

August 2016

Biopsychosocial Vulnerability-Stress Modeling for an Incarcerated Population

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Recommended Citation

Shelton, Deborah; Barta, Bill; Trestman, Robert; and Wakai, Sara (2016) "Biopsychosocial Vulnerability-Stress Modeling for an Incarcerated Population," *Journal for Evidence-based Practice in Correctional Health*: Vol. 1 : Iss. 1 , Article 1.

Available at: <http://digitalcommons.uconn.edu/jepch/vol1/iss1/1>

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Abstract

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Abstract

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Introduction

According to the most recent Bureau of Justice Statistics report (BJS, 2006), 56% of all state correctional prison and jail inmates exhibit either a history of diagnosed mental illness or symptoms of mental illness. It is likely that this is a conservative estimate, given that the brief screens used to detect mental illness following arrest fail to detect mental illness up to 63% of the time (Steadman, Scott, Osher, Agnese, & Robbins, 2005). Experts also believe that the number of persons with mental illness (PMI) who enter the prison system is growing. The criminalization of PMI is attributable in large part to long-standing underinvestment by states in community mental health. Publicly financed mental health systems are, as Fellner (2006) notes, “fragmented, chronically under-funded, and rife with barriers to access.” As a result, “too many people who need publicly financed mental health services cannot obtain them until they are in an acute psychotic state and are found to be a danger to themselves or others (p. 393).”

In response to the steady influx of PMI, mental health diversion programs have been set up in many jurisdictions throughout the country with the aim of placing PMI under alternative forms of community supervision; this may occur post-booking and may carry the stipulation that they plead guilty to criminal charges. Some studies appear to show that persons who complete diversion programs commit new offenses at a lower rate than persons who do not complete the process (e.g., McNiel & Binder, 2007). However, these data should be viewed cautiously when comparisons are made between PMI who are deemed eligible for diversion programs and those who are not. Typically, offenders are considered eligible if they are only guilty of misdemeanors and deemed to present a low risk to public safety (Lim & Day, 2013); hence,

selection bias presents a threat to the validity of research findings. Comparisons between persons who accept or decline participation in diversion programs are also susceptible to bias.

In addition, experts have noted that these programs may produce unintended effects. If persons who complete the program are given priority for community mental health beds, fewer beds will be available for PMI who are not involved (or not yet involved) in the criminal justice system. As already noted, many socio-economically disadvantaged PMI lack access to timely mental health treatment. If the criminal justice system becomes a “gateway” to mental health services, larger numbers of mentally ill persons will face the added stigma of having a criminal record (Christy, Poythress, Boothroyd, Petrila, & Mehra, 2005).

There are also concerns about the appropriateness of the community mental health programming that is offered. According to review of the literature by Barrenger and Draine (2013), “Interventions for persons with [serious mental illness] ... involved in the criminal justice system have produced mixed results and have overwhelmingly focused on the individual-level factors that pose risks for reincarceration, primarily focusing on linking individuals to existing mental health treatment without addressing social welfare needs such as housing and income.” Yet, conditions such as homelessness and social marginalization “exacerbate mental illness or increase the risk of criminal offending or contact with the criminal justice system (p. 157).”

Currently, the complex interactions among mental illness, social disadvantage, and exposure to adverse correctional and community environments is under-theorized and understudied (Skeem, Manchak, & Peterson, 2011). A demonstrable need exists to strengthen mental health services provided in correctional environments (Knoll, 2006). At the same time, literature identifying effective correctional mental health

treatment approaches is sparse. This gap is even more marked when seeking guidance to improve nursing practice and develop realistic benchmarks for nursing performance in correctional facilities.

In this paper, the general principles of a vulnerability-stress model of psychopathology will be outlined based on theory and a review of literature and applied to corrections-involved PMI. Specific attention is given to the implications and applications of this model for correctional nursing.

