way of highlighting gaps in the literature. Second, it gives the meta-analyst options with regard to data analysis. The plan for the current meta-analysis was to treat missing data in two ways - excluding entirely those studies with missing data and substituting a single-value estimate such as zero for a null effect or the mean value of observed cases – and then assess any differences in outcomes. However, the amount of missing data was so large, it was determined that excluding cases would result in too few studies for a meaningful summary of the research and substitution with null or average values would not be appropriate.

Inter-rater Reliability

The author coded all studies using a master coding guide (see Appendix B). A second person, experienced in meta-analysis, was then asked to code a sample of ten studies which, unbeknownst to her, was comprised of a random sample of five included studies and a random sample of five rejected studies. Inter-rater reliability, based on all ten studies, was then calculated on forty-six variables representing study characteristics, sample characteristics, outcome data, all predictor categories, and methodological quality. The resultant reliability score was .90 according to Yeaton and Wortman's (1993) formula[10]:

$$Agreement = \frac{\sum Agreements}{\sum Agreements + \sum Disagreements}$$

Data Analysis

Descriptive Statistics

First, univariate statistics are reported to describe the studies included in the meta-analysis and the organizations and workgroups they represent.

Effect Size Calculation

A mean effect size was estimated for each independent variable, when possible. The effect size statistic used was the standardized correlation coefficient *r*. This statistic was used because: 1) it is the metric most commonly reported in the population of studies under investigation, 2) it is relatively easy to interpret, and 3) there are formulae available for converting other test statistics into an *r* (Rosenthal, 1991). Because *r* is not normally distributed, this statistic was then converted to the corresponding *Z(r)* values using the Practical Meta-

[10] Due to the large amount of missing data across all variables, the calculation for inter-rater reliability included the percentage of agreement regarding data coded as such.

Analysis effect size calculator, which can be found at:

http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-R-main.php

Weighted effect size calculation

In order to control for differences in sample sizes, a weighted mean effect size was calculated for each *Z(r)* using the following formula:

Σ (*Zr**N-3)/N-3, where N-3 was the total sample size minus three

Corresponding 95% confidence intervals were then calculated for each weighted mean effect size.

Effect Size Homogeneity

The original plan for the meta-analysis was to analyze the homogeneity of studies via calculation of the *Q* statistic (see Lipsey and Wilson, 2001). A significant *Q* statistic would indicate heterogeneity among effect sizes and would imply that a search for moderator variables would be the appropriate next step in the analysis. However, the large amount of missing data and the resultant small number of calculable effect sizes precluded searching for potential moderator variables; therefore, this analysis was not conducted.

Mean Effect Size by Predictor Domains

Based on the results of the primary analyses described above, aggregated mean effect size values were calculated, when possible, for (mutually-exclusive) composite predictor domains created to represent key theoretical components of the integrative model of stress and coping presented in Chapter 2. Specifically, the following predictor domains were calculated:

- Adaptive Personality Characteristics
- Maladaptive Personality Characteristics
- Past Experiences of Trauma/Illness/Injury
- Effort-Reward Calculation

- Control/Authority Evaluation
- Resource Evaluation (sub-divided as the following)
    - Social Support
    - Other
        - Gains
        - Drains
- Approach Coping
- Avoidant Coping
- Person-Environment (Mis)fit

The rationale for the selection of variables for each predictor domain will be discussed in more detail in the following chapter.

Limitations

Though carefully designed, the current study is not without limitations. First, even with a systematic search of the literature, it is likely not all eligible studies were found and included in the analysis. Second, though a clear rationale has been provided for including only studies of "perceived stress," in the analysis, there are limitations inherent in that decision. Direct comparisons with studies using other measures of stress are not possible. (However, the current study provides an organized database of information upon which future studies including alternative outcome measures may be built). Finally, the studies meeting the established eligibility criteria were fraught with missing data. This severely limited the ability to conduct meaningful statistical analyses, and suggests those analyses which are reported should be interpreted with caution. Yet, as a stated purpose of the meta-analysis was to systematically

document and report gaps in the literature, the large amount of missing data offers an important starting point for discussions about the true state of the research in this area.

Summary of Methods

The current study is a quantitative synthesis of the empirical literature on perceived stress among police officers. Advantages to such an endeavor include:

1. the systematic organization of a large amount of empirical literature via a transparent process which may later be replicated or updated as new research becomes available,
2. the generation of precise effect size estimates which will allow for greater confidence in the assessment of the strength of relationships of interest,
3. assessment of the impact of methodological variations across studies, and
4. the systematic documentation of gaps or deficiencies in the research body.

As will be discussed in the following chapter, the current meta-analysis makes an important contribution toward items one and four above, but can only suggest avenues for further exploration of items two and three based on the current state of the research.

CHAPTER 4:
RESULTS

The preceding chapters provided a history of the development of the research in police stress, offered a narrative review and critique of that research, and outlined a method whereby meta-analysis would be used to systematically quantify the findings from a significant portion of that body of work (studies examining the outcome of perceived stress, specifically). This chapter presents the results of the researcher's endeavor to achieve those goals, including obstacles which limited the attainment of some. Specifically, the results are presented in four sections. First, the characteristics of the studies included in the meta-analysis are presented. Second, the characteristics of the samples included in these studies are presented. Third is a presentation and discussion of missing data and their impact on the current study. Finally, correlates are collapsed into predictor domains mapped to the integrative model of stress and coping presented in Chapter 2, and a discussion of those findings is presented.

STUDY CHARACTERISTICS

The search procedure outlined in the previous chapter resulted in the identification of 103 eligible studies from which 338 individual effect sizes were calculated. As indicated in Table 4.1, the majority of studies (69.2%) were from published sources. However, a sizeable number of studies (30.8%) were from unpublished sources. One criticism of meta-analysis previously discussed is that of the "file drawer" problem. The inclusion of a substantial number of unpublished studies in the current analysis, coupled with the targeted attempts to locate unpublished studies described in Chapter 3, minimizes the probability of publication bias and is a strength of the current study.

Though police officers were the population under study, more studies were conducted by psychologists (37.9%) than by researchers in the field of criminal justice (24.6%). The "other"

category (21.3%) included a variety of disciplines, with slightly higher representation in the combined fields of medicine/community health and management/economics. The fact that researchers across such a diverse population of disciplines have contributed to this body of research may also account for many of the inconsistencies discussed in further detail below.

While the eligibility criteria allowed for the inclusion of studies authored between 1960 and mid-2011 (through the conclusion of the researcher's search period), no studies prior to the 1980s met the other criteria necessary for inclusion. This is likely because early studies focused on surveying police officers in an attempt to generate lists of potential stressors or defined their outcome more narrowly (*e.g.,* as "role stress"). A narrative review of popular issues in criminal justice might suggest that interest in police stress reached its peak in the 1980s; however, in absolute numbers, studies of police stress from 2000 to 2009 more than doubled those conducted in any previous decade. Interest in the subject does not appear to be waning, as evidenced by the fact that 25 of the studies eligible for inclusion were authored in the last 18 months of the search window.

While the majority (59.5%) of studies included in the analysis was conducted in the United States, the topic of police stress is receiving attention from researchers around the world, with other former European colonies and the United Kingdom leading in the generation of studies (19.8%, collectively).

As Table 4.1 indicates, there is considerable variation in the type of measures used for perceived stress as an outcome. The two most-often used measures were author-created, Likert-type scales (15.1%) and single-item measures (14.8%). A full 25.7% of the total studies included in the analysis used a variety of measurement instruments that were represented nine or

Table 4.1
Characteristics of studies included in the meta-analysis (338 effect sizes from 103 studies)

Variable	Freq (percent) (k=338)	Freq (percent) (N=103)
Publication Source		
Published	234 (69.2)	70 (68.0)
Unpublished	104 (30.8)	33 (32.0)
Discipline of Primary Author		
Criminal Justice	83 (24.6)	20 (19.4)
Psychology	128 (37.9)	41 (39.8)
Other	72 (21.3)	24 (23.3)
Not Reported	55 (16.3)	18 (17.5)
Year Published or Authored		
1980-1989	49 (14.3)	19 (18.4)
1990-1999	77 (22.6)	25 (24.3)
2000-2009	188 (55.6)	49 (47.6)
2010-mid 2011	25 (7.4)	10 (9.7)
Country of Study		
United States	201 (59.5)	63 (61.2)
Australia	31 (9.2)	8 (7.8)
Canada	20 (5.9)	5 (4.9)
United Kingdom	16 (4.7)	2 (1.9)
Turkey	8 (2.4)	1 (0.01)
mixed	7 (2.1)	2 (1.9)
other	55 (16.3)	22 (21.4)
Type of Stress Measure		
Author-created, Likert-type scales	51 (15.1)	14 (13.6)
Single-item measure	50 (14.8)	8 (7.8)
General Health Questionnaire (all versions)	44 (13.0)	7 (6.8)
Speilberger Police Stress Survey	36 (10.7)	12 (11.7)
Cohen *et al.* Perceived Stress Scale	19 (5.6)	11 (10.7)
Work Environment Inventory	11 (3.3)	2 (1.9)
Brief Symptom Inventory	10 (3.0)	3 (2.9)
Depression, Anxiety & Stress Scales	10 (3.0)	3 (2.9)
Occupational Stress Indicator	10 (3.0)	3 (2.9)
Occupational Stress Inventory	10 (3.0)	4 (3.9)
Other (25 different scales)	87 (25.7)	36 (35.0)

Totals may not equal 100% due to rounding.

fewer times in the overall population of studies. Further, the third most popular instrument used was some variation of the General Health Questionnaire, which is arguably a broader measure of overall ill-health, but which has been accepted by many stress researchers as a reasonable measure of perceived stress because it asks subjects to self-report frequency and intensity of feelings of strain.

In sum, studies included in the analysis were more likely than not to be published (69.2%), to have been authored between 2000 and 2009 (55.6%), and to have been conducted in the United States (59.5%). Further, they were more often conducted by scholars in the field of psychology (37.9%) than any other discipline, and more likely to utilize author-created, Likert-type scales for assessment of perceived stress (15.1%) than any other measure.

STUDY QUALITY

All studies included in the meta-analysis were given an overall methodological quality score based on the following nine-item index:

1. Was there a theoretical explanation for the selection of variables? (no = 0, yes = 1)
2. Was there an adequate description of the sample? (no = 0, yes = 1)
3. Was the sample representative of the population under study? (no = 0, yes = 1)
4. Was there an adequate description of the methods? (no = 0, yes = 1)
5. Was the response rate at least 60%? (no = 0, yes = 1)
6. Was reliability reported for the primary outcome measure? (no = 0, yes = 1)
7. Was reliability adequate (as assessed by the study author) for the primary outcome measure? (no = 0, yes = 1)
8. Was statistical power assessed? (no = 0, yes = 1)
9. Was statistical power adequate (as assessed by the study author)? (no = 0, yes = 1)

The mean methodological quality index score for the 103 studies included in the meta-analysis was quite low; only 3.83. Table 4.2 summarizes the index scores of the studies by item.

Table 4.2
Methodological characteristics of the studies contributing to the meta-analysis

Characteristic	Freq (percent) (n = 103)
1. Theoretical Explanation	
No	22 (21.4)
Yes	81 (78.6)
2. Adequate Sample Description	
No	92 (89.3)
Yes	11 (10.7)
3. Sample Representative of Population	
No	81 (78.6)
Yes	22 (21.4)
4. Adequate Description of Methods	
No	15 (14.6)
Yes	88 (85.4)
5. Response Rate at Least 60%	
No	66 (64.1)
Yes	37 (35.9)
6. Reliability Reported for Outcome Measure	
No	32 (31.1)
Yes	71 (68.9)
7. Reliability Adequate for Outcome Measure	
No	32 (31.1)
Yes	71 (68.9)
8. Statistical Power Assessed	
No	95 (92.2)
Yes	8 (7.8)
9. Statistical Power Adequate	
No	97 (94.2)
Yes	6 (5.8)

The majority of studies (78.6%) provided some sort of theoretical explanation for the selection of the variables included in the study, though most were not an explicit test of any particular theory. Rather, authors tended to draw on one or more theory to justify the selection of variables for studies designed to test more narrow hypotheses, many of which were not directly related to the theory or theories initially discussed.