Incarceration-Related Stress

Before laying out a vulnerability-stress model of psychopathology that is specific to corrections-involved PMI, it is important to consider the unique stressors faced by this population. PMI face an increased risk of experiencing a “revolving door” of repeated arrests and convictions stemming from low-level felony, misdemeanor, or disorderly conduct arrests and parole revocation (c.f., Canada & Watson, 2013). In some instances, these are survival crimes – for example, shoplifting, trespass, or “dine and dash” (eating at a restaurant without paying the bill) – stemming from homelessness and low employability. More commonly, offenses committed by PMI are attributable to instances of reactive aggression in response to provocations (Peterson, Skeem, Hart, Vidal, & Keith, 2010).

Likelihood of physical assault provides additional stressors for PMI during periods of incarceration. Males who have mental illness are 1.6 times more likely and women with mental illness are 1.7 times more likely to be physically assaulted by other inmates, and are also more likely to be physically assaulted by prison staff (Blitz, Wolff, & Shi, 2008). Further, in a study of the Texas prison system, PMI were found to be 8 times more likely than other inmates to be victims of sexual assault (Austin, Fabelo, Gunter & McGinnis,

2006). Limitations in coping ability secondary to their mental illness puts these individuals at greater risk and in need of protection within this environment. Often times this results in an increased use of restrictive environments, which are known to cause more stress and increase psychotic symptoms (Hills, Seigfried & Ickowitz, 2004).

Denial of Positively Valued Goals. The day-to-day experience of incarceration is also highly stressful. Blevins, Listwan, Cullen, & Jonson (2010), using General Strain Theory as a framework, identify broad categories of incarceration-related stressors. Denial of positively valued goals is the first of these, examples of which being the experience of disjuncture between expected and actual outcomes and violations of the expectation of fair treatment. Correctional officers provide inmates with rewards for good behavior (e.g., special privileges) and punishments (e.g., documented infractions) for misbehavior. The likelihood that an inmate will earn privileges and avoid infractions depends in part on his or her ability to inhibit inappropriate behavior and follow instructions, and this may be challenging for PMI (c.f., Fellner, 2006). An inmate who recognizes that emotional outbursts are problematic may seek out facility-based programs dealing with issues such as anger management, only to discover that a record of infractions renders him or her ineligible to participate (P. Hynes, personal communication, 7/31/2015).

Removal of Positively Valued Stimuli. The second category of stressor identified in Blevins et al. is the removal of positively valued stimuli. Examples include the experience of autonomy, privacy, freedom of movement, and the ability to interact freely with friends and family. The extent of the deprivation of these stimuli can hardly be appreciated unless one has spent time in a correctional facility.

Perceived autonomy and social interaction are not merely “valued stimuli” but are important buffers against stress. An extensive literature in organizational psychology has shown that employees are able to overcome the stress of having a highly physically and emotionally demanding job if they perceive themselves as autonomous rather than controlled, and can avail themselves of social support (e.g., Bakker & Demerouti, 2007). From the standpoint of mental health, providing individuals with autonomy support and access to social networks are decisive factors in promoting successful recovery from mental illness (Drake & Whitley, 2014; Schön, Denhov, & Topor, 2009).

Exposure to Noxious Stimuli. The third broad category of incarceration-related stressor is exposure to noxious stimuli, such as noise, crowding, personal victimization, and witnessing the victimization of other inmates. Exposure to noise and crowding activates the hypothalamic-pituitary-adrenocortical (HPA) axis (Evans & Kim, 2007), which, as will be discussed, is involved in the physiological response to stress. Social isolation (Cacioppo & Hawkley, 2003) and sensory deprivation (Wade, Hankins, Smyth, Rhone, Mythen, Howell et al., 2014) are major stressors, with the latter known to be associated with increased risk of experiencing hallucinations and delusions. PMI are placed in administrative segregation or “solitary confinement” more frequently than other inmates (Knoll, 2006; Testa, 2015). Being subjected to administrative segregation has been shown to produce clinical symptoms of depression and anxiety among persons who did not previously exhibit these symptoms (Andersen, Sestoft, Lillebaek, Gabrielsen, Hemmingsen, & Kramp, 2000). Psychiatric illness and exposure to administrative segregation are risk factors for suicide, with suicide being the 3rd leading cause of death in U.S. correctional facilities (Patterson & Hughes, 2008).