An overwhelming majority of studies (89.3%) did not provide an adequate description of their respective samples; the implication for this are discussed in more detail later in this chapter. Sample descriptions were judged as "inadequate" if any of the characteristics summarized in Table 4.3 were missing.

Most (78.6%) of studies either reported that their respective samples were *not* representative of the populations from which they were drawn or they simply did not report enough information to reach a conclusion on this item. Missing data regarding methodological characteristics were coded as "0." In that sense, the methodological quality index is conservative. However, the failure to report this information ought to be considered a quality issue, as well.

Only 14.6% of studies failed to provide an adequate description of the methods used in the study. However, this index item was merely a measure of the reporting, not a judgment about the quality of the methods themselves. In that light, it is somewhat distressing that nearly 15% of studies did not provide enough information for the meta-analyst to clearly ascertain exactly how the studies were conducted.

As with item number three, the index item regarding response rate was scored as "0" if the study either reported a response rate of less than 60% or failed to report sufficient information to calculate a response rate at all. As indicated by Table 4.2, nearly two-thirds (64.1%) of studies scored "0" on this item.

Item number six reflects whether the author considered reliability issues as they related to his or her outcome measure. Studies were scored as "1" for this item if reliability was directly assessed by the author or if the outcomes of other reliability studies were reported for the particular measure used. In that sense, reliability reporting for the outcome measure was liberally assessed; still, 31.1% of studies scored "0" for the item.

Perhaps not surprisingly, the item scoring the adequacy of the reliability of the outcome measure (as judged by the study authors themselves) mirrored that of the previous item. Most studies that reported a reliability score judged it as adequate.

Very few studies (7.8%) assessed statistical power. Fewer still (5.8%) judged the statistical power of their respective studies as adequate. It is not known whether this is because authors do not understand power analyses or because they already know the samples to which they have access are not large enough to allow for adequate statistical power.

Unfortunately, the degree of missing data did not allow for an exploration of methodological index variables as potential moderators of study outcomes. However, the documentation of those items does allow for a summary analysis. Specifically, the average methodological quality of studies included in the meta-analysis was low (3.83). That said, there was wide variation among studies, ranging from a low of zero to a high of seven. Most studies (32) scored four, with the second most (24) scoring five, and the third most (12) scoring three out of nine. Taken together, this suggests that the most common level of methodological quality is moderate with room for improvement.

SAMPLE CHARACTERISTICS

Table 4.3 summarizes the characteristics of the samples from which the 338 effect sizes were estimated. Since individual studies could contribute multiple effect size estimates, the

sample characteristics are discussed in relation to the percentage of effect size estimates they contributed to the meta-analysis rather than as a percentage of the included studies.

Majority-male samples contributed the most effect sizes (69.2%), with mixed-gender samples and majority-female samples contributing substantially fewer (17.5% and 5.0%, respectively). However, a full 8.3% of the calculated effect sizes were drawn from samples that failed to report gender composition at all. Even if it could be assumed that those not reporting gender compositions were all mixed or majority-female, it is clear that most of the reported relationships are based on research conducted on primarily male samples. This fact should urge caution in generalizing findings to female officers, and, at a minimum, suggests the field might benefit from more research focused on that group.

With regard to racial/ethnic composition, most effect sizes were drawn from samples that failed to report this information at all (52.7%). Majority-white samples contributed 24.3% of effect sizes within this category, and mixed samples contributed 22.8%. One majority-black sample contributed 0.3% of the effect sizes in this category of data. Recall from Chapter 2 that much discussion has centered around the possibility that racial/ethnic minorities might experience more stress or might experience stress differently from their majority counterparts (particularly if they comprise a minority of their respective work groups). However, most of the relationships reported in this meta-analysis come from studies that failed to even report the racial/ethnic composition of the sample under study, much less any measure of perceived token status or any analysis of the potential relationship between either of those variables and perceived stress.

Unfortunately, many studies seemed to confuse rank with job assignment. As much as possible, information regarding these two distinct variables was coded for in the current meta-

analysis. However, as can be seen in Table 4.3, this information was either not reported at all in many studies or was not reported in such a way that specific rank or job assignment data could be clearly ascertained.

With regard to rank, the majority of effect size estimates were again calculated from studies that failed to report this information at all (50.6%). The next largest contribution of effect sizes came from studies with samples of mixed rank (34.3%), followed by samples of front line/police officers (14.8%). Only one study contributed 0.3% of effect sizes from a sample of sergeants.

Job assignment data were even scarcer, with fully 80.2% of contributed effect sizes in this category coming from studies which did not report on this variable at all. The next largest contribution came from studies with samples of mixed job assignments (11.5%), followed by studies of samples with at least an 80% majority assigned to operational – patrol duties (5.6%). Only 2.4% and 0.3% of effect sizes came from samples that were primarily assigned to other operational or administrative duties, respectively. Considering the importance of rank and job assignment as they relate to the popular (if misguided) dichotomy of police stress as being either operational or organizational in nature, it is surprising that these variables are not more clearly defined and reported in police stress research.

As with other sample characteristics, the plurality of effect size estimates within agency type came from the "not reported" category (33.1%). Samples of municipal agencies contributed the next most (27.5%), and mixed samples the next (19.5%). The "other" category, at 7.1%, included samples from non-U.S. agencies that did not clearly fit in any other category. Sheriff/county and state-level agencies contributed almost equally to the category (with 5.3%

Table 4.3
Characteristics of the samples in the meta-analysis (338 effect sizes from 103 studies)

Variable	Freq (percent) (k=338)	Freq (percent) (N=103)
Gender		
Male	234 (69.2)	70 (68.0)
Female	17 (5.0)	3 (2.9)
Mixed	59 (17.5)	19 (18.4)
Not Reported	28 (8.3)	11 (10.7)
Race/ethnicity		
white	82 (24.3)	26 (25.2)
black	1 (.3)	1 (0.01)
mixed	77 (22.8)	20 (19.4)
Not Reported	178 (52.7)	56 (54.4)
Rank		
police/line officer	50 (14.8)	10 (9.7)
sergeant	1 (.3)	1 (0.01)
mixed	116 (34.3)	34 (33.0)
Not reported	171 (50.6)	58 (56.3)
Job Assignment		
Operational - patrol	19 (5.6)	7 (6.8)
Operational - other	8 (2.4)	3 (2.9)
Administrative	1 (.3)	1 (0.01)
mixed	39 (11.5)	12 (11.7)
Not reported	271 (80.2)	80 (77.7)
Type of Police Agency		
municipal	93 (27.5)	36 (35.0)
sheriff/county	18 (5.3)	3 (2.9)
state	20 (5.9)	6 (5.8)
federal	5 (1.5)	2 (1.9)
other	24 (7.1)	6 (5.8)
mixed	66 (19.5)	21 (20.4)
Not reported	112 (33.1)	29 (28.2)
Location		
urban	70 (20.7)	28 (27.2)
suburban	15 (4.4)	3 (2.9)
rural	27 (8.0)	4 (3.9)
mixed	30 (8.9)	14 (13.6)
Not reported	196 (58.0)	54 (52.4)

Totals may not equal 100% due to rounding.

and 5.9%, respectively). Federal agencies contributed only 1.5% of total effect size estimates within the category.

Regarding location (defined in the current study as a measure of urbanism); again, most effect size estimates (58.0%) came from studies that failed to report this information. The next largest contribution (20.7%) came from urban samples, followed by mixed (8.9%), rural (8.0%), and suburban (4.4%) samples.

When considering the generalizability of a study's results from one sample to a broader population of police officers, this scholar would want, *at a minimum*, to know: the gender composition of the sample, the racial/ethnic composition, the composition with regard to rank and job assignment, the type of agency or agencies the sample was drawn from, and information regarding the location in which the agency or agencies operated. However, as Table 4.3 indicates, even such basic information was not consistently reported among the studies included in the meta-analysis. Again, this may, in part, be the result of researchers from a variety of disciplines and perspectives conducting research on police officers without the benefit of a background in criminal justice theory, generally. Regardless of the reason, such a high degree of missing data severely limits both the information that can be gleaned from individual studies and the generalizability of any findings of interest. Unfortunately, sample characteristics were not the only category of variables fraught with missing data. The following section describes the degree and distribution of missing data, ending with a discussion of how that fact severely limited the current study.

MISSING DATA

Tables 4.4 through 4.12 present summaries of missing data by category, organized from individual-level to macro-level data (as discussed in the literature review in Chapter 2). It is

important to note that these summaries are of those studies that did not report the relevant information at all; however, many studies reported the information, but did not report data sufficient to calculate an effect size representing the relationship between the data and the outcome of stress. In that sense, even less usable data could be drawn from the 103 studies than the following tables imply. Also, since the large amount of missing data is such an important focus of the current meta-analysis, it is worth noting that the inter-rater reliability of .90 reported in the previous chapter included whether or not items were coded as "missing."

Table 4.4
Missing Data for Individual-Level Demographic Variables (N=103)

Variable	Frequency Missing	Percent Missing
Race/ethnicity	56	54.37
Gender	13	12.62
Perceived Token Status	102	99.03
Mean Age	41	39.81
Level of Education	48	46.60
Marital Status	50	48.54

Had there been sufficient data available, the current meta-analysis would have included a mean effect size estimate for each variable as well as tests for the heterogeneity of effect sizes within each variable followed by searches for moderators when appropriate. This would have included analyses based on variations in methodological quality. Discussions would have, in part, centered on the *relative* strength of individual correlates of police stress. However, such analyses conducted with so few effect size estimates would have been mere exercises lacking in real meaning and might therefore have detracted from what has perhaps become the most important contribution of the meta-analysis – the systematic documentation of the considerable gaps and inconsistencies in the research body.

Table 4.5
Missing Data for Individual-Level Personality & Coping Variables (N=103)

Variable	Frequency Missing	Percent Missing
Personality Characteristics		
Type A-B	96	93.20
Locus of Control	97	94.17
Neuroticism	100	97.09
Extraversion	100	97.09
Trait Anxiety	95	92.23
Self-Esteem	97	94.17
Control/Compulsiveness	102	99.03
Need for Power	103	100.00
Attitudes		
Attitude Toward Counseling	101	98.06
Attitude Toward Job	101	98.06
Coping		
Global Use of Strategies	89	86.41
Global Social Support	96	93.20
Social Support (Non-Work)	92	89.32
Surface Acting	101	98.06
Religiosity/Faith	99	96.12
Participation in Leisure Activities	93	90.29
Active Coping	96	93.20
Avoidant Coping	96	93.20
Alcohol Use	91	88.35
Tobacco Use	97	94.17
Hardiness/Resiliency		
Global Measure	98	95.15
Post-Traumatic Growth	102	99.03

Table 4.6
Missing Data for Individual-Level Past Experiences Variables (N=103)

Variable	Frequency Missing	Percent Missing
Trauma (General)	101	98.06
On-the-Job Trauma	95	92.23
Military Experience	101	98.06
Sick Days Used in Previous Year	99	96.12
Participation in Stress Management Training	97	94.17

Table 4.7
Missing Data for Individual-Level Current Situation Variables (N=103)

Variable	Frequency Missing	Percent Missing
General Well-being		
Perceived Health	95	92.23
Life Satisfaction	100	97.09
Depression (not as proxy for stress)	93	90.29
Time on the Job (Career Stage)	57	55.34
Supervisory Status	90	87.38
Rank	58	56.31
Job Assignment	82	79.61
Shift Assignment	97	94.17
Workload	93	90.29
Job Control	95	92.23
Job Satisfaction	77	74.76
Intention to Quit	98	95.15
Reward Expectation	98	95.15
Work-Family Conflict	97	94.17
Negative Life Events		
Global Measure	96	93.20
Serious Illness	102	99.03
Recent Divorce	102	99.03
Problems with Children	103	100.00
Recent Death of Loved One	103	100.00
Financial Difficulties	103	100.00

Table 4.8
Missing Data for Individual-Level Operational Exposure Variables (N=103)

Variable	Frequency Missing	Percent Missing
Operational Exposure		
Global Measure	98	95.15
Threat to Self (Dangerousness)	98	95.15
Exposure to Violence	101	98.06
Inflicting Harm on Others	102	99.03
Death or Serious Injury of Colleague	103	100.00
Crime Rate (Assignment Area)	103	100.00
Violent Crime Rate (Assignment Area)	103	100.00
Property Crime Rate (Assignment Area)	103	100.00

Table 4.9
Missing Data for Organizational-Level Variables (N=103)

Variable	Frequency Missing	Percent Missing
Number of Organizations	10	9.71
Type of Organization	29	28.16
Structure (Bureaucratic Complexity)	102	99.03
Size of Organization	67	65.05
Organizational Support		
Social Support (Work)	95	92.23
Social Support (Supervisor)	96	93.20
Social Support (Peers)	97	94.17
Instrumental Support	98	95.15
Organizational Culture (Bias)	97	94.17
Organizational Fairness	92	89.32
Sexual/Gender Harassment	97	94.17
Racial/Ethnic Harassment	101	98.06

Table 4.10
Missing Data for System-Level Variables (N=103)

Variable	Frequency Missing	Percent Missing
Perceived Effectiveness of CJ System	101	98.06
Perceived Justness of CJ System	102	99.03

Table 4.11
Missing Data for Community-Level Variables (N=103)

Variable	Frequency Missing	Percent Missing
Number of Communities	70	67.96
Location (Urbanism)	54	52.43
Ratio Officers to Population	103	100.00
Crime Rate (Jurisdiction)	102	99.03
Violent Crime Rate (Jurisdiction)	102	99.03
Property Crime Rate (Jurisdiction)	102	99.03
Public Attitude Toward Police	99	96.12
State of Media Relations	102	99.03

Table 4.12
Missing Data for Macro-Level Variables (N=103)*

Variable	Frequency Missing	Percent Missing
Country of Study	10	9.71
Region of United States	4	6.35

*Region of United States N=63

In summary, the large amount of missing data severely limited the number of meaningful analyses that could be conducted on this dataset. It also means the evidence concerning correlations between any predictors and stress among this population of studies should be very cautiously interpreted; generalizing these results to a broader population would also not be prudent.

PREDICTOR DOMAINS

While the small number of reported (or calculated) effect sizes does not allow for a meaningful analysis of the relationship between individual correlates and stress, collapsing those correlates into broad domains mapped to the integrative model of stress and coping presented in Chapter 2 allows for at least a preliminary analysis of that model. Unfortunately, overlapping confidence intervals do not permit this researcher to definitively state that the predictor domains are unique constructs, and the small number of cases does not permit a reliability analysis such as Cronbach's alpha; however, similar patterns of weighted effect sizes among the individual variables that make up each construct suggest the *a-priori* groupings are meaningful.[1] The following sections describe the selection of variables for each predictor domain and summarize the findings within. The chapter then concludes with a summary of the results when considered overall.

Figure 4.1 is a copy of the integrative model of stress and coping presented in Chapter 2 (Figure 2.1), presented here with the predictor domains created in the current meta-analysis in red. Sub-categories within broader constructs of the model are included in parentheses, also in red.

[1] Not all effect size estimates generated for the meta-analysis are represented in the predictor domains presented here.

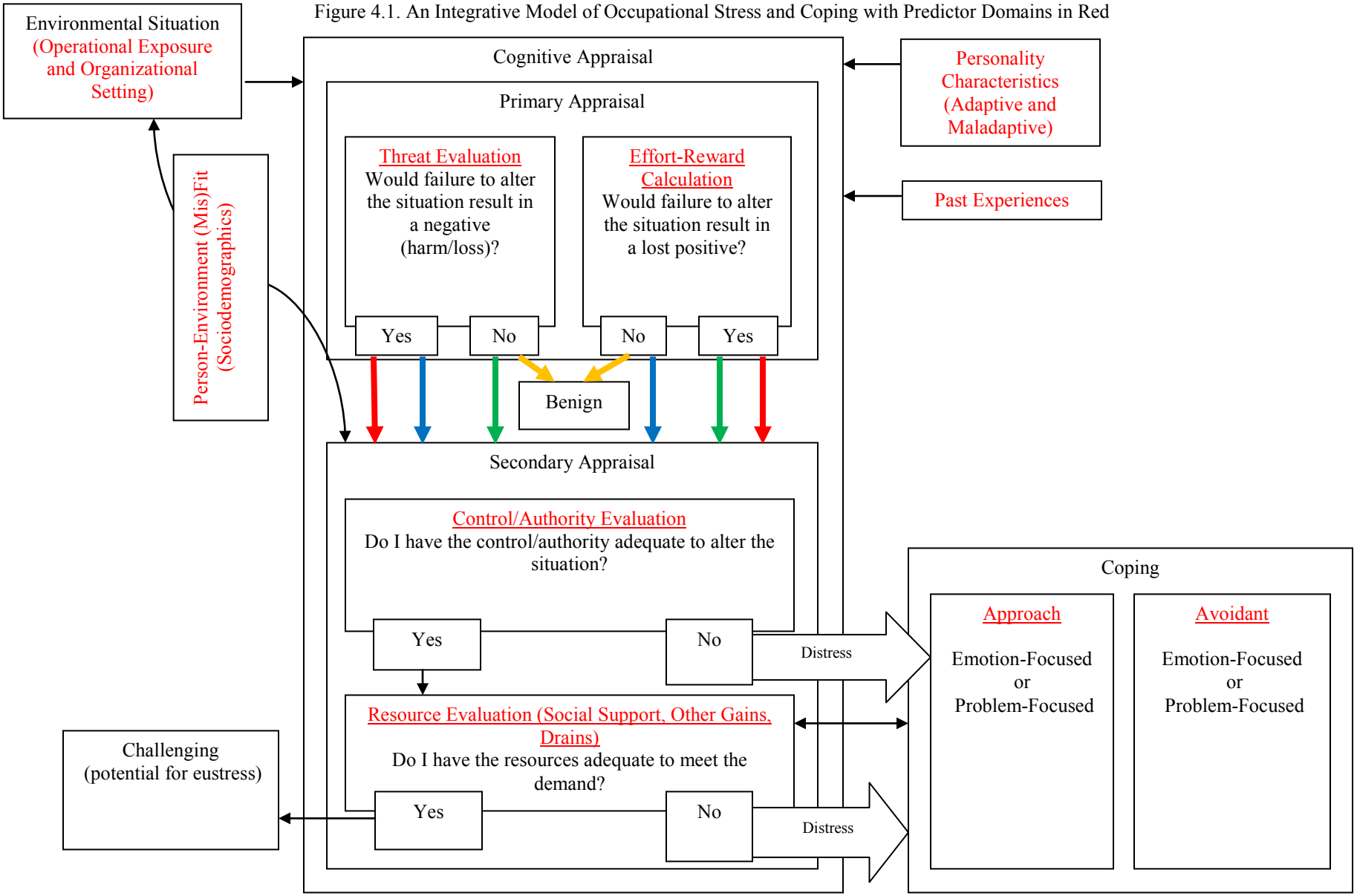
The Environmental Situation

Recall from Chapter 2 that most conceptualizations of the stress and coping process start with what researchers call a "stressor" or "demand." Yet this researcher asserts it is more appropriate to avoid value-laden labels at the start and simply acknowledge that any given environmental situation has the potential to present a demand. Most police stress research has focused on demands originating from the operational environment or from the police organization itself. Therefore, in accordance with the integrative model of stress and coping represented in Figure 4.1, both "operational exposure" and "organizational setting" would be considered part of the environmental situation. Unfortunately, there were not enough effect size estimates generated in the current meta-analysis to analyze "organizational setting" as a predictor domain. However, variables which constituted reasonable measures of the degree of exposure to potential operational demands were collapsed into a predictor domain called "operational exposure," which is discussed in more detail below.

Operational Exposure

Table 4.13 presents unweighted and weighted mean effect sizes for individual measures and a combined measure of operational exposure. Unfortunately, the table reflects data from a small number of effect sizes ($k = 8$), and should especially be interpreted with caution. Here, job assignment was coded such that frontline assignments were assumed to produce more exposure to potential operational demands than administrative assignments. "Global operational exposure" reflects an overall measure of the frequency and intensity of exposure to a list of

Figure 4.1. An Integrative Model of Occupational Stress and Coping with Predictor Domains in Red



specific operational events, as measured by the Speilberger Police Stress Survey (1981).[1] The "threat to self" item represents a similar measure; however, it was only a frequency count of exposure to operational events likely to produce a threat of harm to the police officer. "Exposure to violence" was a measure reflecting the frequency and intensity of exposure to the suffering of others due to violence. Location and crime rate of the jurisdiction were included in this domain because it has been theorized that officers working in more urban areas and in areas with higher overall crime rates have greater potential for exposure to operational events that might be considered stressful. The pattern of effect size estimates suggests these latter two measures might not be measuring exposure in the same way as the previous four; however, the number of studies is so small that no definitive conclusion can be made about the appropriateness of combining these measures. When considered collectively as a measure of operational exposure, these variables produced a weighted mean effect size of only 0.13, implying the potential for stress originating from the demands of fieldwork is noteworthy, but perhaps not as important as the popular image of policing would suggest.

Table 4.13
Unweighted (Mr) and weighted mean effect sizes (Mz^+) for Operational Exposure

Predictor (*k*)	N	Mr	Mz^+	CI
Job Assignment (3)	2332	0.21	0.21	-0.03 to 0.45
Global Operational Exposure (1)	197	0.53	0.53	
Threat to Self (Exposure) (1)	58	0.28	0.28	
Exposure to Violence (1)	54	0.36	0.36	
Location (Urbanism) (1)	338	-0.07	-0.07	
Crime Rate (Jurisdiction) (1)	812	-0.04	-0.04	
ALL (8)	3791	0.15	0.13	-0.03 to 0.28

[1] The particular study from which this effect size was estimated used a different measure for overall perceived stress. Therefore, a correlation between operational exposure and overall perceived stress could be calculated, making it appropriate to include this particular measure in a "predictor" category.

Cognitive Appraisal

In accordance with the proposed model, an environmental situation is categorized as a demand, as benign, or as challenging through the process of cognitive appraisal. That process begins with the primary appraisal, which evaluates the environmental situation in light of two questions: "Would failure to alter the situation result in a negative (harm/loss)?" and "Would failure to alter the situation result in a lost positive?" If the answer to both is "no," then the situational is appraised as benign. If the answer to either is "yes," then a secondary appraisal evaluates the individual's capabilities and resources for addressing the situation. Recall from the discussion in Chapter 2 that personality characteristics and past experiences are believed to influence that entire cognitive process. Therefore, predictor domains related to each are next discussed, followed by discussions of predictor domains within the more specific constructs of primary and secondary appraisal, respectively.

Personality Characteristics

Tables 4.14 and 4.15 present the unweighted and weighted mean effect sizes for adaptive and maladaptive personality characteristics, respectively. Adaptive characteristics include those theorized to make an individual more likely than not to evaluate themselves as able to respond favorably to difficult situations. Maladaptive characteristics are those theorized to make an individual less likely to see themselves as being able to respond well to difficult situations. One would expect these two categories of personality characteristics to have equal effects (in terms of magnitude) on the process of cognitive appraisal, and that is exactly the result found here.

Adaptive Characteristics

Table 4.14 summarizes effect size estimates for a number of adaptive personality characteristics. The first is literally a measure of one's ability to adapt to a changing

environment. Masculinity is the second, and was included with other adaptive characteristics because it was reasoned that, in the male-dominated workforce of policing, having a more masculine than feminine personality would better serve an individual in adapting to difficult situations in ways likely to be deemed acceptable by the subculture of the work organization. Social desirability is the third and reflects a measure of an individual's ability to act in ways that are suitable to others. Fourth is emotional quotient (also called emotional intelligence), which is thought to influence adaptivity by allowing for a more nuanced understanding of difficult situations and their potential consequences. The final three are measures more commonly found in stress studies and described in greater detail in Chapter 2 than were the less-common measures discussed above. Extraversion and higher levels of self-esteem have long been linked with better outcomes in response to stress, and hardiness is by definition a measure of one's resiliency in the face of demands. While the number of effect size estimates for any one of these characteristics is small, taken together, the domain of "adaptive characteristics" appears to have a modest (0.06) effect on the perception of stress.

Table 4.14
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Adaptive Personality Characteristics

Predictor (*k*)	N	Mr	Mz^{+}	CI
Adaptivity (1)	51	-0.73	-0.73	
Masculinity (1)	116	-0.05	-0.05	
Social Desirability (1)	100	-0.13	-0.13	
Emotional Quotient (1)	31	-0.46	-0.46	
Extraversion (3)	407	-0.02	-0.01	-0.95 to 0.93
Self-Esteem (5)	476	-0.32	-0.35	-0.69 to -0.01
Hardiness (4)	888	-0.21	-0.24	-0.83 to 0.35
ALL (16)	2069	-0.20	0.06	-0.02 to 0.15

Maladaptive Characteristics

Like adaptive characteristics, we can see from Table 4.15 that maladaptive personality characteristics have a modest effect (0.06) on the perception of stress among those studies in the

current meta-analysis. All of the individual characteristics included in this predictor domain are fairly common among stress studies, as described in Chapter 2, and have long been linked with more negative stress outcomes. It may be, however, that the influence of personality characteristics has been somewhat overstated.

Table 4.15
Unweighted (Mr) and weighted mean effect sizes (Mz^+) for Maladaptive Personality Characteristics

Predictor (*k*)	N	Mr	Mz^+	CI
Neuroticism (3)	348	0.07	0.11	-0.00 to 0.21
Trait Anxiety (7)	531	0.59	0.08	0.03 to 0.14
Control/Compulsiveness (1)	104	-0.13	-0.13	
Type A (3)	879	0.17	0.17	-0.03 to 0.37
External Locus of Control (4)	730	0.29	0.31	0.02 to 0.59
ALL (18)	2592	0.26	0.06	0.01 to 0.10

Past Experiences

Table 4.16 presents the unweighted and weighted mean effect sizes for the past experiences of trauma, illness, and injury, both individually and as a combined measure. While there has been some debate about whether past experiences of trauma or other negative events help make a person more resilient to future stress or adds to a cumulative experience of stress,

Table 4.16
Unweighted (Mr) and weighted mean effect sizes (Mz^+) for Past Experiences of Trauma/Illness/Injury

Predictor (*k*)	N	Mr	Mz^+	CI
Previous Trauma (General) (2)	299	0.24	0.25	0.00 to 0.49
Previous Job Trauma (8)	1614	0.11	0.11	-0.09 to 0.32
Injury in Previous Year (1)	98	0.39	0.39	
Mean Sick Days in Previous Year (4)	999	0.21	0.21	-0.13 to 0.56
ALL (15)	3010	0.17	0.07	0.02 to 0.12

we can see that, in combination, these variables have only a modest influence (0.07) on perceived stress. It should be noted, however, that these were variables were coded such that the

relationship should be interpreted as previous negative experiences are related to an increase in perceived stress, lending support for the cumulative theory, at least among these studies.

Primary Appraisal.

The primary appraisal includes both the threat evaluation and the effort-reward calculation. However, there were not enough effect size estimates generated in the current meta-analysis to allow for the calculation of a predictor domain representing threat evaluation. Therefore, the following section presents only that information pertaining to effort-reward calculation.

Effort-Reward Calculation

Table 4.17 presents the unweighted and weighted mean effect sizes for reward expectation, organizational fairness, perceived effectiveness of the criminal justice system, perceived justness of the criminal justice system, and the combination of those variables as an overall measure of effort-reward calculation. Reward expectation included various measures of the degree to which officers' expectations regarding rewards for work efforts had been met. The assumption was if officers' previous efforts had not been sufficiently rewarded, that would alter their perceptions regarding future expenditures of effort. Organizational fairness represented measures of officers' perceptions about the practices of their respective organizations. The measure was included here based on the assumption that officers would not expect consistent or fairly-applied rewards-for-effort in organizations viewed as generally unfair. Perceptions regarding the effectiveness and justness of the criminal justice system were included here based on the assumption that officers would find their crime-fighting efforts worthwhile if they viewed the system as being fair and just, less so otherwise. As indicated by Table 4.17, the pattern of

unweighted mean effect sizes was consistent, and, in combination, these measures do have a modest (0.10) impact on perceived stress.

Table 4.17
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Effort-Reward Calculation

Predictor (*k*)	N	Mr	Mz^{+}	CI
Reward Expectation (3)	3006	-0.22	-0.22	-0.33 to -0.11
Organizational Fairness (5)	6060	-0.22	-0.22	-0.32 to -0.12
Effectiveness of CJ System (1)	59	-0.52	-0.52	
Justness of CJ System (1)	59	-0.33	-0.33	
ALL (10)	9184	-0.22	0.10	0.03 to 0.17

Secondary Appraisal.

Secondary appraisal involves the evaluation of both one's control or authority to address a difficult situation and his or her resources for doing so. The studies in the current meta-analysis provided enough effect size estimates to create predictor domains reflecting both of these evaluations. The following sections discuss each.

Control/Authority Evaluation

Table 4.18 presents the unweighted and weighted mean effect sizes for job control, rank, and supervisory status as individual measures and as a combined measure of control/authority evaluation. Job control is the most direct measure of the construct, as it measures subjects' perceptions of the degree of control or influence they have over work activities. This measure was coded such that increased perceived job control was related to lower levels of perceived stress. Rank and supervisory status were both included in this predictor domain because it is assumed that both an increase in rank and a move from non-supervisor to supervisor would include an increase in job control. However, the differential pattern for supervisory status may also reflect the fact that an increase in freedom to make decisions may be accompanied by increased accountability for those decisions, resulting in more, not less, perceived stress.

Regardless, the collective influence of these variables on perceived stress is modest (0.06) among the studies included in the meta-analysis.

Table 4.18
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Control/Authority Evaluation

Predictor (*k*)	N	Mr	Mz^{+}	CI
Job Control (6)	7812	-0.34	-0.41	-0.82 to 0.00
Rank (10)	4183	-0.05	-0.06	-0.23 to 0.10
Supervisory Status (2)	319	0.11	0.11	0.04 to 0.17
ALL (18)	13214	-0.22	0.06	-0.01 to 0.12

Resource Evaluation

Tables 4.19 through 4.22 present the unweighted and weight mean effect sizes for the umbrella domain of resource evaluation. Among this category of correlates, measures were conceptualized as those that would be expected to contribute to resources (gains) versus those that would be expected to deplete resources (drains). Of those measures expected to contribute to resources, social support was most often measured among those studies included in the analysis. Therefore, social support measures are presented both separately (Table 4.19) and in combination with other resources gains (Table 4.21).

Table 4.19
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Resource Evaluation (Social Support)

Predictor (*k*)	N	Mr	Mz^{+}	CI
Global Social Support (4)	1073	-0.25	-0.27	-0.76 to 0.23
Social Support (Non-Work) (6)	4738	-0.26	-0.27	-0.41 to -0.13
Social Support (Work) (7)	6623	-0.33	-0.35	-0.44 to -0.26
Social Support (Supervisor) (2)	543	-0.26	-0.26	-0.46 to -0.07
Social Support (Peers) (1)	338	-0.25	-0.25	
Public Attitude Toward Police (3)	459	-0.33	-0.35	-0.76 to 0.06
ALL (23)	13774	-0.29	0.04	0.02 to 0.07

Social support. Table 4.19 suggests that higher levels of social support, regardless of the source, are correlated with lower levels of perceived stress within a fairly narrow 95%

confidence interval. However, social support variables, collectively, exert a very modest influence on perceived stress (0.04) among the included studies.

Other gains. The variables included in Table 4.20 collectively exert a more substantial, though still modest, influence on perceived stress (0.09). However, the pattern among the variables is not consistent, suggesting stress management training might not fit with other resource-gain measures. That said, it is possible that participation in stress management training, while ostensibly providing more tools for coping, also makes individuals more able to recognize the stress they are experiencing, thus more likely to report higher levels of perceived stress than those not having participated in stress management training.

Table 4.20
Unweighted (Mr) and weighted mean effect sizes (Mz^+) for Resource Evaluation (Other – Gains)

Predictor (*k*)	N	Mr	Mz^+	CI
Instrumental Support (2)	2278	-0.24	-0.24	-0.38 to -0.11
Stress Management Training (4)	1283	0.12	0.13	-0.13 to 0.38
General Health/Well-being (5)	968	-0.18	-0.20	-0.75 to 0.35
ALL (11)	4529	-0.12	0.09	-0.09 to 0.27

Table 4.21
Unweighted (Mr) and weighted mean effect sizes (Mz^+) for Resource Evaluation (Social Support + Other Gains)

Predictor (*k*)	N	Mr	Mz^+	CI
Global Social Support (4)	1073	-0.25	-0.27	-0.76 to 0.23
Social Support (Non-Work) (6)	4738	-0.26	-0.27	-0.41 to -0.13
Social Support (Work) (7)	6623	-0.33	-0.35	-0.44 to -0.26
Social Support (Supervisor) (2)	543	-0.26	-0.26	-0.46 to -0.07
Social Support (Peers) (1)	338	-0.25	-0.25	
Public Attitude Toward Police (3)	459	-0.33	-0.35	-0.76 to 0.06
Instrumental Support (2)	2278	-0.24	-0.24	-0.38 to -0.11
Stress Management Training (4)	1283	0.12	0.13	-0.13 to 0.38
General Health/Well-being (5)	968	-0.18	-0.20	-0.75 to 0.35
ALL (34)	18303	-0.25	0.06	0.00 to 0.11

When considering social support measures in combination with other measure of resource gains, we again see a modest weighted mean effect size of 0.06 (see Table 4.21). However, the narrower confidence interval for social support measures reported in Table 4.19 suggests, at least among these studies, that social support *should* be considered separately from the other resource gain measures summarized in Table 4.20.

Drains. Table 4.22 includes variables thought to drain resources, either tangible or intangible, from "reserves" that might otherwise be used to cope with work stress. Indeed, the pattern of effect size estimates is consistent with this assumption. Though the overall contribution of these variables as a combined measure is, again, very modest (0.04), the 95% confidence interval is reasonably narrow, offering a degree of confidence in the reliability of these combined measures.

Table 4.22
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Resource Evaluation (Other – Drains)

Predictor (*k*)	N	Mr	Mz^{+}	CI
Workload (8)	7865	0.28	0.29	0.19 to 0.39
Depression (7)	582	0.51	0.60	0.33 to 0.88
Work-Family Conflict (6)	3218	0.37	0.40	0.20 to 0.60
Global Negative Life Events (5)	708	0.29	0.30	0.19 to 0.41
Recent Divorce (1)	177	0.39	0.39	
ALL (27)	12550	0.32	0.04	0.02 to 0.06

Coping

Tables 4.23 and 4.24 present the unweighted and weight mean effect sizes for the predictor domains of approach coping and avoidant coping, respectively. Recall from Chapter 2 that approach (or active) coping, is most often associated with more improved stress outcomes than is avoidant coping in the general stress and coping literature. The prevailing notion is that approach coping strategies work to alleviate either the demand itself or the negative emotions

associated with it whereas avoidant coping only masks problems and emotions. The patterns revealed among variables within each table suggest this is the case, with approach coping variables consistently associated with lower levels of perceived stress and avoidant coping variables associated with higher levels. Yet, weighted mean effect size estimates for both predictor domains are equally modest at 0.07.

Table 4.23
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Approach Coping

Predictor (*k*)	N	Mr	Mz^{+}	CI
Active Coping (4)	1150	-0.16	-0.16	-0.43 to 0.10
Religious Activity (2)	363	-0.04	-0.04	-0.15 to 0.07
Leisure Activity (7)	1557	-0.19	-0.19	-0.33 to -0.06
ALL (13)	3070	-0.16	0.07	0.02 to 0.14

Table 4.24
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Avoidant Coping

Predictor (*k*)	N	Mr	Mz^{+}	CI
Avoidant Coping (4)	215	0.37	0.45	0.00 to 0.89
Surface Acting (1)	196	0.58	0.58	
Alcohol Use (7)	1193	0.13	0.14	-0.12 to 0.39
Tobacco Use (3)	570	0.05	0.05	-0.09 to 0.18
ALL (15)	2174	0.17	0.07	0.02 to 0.11

Person-Environment (Mis)Fit

Table 4.25 presents the unweighted and weighted mean effect sizes for measures of person-environment fit, actually conceptualized here as the degree of *mis*fit between the person and his or her environment.[2] Job dissatisfaction and intention to quit were both seen as reasonable proxy measures for P-E misfit, as intention to quit suggestions some level of dissatisfaction and dissatisfaction implies some degree of misfit. Measures of the degree of bias in the organizational culture actually tapped individuals' perceptions of the degree of bias exhibited *toward* them. A high degree of experienced bias, therefore, seemed a reasonable

[2] To ensure consistency across measures and be able to combine them into a meaningful overall measure, job satisfaction items were reverse-coded and presented as job dissatisfaction.

measure of misfit. Finally, the experience of sexual/gender and racial/ethnic harassment were specific measures of organizational bias. While the pattern of mean effect size estimates was not wholly consistent, the overall influence of person-environment misfit as a predictor domain was extremely modest (0.03).

Table 4.25
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Person-Environment (Mis)Fit

Predictor (*k*)	N	Mr	Mz^{+}	CI
Job Dissatisfaction (20)	8600	0.39	0.44	0.32 to 0.56
Intention to Quit (3)	1328	0.37	0.39	-0.06 to 0.84
Organizational Culture (Bias) (3)	2474	0.43	0.47	-0.01 to 0.95
Sexual/Gender Harassment (4)	2855	-0.11	-0.13	-0.73 to 0.47
Racial/Ethnic Harassment (1)	1087	0.17	0.17	
ALL (31)	16344	0.29	0.03	0.01 to 0.06

Sociodemographics

Table 4.26 summarizes unweighted and weighted mean effect sizes for individual sociodemographic variables and for a combined measure of those variables. They are not included under the broad category of P-E fit because they can only constitute a measure of fit when considered in combination with workgroup make-up. However, sociodemographics are more often measured than other categories of variables and have been theorized to influence

Table 4.26
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) for Sociodemographics

Predictor (*k*)	N	Mr	Mz^{+}	CI
Race (8)	3603	0.04	0.13	-0.21 to 0.46
Gender (36)	16949	0.07	0.03	0.01 to 0.04
Age (20)	6808	-0.02	0.05	-0.06 to 0.16
Education (15)	5987	-0.02	0.07	-0.13 to 0.26
Marital Status (11)	3093	-0.07	0.09	-0.01 to 0.18
Time on the Job (23)	8309	0.02	0.04	-0.01 to 0.10
ALL (113)	44749	0.02	0.05	-0.19 to0 .30

perceived stress in a variety of ways, as discussed in Chapter 2. They are presented together here simply to demonstrate that, in combination, their influence on perceived stress is modest (0.05),

though, when considered individually, race appears to have the greatest influence (0.13). However, as with all the predictor domains presented here, the 95% confidence interval is broad enough to warrant further investigation before drawing any firm conclusions.

Summary of Results by Predictor Domain

Table 4.27 summarizes unweighted and weighted mean effect sizes by predictor domain. Note that weighted mean effect sizes range from 0.03 to 0.13 with most domains at 0.07 or less. While the "operational exposure" domain generated the largest weighted mean effect size, it also included the fewest individual effect size estimates ($k = 8$) and therefore has a very broad 95% confidence interval. When considering the small number of individual effect sizes and the subsequent limitation in our ability to interpret these data with confidence, perhaps the best summation that can be offered is that, among these studies, each predictor domain appears to make a fairly modest contribution to the experience of perceived stress. Further, this finding is not entirely unexpected. Recall McGrath's (1976) working definition of stress as a potential that exists:

> …when an environmental situation is *perceived* as presenting a *demand* which threatens to exceed the person's *capabilities and resources* for meeting it, under conditions where he *expects* a substantial differential in the *rewards and costs* from meeting the demand versus [*failing* to meet] it. (p. 1352, italics added)

Thus, it is the interaction of an individual's perception and the reality of his or her environment that ultimately shapes the experience (or non-experience) of stress. Perhaps it should not be surprising that the factors which influence each of these offer equally important contributions to the process. This conceptualization of stress may allow researchers to move beyond the surface-level search for so-called stressors that has characterized much of the research for the past forty years to more meaningful and theoretically-driven analyses of the process itself.

Table 4.27
Unweighted (Mr) and weighted mean effect sizes (Mz^{+}) by Predictor Domain

Predictor Domain (*k*)	N	Mr	Mz^{+}	CI
Operational Exposure (8)	3791	0.15	0.13	-0.03 to 0.28
Adaptive Personality Characteristics (16)	2069	-0.20	0.06	-0.02 to 0.15
Maladaptive Personality Characteristics (18)	2592	0.26	0.06	0.01 to 0.10
Past Experiences of Trauma/Illness/Injury (15)	3010	0.17	0.07	0.02 to 0.12
Effort-Reward Calculation (10)	9184	-0.22	0.10	0.03 to 0.17
Control/Authority Evaluation (18)	13214	-0.22	0.06	-0.01 to 0.12
Resource Evaluation (Social Support) (23)	13774	-0.29	0.04	0.02 to 0.07
Resource Evaluation (Other – Gains) (11)	4529	-0.12	0.09	-0.09 to 0.27
Resource Evaluation (Other – Drains) (27)	12550	0.32	0.04	0.02 to 0.06
Approach Coping (13)	3070	-0.16	0.07	0.02 to 0.14
Avoidant Coping (15)	2174	0.17	0.07	0.02 to 0.11
Person-Environment (Mis)Fit (31)	16344	0.29	0.03	0.01 to 0.06
Sociodemographics (113)	44749	0.02	0.05	-0.19 to 0.30

SUMMARY

This chapter has presented the results of the current meta-analysis by summarizing the characteristics of the studies included, the samples upon which those studies were based, the degree of missing data and its impact on the analysis, and the preliminary investigation of the data when grouped into predictor domains mapped to the integrative model of stress and coping presented in Chapter 2. The following chapter will present a summary of the dissertation and offer concluding thoughts along with suggestions for future research.

CHAPTER 5:
SUMMARY AND CONCLUSIONS

There has been intense interest in the topic of police stress among researchers of a variety of disciplines spanning several decades. Despite this, it is difficult to draw firm conclusions about the subject because research findings have not been consistent. As Abdollahi (2002) points out, this is likely because the research body has been "exploratory, disciplinary specific, investigative in nature, and lacking a theoretical foundation," (p.16). Many writings on the topic have been anecdotal in nature, and as far back as 1978, Davidson and Veno lamented that no "integrated analytic review of the existing data" in the area of stress as specifically related to police had been conducted (p. 187). In the three and a half decades since, it appears no one has attempted to analyze the evidence on this issue in any way more systematic than that of the occasional traditional narrative review (*e.g.,* Webb & Smith, 1980; Malloy & Mays, 1984; Abdollahi, 2002). Therefore, the stated purpose of this dissertation was to identify and compare the key correlates of perceived stress among police officers via the use of meta-analysis. Specifically, the plan of the dissertation was to:

1. systematically organize the large amount of empirical literature via a transparent process which might later be replicated or updated as new research becomes available,
2. generate precise effect size estimates which would allow for greater confidence in assessment of the strength of relationships of interest,
3. assess the impact of methodological variations across studies, and
4. systematically document gaps or deficiencies in the research body.

This chapter will revisit the results of the analyses presented in Chapter 4 in light of what conclusions can be drawn from them and what avenues for future research they suggest. The chapter will then conclude with a discussion of the limitations and significance of the current study.

Summary of Findings

The current study is a quantitative synthesis of the empirical literature on perceived stress among police officers. The plan of analysis proposed to first compare individual correlates of perceived stress in order to draw conclusions about their relative strength and stability. Unfortunately, the 103 studies which met the inclusion criteria for the meta-analysis were so fraught with missing data there were not enough effect size estimates for individual correlates to allow for meaningful comparisons at that level. However, the systematic documentation of the depth and breadth of missing data is an important contribution of the current study, and should help guide future research in this area.

The current study also proposed a model of stress and coping as an interactive process between an individual and his or her environment. Although the large amount of missing data did not allow for meaningful comparison of individual predictors, collapsing correlates into predictor domains that mirrored the proposed model of stress and coping did allow for a preliminary analysis of some of the constructs in that model. While the broad confidence intervals generated for each domain do urge caution in interpretation, the findings at least suggest that each domain contributes to the perception of stress and that knowledge in this area might best be advanced by recognizing the importance of each in shaping an interactive process of stress and coping rather than attempting to rank individual correlates. In short, the data do not allow definitive conclusions that personal characteristics or job characteristics, for example, are

more important than others in shaping stress perception among police officers. Clearly, these findings are limited by the degree of missing data, but it may be that questions about what is *most* important in shaping police stress have remained unanswered because the variables of interest make *equally* important contributions to a complex process.

Implications and Directions for Future Research

In Chapter 2, it was asserted that the research in perceived stress among police officers, when considered collectively, suffered from a lack of theoretical guidance, inconsistency of measurement, and variable rigor of methodological design. Perhaps the most important contribution of the current study is that it supports those contentions through a process of systematic documentation. The breadth and degree of missing data is staggering, the inconsistency of measurement is substantial, and the shortage of methodologically rigorous studies is disappointing. In short, the research literature is largely comprised of forty years' worth of exploratory studies. It is important to remember, however, that the current meta-analysis only includes those studies assessing perceived stress as the outcome measure. It is not known, therefore, if studies of police stress which use alternative outcomes (*e.g.,* physiological measures or physical strain measures) suffer from the same (or the same degree of) shortcomings. The current study can only affirm that researchers of *perceived stress* among police officers – of which there are many - need to "get on the same page" about what is important in stress research. That starts with a theory or theories about stress, generally. Having a theoretical basis will guide decision-making regarding the selection of variables to include in studies. When researchers are more consistently measuring the same variables, the tools used to measure them can be refined. Then, through repeated use of valid measures, researchers can begin to systematically support or

debunk theories. Unless these challenges are embraced, scholars in this area of research may still be debating the same questions forty years from now.

A further limitation of the research body is that so many studies either assess perceived stress *or* some objective measure, yet fail to assess and compare both types of outcome measures for the same samples. Similarly, many studies assess a measure of "operational stress" and a separate measure of "organizational stress," but do not assess an overall measure of stress. (Such studies were rejected for inclusion in the current analysis). By operationalizing outcome measures in this way, some researchers are implying that stress is either operational or organizational in nature and are narrowing the focus to which "causes" more stress than the other. This simplification of a complex process overlooks the nuanced contributions of correlates that do not fit neatly into either category.

Even among those studies which assess similar outcome measures (*i.e.,* subjective or objective measures), there is no agreement on a standardized measure of job stress among police officers. Many studies included in the current analysis utilized author-created, Likert-type scales to assess perceived stress. Further, several studies that used a measure created by someone other than the author reported modifying that measure in some way. While these scales appear to be similar intensity indexes of the subjective experience of stress, one cannot be confident they are measuring the same outcome with the same degree of reliability.

The research body is further limited by the fact that the overwhelming majority of studies are cross-sectional in nature and limited in scope. The cross-sectional nature of most studies means researchers can, at best, draw conclusions about correlations between police officer stress and other variables, but not about causative relationships. Further, studies of samples drawn from one organization or one region (as many are) simply do not offer variation on theoretically-

relevant constructs. For example, in the current analysis, so few studies reported variation in, and assessment of, organizational characteristics, community characteristics, or regional characteristics, that no meaningful summary regarding their possible contributions to perceived police stress could be made. Allowing that longitudinal studies of broad scope are cost-prohibitive and labor intensive, more of such studies are very much needed in the area of police stress.

Another limitation in scope relates to the populations of police officers being studied. Not a single study included in the current meta-analysis compared active duty police officers with those who had retired or otherwise left the job. Considering the likelihood that unresolved stress leads to withdrawal from the profession, researchers may be narrowing their analyses to only those individuals best equipped for coping with the pressures of the job. There may be much to learn from comparing active duty with former or non-active duty police officers, but this avenue of research remains largely unexplored.

It should be noted that a lack of standardization among professional journals in terms of what information they require to be reported in empirical studies contributes to the problems associated with knowledge accumulation in this, as well as many other, fields of research. While the current study included concentrated efforts to locate unpublished studies, it did not include an attempt to contact authors and gather missing data from located studies. Therefore, it is possible that some studies collected far more data than were reported, but ended up rejected from inclusion in the current meta-analysis because effect sizes could not be calculated based on the *reported* data. That fact may be viewed as a limitation of the current study – others of which are discussed below – but it also points to a widespread problem in the dissemination of research generally. The good news is this shortcoming could easily be addressed by requiring all

empirical studies to report, at a minimum, a correlation matrix and means and standard deviations for all study variables (in addition to whatever test statistics are generated in the analyses). The bad news is, despite the increasing popularity of meta-analysis as a research tool and calls for just such reforms (*e.g.,* Gendreau & Smith, 2007), there is still a lack of standardization among professional journals within disciplines, much less across the many disciplines which contribute to police stress research.

Despite the limitations of the research body, two specific findings from the current study stand out as suggested avenues for future research and possibly for the development of prevention strategies. One is the finding that past experiences of trauma, illness, or injury are related to an increase in perceived stress levels. The implication is that stress can have a cumulative effect and repeated experiences of stress do not necessarily increase hardiness. Additional research to better understand the cumulative effect versus the hardiness effect of stress is certainly warranted. Further, organizations interested in stress prevention should acknowledge and expect that stress does not only occur as the result of exposure to especially traumatic events, but can build up over time as a result of repeated experiences, none of which may be "crisis" events in and of themselves.

A second finding of particular interest is that increased levels of social support are consistently related to decreased levels of perceived stress, regardless of the source of support. Thus, stress management programs may do well to help officers consider the cultivation of strong social support networks regardless of marital status or work-group cohesion. In other words, perhaps the take away is that it does not matter what an officer's social support network "looks" like, so long as he or she has one.

Like most of the findings in the current study, those related to the effect of past experiences and the impact of social support need replication with methodological rigor before scholars can draw any firm conclusions. However, the patterns uncovered in these two areas at least provide some specific direction for further exploration.

Limitations and Significance of the Current Study

Though carefully designed, the current study itself has substantial limitations. First, even with a systematic search of the literature, it is likely not all eligible studies were found and included in the analysis. Second, though a clear rationale has been provided for including only studies of "perceived stress," in the analysis, there are limitations inherent in that decision. Direct comparisons with studies using other measures of stress are not possible. (In fact, the systematic documentation of empirical studies of police stress which use alternative outcome measures is one strongly suggested avenue for future research). Finally, the studies meeting the established eligibility criteria were fraught with missing data. This severely limited the ability to conduct meaningful statistical analyses, and suggests those analyses which are reported should be interpreted with caution.

Nevertheless, as a stated purpose of the meta-analysis was to systematically document and report gaps in the literature, the large amount of missing data offers an important starting point for discussions about the true state of the research in this area. The sheer number of studies reviewed for possible inclusion in the current study highlights the popularity of the topic across a wide variety of disciplines and from many different perspectives. The fact that interest in the topic is not waning – and may, in fact, be growing – underscores the important contribution of the current study in systematically taking stock of "where we are" and pointing out avenues that

may need further exploration in the continued quest to improve the state of knowledge accumulation in the area of police stress.

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APPENDIX A:

Email Solicitation for Unpublished Studies

Greetings:

I am writing to request your help with my dissertation research. I am a doctoral candidate in the School of Criminal Justice at the University of Cincinnati. My dissertation research involves a meta-analysis of research into police officer stress. I have identified you as someone who is conducting or has conducted such research through a review of the recent annual meeting programs of ASC, ACJS, or APA.

I am hoping you are willing to share any unpublished studies on this topic and/or direct me to other researchers you know who may be able to assist me. Specifically, studies must meet the following criteria:

1) Research conducted between 1960 and 2011
2) Police officers as subjects under study
3) Perceived stress included as an outcome measure
4) Statistical information sufficient to convert the reported statistic into an effect size (at a minimum, sample size, means and standard deviations of study variables, and results from any statistical tests you have conducted)

I have included basic information about my dissertation below. If you have questions, please feel free to contact me directly.

Thank you for your attention to this matter and any assistance you might provide,

Jennifer H. Webster, M. S.

Approved Dissertation Title:
"A Meta-Analytic Review of the Correlates of Perceived Job Stress Among Police Officers"

Dissertation Committee Members:
Dr. Lawrence F. Travis, III (Committee Chair)
University of Cincinnati

Dr. James Frank
University of Cincinnati

Dr. Paula Smith
University of Cincinnati

Dr. John M. Violanti
University at Buffalo, State University of New York

APPENDIX B:

Master Code Sheet

MASTER CODE SHEET

CODING INFORMATION:

DATE: _____ Date of coding as YYMMDD

CODER: _____ Person coding study:

1: Jennifer Webster
2: other _____

INCLUDED: _____ Studied accepted or rejected for inclusion?

1: accepted
2: rejected – does not meet general inclusion criteria (subject, outcome, date):
_____
3: rejected – does not report data to compute ES (r)
4: rejected – secondary study of sample already included in MA:
(ID):_____

NOTES:
_____

STUDY INFORMATION:

ID: _____ 3-digit study identification number corresponding to database

Title: _____

Author(s): _____

Author Contact Information:

Name: _____

Organization:_____

Department: _____

Street Address: _____

City/State/Zip/Country:_____

Email: _____

DOCTYPE: _____ Type of document:

1: journal article
2: book
3: professional report
4: conference presentation
5: thesis/dissertation
6: online article
7: other _____
99: MISSING

PUBSTAT: _____ Publication status:

1: published
2: not published
99: MISSING

YEAR: _____ Year published or authored as YYYY (9999 IF MISSING).

DISC: _____ Discipline of primary author:

1: criminal justice
2: psychology
3: other _____
99: MISSING

AFFILTYP: _____ Affiliation type of primary author:

1: academic institution
2: police organization
3: research firm/consultant
4: other government unit or agency
5: other _____
99: MISSING

FUNDING: _____ Source of funding:

1: academic institution
2: police organization
3: government
4: research firm/organization
5: other _____
99: MISSING

SAMPLEN: _____ Total sample (or subsample) size (n)

DEMOGRAPHIC CHARACTERISTICS:

RACE: _____ Race/ethnicity of sample (at least 80% to be coded as a specific race):

1: white
2: black
3: Hispanic
4: Asian
5: native
6: other _____
7: mixed
99: MISSING

RACEP: _____ % white

RACESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RACEES: _____ Effect size value for race

GEN: _____ Gender of sample (at least 80% to be coded as either male or female):

1: male
2: female
3: mixed
99: MISSING

GENP: _____ % male

GENSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

GENES: _____ Effect size value for gender.

AGE: _____ Mean age of the sample (999 IF MISSING).

AGESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

AGEES: _____ Effect size value for age.

EDU: _____ Median education level for sample:

1: less than grade 12
2: high school graduate
3: some undergraduate
4: bachelor degree
5: some graduate
6: graduate degree
99: MISSING

EDUM: _____ Mean years of education of sample (999 IF MISSING).

EDUSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

EDUES: _____ Effect size value for education level.

MARRY: _____ Marital status of sample (must be at least 80% to be coded as specific category):

1: married or cohabitating
2: single – never been married
3: single – divorced
4: single – widowed
5: single – not otherwise specified
6: mixed
99: MISSING

MARRYP: _____ % married or cohabitating.

MARRSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

MARRYES: _____ Effect size value for marital status.

TOKEN: _____ Token status of sample (must be at least 80% to be coded as token or non-token):

1: token
2: non-token
3: mixed
99: MISSING

TOKENP: _____ % reporting token status

TOKESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TOKENES: _____ Effect size value for token status.

OTHER INDIVIDUAL-LEVEL CHARACTERISTICS:

Personality/Coping/Hardiness and Resiliency

PCMEAS: _____ Are measures of personality, coping, and/or hardiness/resiliency included in the study?

0: no – GO TO ATD
1: yes

Personality Measures

PERMEAS: _____ Are measures of personality included in the study?

0: no – GO TO COPMEAS
1: yes

PERGLOBAL: _____ Is a global personality measure used for the study?

0: no – GO TO TYPEA
1: yes

PERTYPE: _____ Type of global personality measure used for the study:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

PERINS: _____ What measurement instrument or scale was used for global personality measure?

1: Basic Character Inventory
2: NEO Five Factor Inventory
3: Eysenck Personality Inventory
4: Sixteen Personality Factor Questionnaire
5: other _____
99: MISSING

PERMOD: _____ Was the global personality instrument modified from its original version?

0: no
1: yes
99: MISSING

PERMEAN: _____ Mean of the global personality measure (999 IF MISSING).

PERSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

PERES: _____ Effect size value for the global personality measure.

TYPEA: _____ Is personality Type (A-B) assessed?

0: no – GO TO LOCUS
1: yes

TYPEAT: _____ Type of measure used for personality Type (A-B):

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:
_____

TYPESUB: _____ Is the measure used for personality Type (A-B) a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

TYPEASTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TYPEAES: _____ Effect size value for Type A personality.

LOCUS: _____ Is locus of control (external-internal) assessed?

0: no – GO TO NEURO
1: yes

LOCUST: _____ Type of measure used for locus of control:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

LOCUSSUB: _____ Is the measure used for personality locus of control a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

LOCUSSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

LOCUSES: _____ Effect size value for locus of control.

NEURO: _____ Is Neuroticism assessed?

0: no – GO TO EXTRA
1: yes

NEUROT: _____ Type of measure used for Neuroticism:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

NEUROSUB: _____ Is the measure used for Neuroticism a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

NEUROSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

NEUROES: _____ Effect size value for Neuroticism.

EXTRA: _____ Is Extraversion assessed?

0: no – GO TO ANX
1: yes

EXTRAT: _____ Type of measure used for Extraversion:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

EXTRASUB: _____ Is the measure used for Extraversion a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

EXTRASTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

EXTRAES: _____ Effect size value for Extraversion.

ANX: _____ Is Trait Anxiety assessed (NOT as a proxy for stress)?

0: no – GO TO SELF
1: yes

ANXT: _____ Type of measure used for Trait Anxiety:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ANXSUB: _____ Is the measure used for Trait Anxiety a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

ANXSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ANXES: _____ Effect size value for Trait Anxiety.

SELF: _____ Is Self-Esteem assessed?

0: no – GO TO CTRL
1: yes

SELFT: _____ Type of measure used for Self-Esteem:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SELFSUB: _____ Is the measure used for Self-Esteem a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

SELFSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SELFES: _____ Effect size value for Self-Esteem.

CTRL: _____ Is Control/Compulsiveness assessed?

0: no – GO TO NFP
1: yes

CTRLT: _____ Type of measure used for Control/Compulsiveness:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

CTRLSUB: _____ Is the measure used for Control/Compulsiveness a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

CTRLSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CTRLES: _____ Effect size value for Control/Compulsiveness.

NFP: _____ Is Need for Power assessed?

0: no – GO TO COPMEAS
1: yes

NFPT: _____ Type of measure used for Need for Power:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

NFPSUB: _____ Is the measure used for Need for Power a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

NFPSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

NFPES: _____ Effect size value for Need for Power.

Coping Measures

COPMEAS: _____ Are measures of coping included in the study?

0: no – GO TO HARDMEAS
1: yes

COPGLOBAL: _____ Is a global coping measure used for the study?

0: no – GO TO SSNW
1: yes

COPETYPE: _____ Type of global coping measure used for the study:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

COPEINS: _____ What measurement instrument or scale was used for global coping measure?

1: COPE Inventory
2: Coping Strategies Scale of the Pressure Management Indicator
3: Revised Ways of Coping Checklist
4: other _____
99: MISSING

COPEMOD: _____ Was the global coping instrument modified from its original version?

0: no
1: yes
99: MISSING

COPEMEAN: _____ Mean of the global coping measure (999 IF MISSING).

COPESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

COPEES: _____ Effect size value for the global coping measure.

SSNW: _____ Is social support from NON-WORK sources assessed?

0: no – GO TO SURF
1: yes

SSNWT: _____ Type of measure used for social support from non-work sources:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SSNWSUB: _____ Is the measure used for social support from non-work sources a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

SSNWSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SSNWES: _____ Effect size value for social support from non-work sources.

SURF: _____ Is "surface acting" assessed?

0: no – GO TO REL
1: yes

SURFT: _____ Type of measure used for surface acting:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SURFSUB: _____ Is the measure used for surface acting a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

SURFSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SURFES: _____ Effect size value for surface acting.

REL: _____ Is religiosity/faith assessed?

0: no – GO TO LEIS
1: yes

RELT: _____ Type of measure used for religiosity/faith:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

RELSUB: _____ Is the measure used for religiosity/faith a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

RELSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RELES: _____ Effect size value for religiosity/faith.

LEIS: _____ Is participation in leisure activities assessed?

0: no – GO TO ACT
1: yes

LEIST: _____ Type of measure used for participation in leisure activities:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

LEISSUB: _____ Is the measure used for participation in leisure activities a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

LEISSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

LEISES: _____ Effect size value for participation in leisure activities.

ACT: _____ Is participation in active/approach coping behaviors assessed?

0: no – GO TO AVD
1: yes

ACTT: _____ Type of measure used for participation in active/approach coping behaviors:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

ACTSUB: _____ Is the measure used for participation in active/approach coping behaviors a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

ACTSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ACTES: _____ Effect size value for participation in active/approach coping behaviors.

AVD: _____ Is participation in avoidant coping behaviors assessed?

0: no – GO TO ALC
1: yes

AVDT: _____ Type of measure used for participation in avoidant coping behaviors:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

AVDSUB: _____ Is the measure used for participation in avoidant coping behaviors a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

AVDSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

AVDES: _____ Effect size value for participation in avoidant coping behaviors.

ALC: _____ Is alcohol consumption assessed?

0: no – GO TO TOB
1: yes

ALCT: _____ Type of measure used for alcohol consumption:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

ALCSUB: _____ Is the measure used for alcohol consumption a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

ALCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ALCES: _____ Effect size value for alcohol consumption.

TOB: _____ Is tobacco use assessed?

0: no – GO TO HARDMEAS
1: yes

TOBT: _____ Type of measure used for tobacco use:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

TOBSUB: _____ Is the measure used for tobacco use a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

TOBSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TOBES: _____ Effect size value for tobacco use.

Hardiness/Resiliency Measures

HARDMEAS: _____ Are measures of hardiness/resiliency included in the study?

0: no – GO TO ATD
1: yes

HARDGLOB: _____ Is a global hardiness/resiliency measure used for the study?

0: no – GO TO PTGROW
1: yes

HARDT: _____ Type of global hardiness/resiliency measure used for the study:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

HARDINS: _____ What measurement instrument or scale was used for global hardiness/resiliency measure?

1: _____
99: MISSING

NOTE:_____

HARDMOD: _____ Was the global hardiness/resiliency instrument modified from its original version?

0: no
1: yes
99: MISSING

HARDM: _____ Mean of the global hardiness/resiliency measure (999 IF MISSING).

HARDSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

HARDES: _____ Effect size value for the global hardiness/resiliency measure.

PTGROW: _____ Is post-traumatic growth assessed?

0: no – GO TO ATD
1: yes

PTGRWT: _____ Type of measure used for post-traumatic growth:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

PTGRWSUB: _____ Is the measure used for post-traumatic growth a subscale of the global personality measure?

1: subscale
2: separate measure
99: MISSING

PTGRWSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

PTGRWES: _____ Effect size value for post-traumatic growth.

Attitudes

ATD: _____ Are attitude measures included in the study?

0: no – GO TO GENH
1: yes

ATC: _____ Is attitude toward counseling assessed?

0: no – GO TO ATJ
1: yes

ATCT: _____ Type of measure used for attitude toward counseling:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ATCSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ATCES: _____ Effect size value for attitude toward counseling.

ATJ: _____ Is attitude toward job assessed?

0: no – GO TO GENH
1: yes

ATJT: _____ Type of measure used for attitude toward job:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ATJSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ATJES: _____ Effect size value for attitude toward job.

General Health/Well-Being/Life Satisfaction

GENH: _____ Is general health or well-being assessed?

0: no – GO TO LSAT
1: yes

GENHT: _____ Type of measure used for general health or well-being:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

GENHSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

GENHES: _____ Effect size value for general health or well-being.

LSAT: _____ Is life satisfaction assessed?

0: no – GO TO DEP
1: yes

LSATT: _____ Type of measure used for life satisfaction:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

LSATSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

LSATES: _____ Effect size value for life satisfaction.

DEP: _____ Is depression assessed (NOT as a proxy for stress)?

0: no – GO TO TRAUMA
1: yes

DEPT: _____ Type of measure used for depression:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

DEPSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

DEPES: _____ Effect size value for depression.

Past Experiences

TRAUMA: _____ Is previous experience of NON-WORK related trauma assessed?

0: no – GO TO JOBTR
1: yes

TRAUMAP: _____ % with previous experience of non-work related trauma.

TRAUSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TRAUMAES: _____ Effect size for previous experience of non-work related trauma.

JOBTR: _____ Is previous experience of the on-the-job trauma assessed?

0: no – GO TO INJURY
1: yes

JOBTRP: _____ % with previous experience of on-the-job trauma.

JOBTSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

JOBTRES: _____ Effect size for previous experience of on-the-job traumatic events.

INJURY: _____ Is experience of on-the-job injury in past year assessed?

0: no – GO TO SICK
1: yes

INJURYP _____ % with on-the-job injury in past year.

INJSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

INJES: _____ Effect size for on-the-job injury in past year.

SICK: _____ Is number of sick days used in past year assessed?

0: no – GO TO MIL
1: yes

SICKM _____ Mean number of sick days used in past year (999 if MISSING).

SICKSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SICKES: _____ Effect size for number of sick days used in past year.

MIL: _____ Is previous military experience assessed?

0: no – GO TO TOJ
1: yes

MILP: _____ % with previous military experience.

MILSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

MILES: _____ Effect size for previous military experience.

Career Stage

TOJ: _____ Is time on the job assessed?

0: no – GO TO SUP
1: yes

TOJMD: _____ Median time on the job for sample:

1: less than 5 years
2: 5-10 years
3: 11-15 years
4: 16-20 years
5: 21-25 years
6: more than 25 years
99: MISSING

TOJMN: _____ Mean time on the job for sample (999 IF MISSING).

TOJSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TOJES: _____ Effect size value for time on the job.

Rank

SUP: _____ Is supervisory status assessed?

0: no – GO TO RANK
1: yes

SUPP: _____ % with supervisory status (999 if MISSING).

SUPSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SUPES: _____ Effect size for supervisory status.

RANK: _____ Rank of sample (must be at least 80% to be coded as a specific rank):

1: police/line officer
2: sergeant
3: lieutenant
4: captain
5: chief
6: other _____
7: mixed
99: MISSING

RANKP: _____ % patrol or line officer (999 if MISSING).

RANKSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RANKES: _____ Effect size value for rank.

Job Assignment

ASGN: _____ Job assignment of sample (at least 80% to be coded as a specific category):

1: operational – patrol
2: operational – other: _____
3: administrative
4: mixed
99: MISSING

ASGNP: _____ % operational – patrol (999 if MISSING).

ASGNSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ASGNES: _____ Effect size value for job assignment.

Shift Assignment

SHFT: _____ Shift assignment of sample (must be at least 80% to be coded as specific shift):

1: day
2: evening
3: overnight
4: variable
99: MISSING

SHFTP: _____ % day shift (999 if MISSING).

SHFTSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SHFTES: _____ Effect size value for shift assignment.

Workload

WKLDA: _____ Is workload assessed?

0: no – GO TO JCTRL
1: yes

WKLDM: _____ How "workload" is measured:

1: perceived
2: objective _____

99: MISSING

WKLDT: _____ Type of measure used for workload:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

WKLDO: _____ % reporting work overload for WKLD (999 IF MISSING)

WKLDU: _____ % reporting work underload for WKLD (999 IF MISSING)

WKLDSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

WKLDES: _____ Effect size value for workload.

Job Control

JCTRL: _____ Is degree of control or influence over work activities assessed?

0: no – GOT TO STSFY
1: yes

JCTRLT: _____ Type of measure used for JCTRL:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

JCTRLSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

JCTRLES: _____ Effect size value for JCTRL.

Job Satisfaction

STSFY: _____ Is job satisfaction assessed?

0: no – GO TO ITQ
1: yes

STSFYT: _____ Type of measure used for STSFY:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

STSFYSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

STSFYES: _____ Effect size value for job satisfaction.

Intention to Quit

ITQ: _____ Is intention to quit assessed?

0: no – GO TO RWD
1: yes

ITQT: _____ Type of measure used for ITQ:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ITQSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ITQES: _____ Effect size value for ITQ.

Reward Expectation

RWD: _____ Is degree to which reward expectations have been met assessed?

0: no – GO TO WFC
1: yes

RWDT: _____ Type of measure used for RWD:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

RWDSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RWDES: _____ Effect size value for RWD.

Work-Family Conflict

WFC: _____ Is "work-family conflict" assessed?

0: no – GO TO NLEMEAS
1: yes

WFCT: _____ Type of measure used for WFC:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

WFCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

WFCES: _____ Effect size value for WFC.

Negative Life Events

NLEMEAS: _____ Are measures of negative life events included in the study?

0: no – GO TO OPEXMEAS
1: yes

NLEGLOB: _____ Is a global Negative Life Events measure included in the study?

0: no – GO TO ILL
1: yes

NLETYPE: _____ Type of global Negative Life Events measure used for the study:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

NLEINS: _____ What measurement instrument or scale was used for global Negative Life Events measure?

1: _____
99: MISSING

NOTE:_____

NLEMOD: _____ Was the global Negative Life Events instrument modified from its original version?

0: no
1: yes
99: MISSING

NLEMEAN: _____ Mean of the global Negative Life Events measure (999 IF MISSING).

NLESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

NLEES: _____ Effect size value for the global Negative Life Events measure.

ILL: _____ Is experience of serious illness within past year assessed?

0: no – GO TO DIV
1: yes

ILLP: _____ % reporting experience of seriousness illness within past year.

ILLSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ILLES: _____ Effect size for experience of serious illness within past year.

DIV: _____ Is recent experience of divorce or serious relationship problems assessed?

0: no – GO TO CHLD
1: yes

DIVP: _____ % reporting recent experience of divorce or serious relationship problems.

DIVSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

DIVES: _____ Effect size for recent experience of divorce or serious relationship problems.

CHLD: _____ Is experience of recent serious problems with children assessed?

0: no – GO TO DLV
1: yes

CHLDP: _____ % reporting experience of recent serious problems with children.

CHLDSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CHLDES: _____ Effect size for experience of recent serious problems with children.

DLV: _____ Is experience of recent death of a loved one assessed?

0: no – GO TO FIN
1: yes

DLVP: _____ % reporting experience of recent death of a loved one.

DLVSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

DLVES: _____ Effect size for experience of recent death of a loved one.

FIN: _____ Is experience of recent serious financial difficulties assessed?

0: no – GO TO OPEXMEAS
1: yes

FINP: _____ % reporting experience of recent serious financial difficulties.

FINSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

FINES: _____ Effect size for experience of recent serious financial difficulties.

Other Operational Exposure Measures

OPEXMEAS: _____ Are other measures of *felt or experienced* operational exposure *independent of the outcome measure* included?

0: no – GO TO NUMORG
1: yes

OPXGLOB: _____ Is a global Operational Exposure measure included in the study?

0: no – GO TO TTS
1: yes

OPXTYPE: _____ Type of global Operational Exposure measure used for the study:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:

OPXINS: _____ What measurement instrument or scale was used for global Operational Exposure measure?

1: _____
99: MISSING

NOTE:_____

OPXMOD: _____ Was the global Operational Exposure instrument modified from its original version?

0: no
1: yes
99: MISSING

OPXMEAN: _____ Mean of the global Operational Exposure measure (999 IF MISSING).

OPXSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

OPXES: _____ Effect size value for the global Operational Exposure.

TTS: _____ Is threat of death or injury to self (*i.e.,* dangerousness) assessed?

0: no – GO TO ETV
1: yes

TTST: _____ Type of measure used for threat of death or injury to self:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

TTSSUB: _____ Is the measure used for threat of death or injury to self a subscale of the global Operational Exposure measure?

1: subscale
2: separate measure
99: MISSING

TTSSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TTSES: _____ Effect size value for threat of death or injury to self.

ETV: _____ Is exposure to violence/suffering of others assessed?

0: no – GO TO IHO
1: yes

ETVT: _____ Type of measure used for exposure to violence/suffering of others:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ETVSUB: _____ Is the measure used for exposure to violence/suffering of others a subscale of the global Operational Exposure measure?

1: subscale
2: separate measure
99: MISSING

ETVSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ETVES: _____ Effect size value for exposure to violence/suffering of others.

IHO: _____ Is experience or fear of inflicting harm on others assessed?

0: no – GO TO DOC
1: yes

IHOT: _____ Type of measure used for experience or fear of inflicting harm on others:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

IHOSUB: _____ Is the measure used for experience or fear of inflicting harm on others a subscale of the global Operational Exposure measure?

1: subscale
2: separate measure
99: MISSING

IHOSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

IHOES: _____ Effect size value for experience or fear of inflicting harm on others.

DOC: _____ Is experience or fear of death or serious injury of colleague assessed?

0: no – GO TO CRA
1: yes

DOCT: _____ Type of measure used for experience or fear of death or serious injury of colleague:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

DOCSUB: _____ Is the measure used for experience or fear of death or serious injury of colleague a subscale of the global Operational Exposure measure?

1: subscale
2: separate measure
99: MISSING

DOCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

DOCES: _____ Effect size value for experience or fear of death or serious injury of colleague.

CRA: _____ Is overall crime rate of assignment area assessed?

0: no – GO TO VRA
1: yes

CRAM: _____ Mean overall crime rate of assignment area (999 IF MISSING).

CRASTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CRAES: _____ Effect size for overall crime rate of assignment area.

VRA: _____ Is violent crime rate of assignment area assessed?

0: no – GO TO PRA
1: yes

VRAM: _____ Mean violent crime rate of assignment area (999 IF MISSING).

VRASTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

VRAES: _____ Effect size for violent crime rate of assignment area.

PRA: _____ Is property crime rate of assignment area assessed?

0: no – GO TO NUMORG
1: yes

PRAM: _____ Mean property crime rate of assignment area (999 IF MISSING).

PRASTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

PRAES: _____ Effect size for property crime rate of assignment area.

ORGANIZATIONAL CHARACTERISTICS:

NUMORG: _____ Number of organizations/departments represented

1: single
2: multiple: # _____
99: MISSING

TYPEORG: _____ Type of police organization(s)

1: municipal
2: sheriff/county
3: state
4: federal
5: other _____
6: mixed
99: MISSING – GO TO STRC

TYPESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

TYPEES: _____ Effect size value for type of police organization.

STRC: _____ Hierarchical/bureaucratic complexity:

1: simple
2: moderate
3: complex
4: mixed
99: MISSING – GO TO SIZEA

STRCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

STRCES: _____ Effect size value for hierarchical/bureaucratic complexity.

SIZEA: _____ Size of organization as reported by author:

1: small
2: medium
3: large
4: mixed
99: MISSING

SIZEO: _____ Size by number of full-time sworn officers:

1: less than 10
2: 10-50
3: 51-100
4: 101-500
5: 501-1,000
6: over 1,000
7: mixed
99: MISSING – GO TO SMTP

SIZESTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SIZEES: _____ Effect size value for size of organization.

SMTP: _____ Is participation in stress management training assessed?

0: no – GO TO SSW
1: yes

SMTPT: _____ Type of measure used for participation in stress management training:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SMTPSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SMTPES: _____ Effect size value for participation in stress management training.

SSW: _____ Is social support from WORK sources assessed?

0: no – GO TO CULTA
1: yes

SSWGLOB: _____ Is there a global social support from work sources measure?

0: no – GO TO SSS
1: yes

SSWT: _____ Type of measure used for global social support from work sources:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SSWSUB: _____ Is the measure used for global social support from work sources a subscale of the global coping measure?

1: subscale
2: separate measure
99: MISSING

SSWSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SSWES: _____ Effect size value for global social support from work sources.

SSS: _____ Is social support from supervisors assessed?

0: no – GO TO SSP
1: yes

SSST: _____ Type of measure used for social support from supervisors:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SSSSUB: _____ Is the measure used for social support from supervisors a subscale or a separate measure?

1: subscale of global coping measure
2: separate measure
3: subscale of global social support from work sources measure
99: MISSING

SSSSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SSSES: _____ Effect size value for social support from supervisors.

SSP: _____ Is social support from peers assessed?

0: no – GO TO ISP
1: yes

SSPT: _____ Type of measure used for social support from peers:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SSPSUB: _____ Is the measure used for social support from peers a subscale or a separate measure?

1: subscale of global coping measure
2: separate measure
3: subscale of global social support from work sources measure
99: MISSING

SSPSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SSPES: _____ Effect size value for social support from peers.

ISP: _____ Is instrumental support assessed?

0: no – GO TO CULTA
1: yes

ISPT: _____ Type of measure used for instrumental support:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

ISPSUB: _____ Is the measure used for instrumental support a subscale or separate measure?

1: subscale of global coping measure
2: separate measure
3: subscale of global social support from work sources measure
99: MISSING

ISPSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

ISPES: _____ Effect size value for instrumental support.

CULTA: _____ Is "inclusiveness of organizational culture" assessed?

0: no – GO TO FAIRA
1: yes

CULTM: _____ How "inclusiveness of organizational culture" is measured:

1: perceived
2: objective _____
99: MISSING

CULTT: _____ Type of measure used for CULT:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

CULTSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CULTES: _____ Effect size value for CULT.

FAIRA: _____ Is "organizational fairness" assessed?

0: no – GO TO SEXH
1: yes

FAIRM: _____ How "organizational fairness" is measured:

1: perceived
2: objective _____

99: MISSING

FAIRT: _____ Type of measure used for FAIR:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

FAIRSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

FAIRES: _____ Effect size value for FAIR.

SEXH: _____ Is experience of sexual harassment on the job assessed?

0: no – GO TO RACH
1: yes

SEXHT: _____ Type of measure used for sexual harassment on the job:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

SEXHSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

SEXHES: _____ Effect size value for sexual harassment on the job.

RACH: _____ Is experience of racial/ethnic harassment on the job assessed?

0: no – GO TO EFF
1: yes

RACHT: _____ Type of measure used for racial/ethnic harassment on the job:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

RACHSTA: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RACHES: _____ Effect size value for racial/ethnic harassment on the job.

SYSTEM-LEVEL CHARACTERISTICS:

EFF: _____ Is "perceived effectiveness of criminal justice system" assessed?

0: no – GO TO JUST
1: yes

EFFT: _____ Type of measure used for "perceived effectiveness of criminal justice system":

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

EFFSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

EFFES: _____ Effect size value for perceived effectiveness.

JUST: _____ Is "perceived justness of criminal justice system" assessed?

0: no – GO TO NUMCOM
1: yes

JUSTT: _____ Type of measure used for "perceived justness of criminal justice system":

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

JUSTSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

JUSTES: _____ Effect size value for perceived justice.

COMMUNITY-LEVEL CHARACTERISTICS:

NUMCOM: _____ Number of communities represented

1: single
2: multiple: # _____
99: MISSING

LOC: _____ Location

1: urban
2: suburban
3: rural
4: mixed
99: MISSING

LOCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

LOCES: _____ Effect size for location.

RATIO: _____ Mean ratio of officer to population (999 IF MISSING).

RATSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RATES: _____ Effect size for ratio of officer to population.

CRIME: _____ Mean overall crime rate (999 IF MISSING).

CRMSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CRMES: _____ Effect size for overall crime rate.

VIOL: _____ Mmean violent crime rate (999 IF MISSING).

VIOLSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

VIOLES: _____ Effect size for violent crime rate.

PROP: _____ If multiple communities, mean property crime rate (999 IF MISSING).

PROPSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

PROPES: _____ Effect size for property crime rate.

PBLC: _____ Is "perceived public attitude toward police" assessed?

0: no – GO TO MEDIA
1: yes

PBLCT: _____ Type of measure used for "perceived public attitude toward police":

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

PBLCSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

PBLCES: _____ Effect size value for public attitude.

MEDIA: _____ Is "perceived state of media relations with police" assessed?

0: no – GO TO COUNTRY
1: yes

MEDIAT: _____ Type of measure used for "perceived state of media relations with police":

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE: _____

MEDSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

MEDES: _____ Effect size value for perceived media relations.

MACRO-LEVEL CHARACTERISTICS:

COUNTRY: _____ Country of study

1: United States
2: Germany
3: South Korea
4: Norway
5: Israel
6: New Zealand
7: Australia
8: South Africa
9: other: _____
10: mixed
99: MISSING

CTRYSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

CTRYES: _____ Effect size value for country of study.

REGION: _____ If United States, region of study (according to Census map):

1: Northeast
2: Midwest
3: South
4: West
5: mixed
99: MISSING – GO TO STRESS

RGNSTAT: _____ Statistical test:

1: *r*
2: ANOVA
3: Chi-square
4: descriptive statistic
5: *t* test
6: *p* value not otherwise specified
99: MISSING

RGNES: _____ Effect size value for region of United States.

OUTCOME MEASURES:

STRESS: _____ Are multiple measures of "stress" recorded?

0: no
1: yes

SIM: _____ Is the outcome measure in response to a simulated (training) environment?

0: no
1: yes

STRESST: _____ Type of measure used for perceived stress:

1: dichotomous
2: summed dichotomous
3: frequency/rate
4: intensity index
5: continuous
99: MISSING

NOTE:_____

INSTR: _____ What measurement instrument or scale was used for the primary stress outcome?

1: Boston Police Officer Survey Stress Scale
2: Brief Symptom Inventory
3: Caplan et al. Psychological Distress Scale
4: Center for Epidemiogical Studies Depression Scale
5: Chen Job Stress Scale
6: Cohen et al. Perceived Stress Scale
7: Coman Revised Critical Life Events Scale
8: Cullen et al. Work Stress Scale
9: Depression Anxiety and Stress Scales
10: General Health Questionnaire
11: Gershon's Work Stress Questionnaire
12: Hopkins Symptom Checklist-21
13: Job Stress Index
14: Job Stress Survey
15: Kessler Psychological Distress Scale
16: Law Enforcement Officer Stress Survey
17: Lipp Stress Symptoms Inventory
18: NASA TLX – Task Load Index
19: Occupational Stress Index
20: Occupational Stress Indicator
21: Occupational Stress Inventory
22: Perceived Stress Indicator
23: Perceived Stress Questionnaire
24: Perceived Stress Survey
25: Police Perceived Stress Survey
26: Police Stress Inventory
27: Police Stress Questionnaire
28: Rapid Stress Assessment Scale
29: Screening Scale for Chronic Stress
30: Sewell Law Enforcement Critical Life Events
31: Speilberger Police Stress Survey
32: Spina Officer Stress Scale
33: State-Trait Anxiety Inventory
34: Stress Appraisal Measure
35: Stress in General Scale
36: Stress Profile
37: Stress Visual Analogue Scale
38: Subjective Stress Experience Scale
39: Subjective Stress Scale
40: Toulouse Stress Scale
41: Wilcher Stress Test
42: Work Environment Inventory
43: Work Stress Inventory
44: other _____
99: MISSING

NOTE: _____

INSTRA: _____ Did the author(s) create this instrument?

0: no
1: yes
99: MISSING

MODIFY: _____ Was the instrument modified from its original version?

0: no
1: yes
99: MISSING

MEAN: _____ Mean of the outcome measure (999 IF MISSING).

METHODOLOGICAL QUALITY INDEX:

METH1: _____ Was there a theoretical explanation for the selection of variables?

0: no
1: yes

METH2: _____ Was there an adequate description of the sample?

0: no
1: yes

METH3: _____ Was the sample representative of the population under study?

0: no
1: yes

METH4: _____ Was there an adequate description of the methods?

0: no
1: yes

METH5: _____ Was the response rate adequate (at least 60%)?

0: no
1: yes

METH6: _____ Was reliability reported for the primary outcome measure?

0: no
1: yes

METH7: _____ Was reliability adequate for the primary outcome measure (as assessed by author)?

0: no
1: yes

METH8: _____ Was statistical power assessed?

0: no
1: yes

METH9: _____ Was statistical power adequate (as assessed by author)?

0: no
1: yes

METHTOT: _____ Total Methodological Quality Index score (0-9).