The Vulnerability-Stress Model

The vulnerability-stress model (VSM), also referred to as a diathesis model, posits that the presence or absence of psychopathology as well as individual differences in the frequency and severity of symptoms are attributable to four key factors. The first of these is a persistent *vulnerability* or *diathesis*, consisting of *both* an inborn *and* acquired liability to psychiatric disorder, where “inborn” implies a genetic factor and “acquired” implies environmental factors such as life event stressors. As Zubin wrote in a 1972 paper, “In most so-called genetic disorders, the hereditary component is necessary but not sufficient for producing the disorder. Similarly, for most so-called environmental disorders, the noxious environmental parameters are necessary but not sufficient (p. 290).” In other words, according to this view, genetic predisposition to illness is regarded as a *component cause* (c.f., Rothman & Greenland, 2005).

The remaining factors are as follows: (1) *coping efforts (responses)*, referring to any behavior that occurs in direct response to an environmental stressor, (2) *coping activities (outcomes)*, meaning the results of these coping efforts, and (3) *competence (self-regulation)*, referring to skills and abilities for responding to stressors (Zubin & Spring, 1977). As will be discussed, competence may be understood in terms of individual differences in the capacity to exercise self-regulation or self-control.

Zubin and Spring developed VSM to resolve perceived shortcomings in the then-prevailing clinical understanding of the etiology and phenomenology of schizophrenia. Some theorists believed that that schizophrenia was primarily an “organic” disorder (e.g., genetically determined, or the result of brain damage) in which psychosocial factors (e.g., severe childhood trauma) played only a minor role, and other theorists believed just the opposite (c.f., Zubin, 1986). Yet, in either case, schizophrenia was believed to be a

chronic and unremitting condition, there was little confidence among professionals regarding prospects for recovery, and persons with the disorder were usually institutionalized.

Despite this prevailing view, it was widely recognized that persons with schizophrenia sometimes exhibited symptom remission or substantial improvement in level of function. Zubin and Spring theorized that the seemingly chronic and unremitting nature of the disorder was attributable to ineffective treatment, psychopathogenic effects of institutional environments, or other external factors. They also theorized that moderating factors must exist to account for between-person variation in the frequency and severity of symptom episodes and within-person variation in reactivity to life event stressors. They considered, for example, the role of premorbid personality, “ecological niche” and social networks (c.f., Zubin, 1986).

VSM as a Transdiagnostic Explanatory Framework.

Subsequent empirical research substantiated the relevance of VSM to schizophrenia (Mueser, Deavers, Penn, & Cassisi, 2013). However, the wide impact that VSM has had on the mental health fields owes to the fact that the model offers a compelling explanatory framework when applied to a wide range of psychiatric conditions. These include, among others, depression (Heim & Binder, 2012; Luecken, Appelhans, Kraft, & Brown, 2006), bipolar disorder (Koenders, Giltay, Spijker, Hoencamp, Spinhover et al., 2014), post-traumatic stress disorder (PTSD, Admon, Milad, & Hendle, 2013), and alcohol abuse (Catanzaro & Laurent, 2004).

Acquired Vulnerability. Each of the preceding accounts emphasizes *acquired vulnerability* – i.e., an enduring impact of adverse life events on subsequent neurophysiological and psychological responses to stress. Admon et al., for example, note that, “abundant animal and human literature has demonstrated how

exposure to psychological stress can lead to long-lasting effects on brain function and structure (p. 317).” Heim et al. observe that, “interactions between genetic diathesis and environmental influences across the lifespan together underlie depression vulnerability in most patients (p. 641).” The authors of both studies point out that early life stress is associated with a reduction in the size of the hippocampus.

The hippocampus is a part of the brain which modulates the neurophysiological response to stress by downregulating the cortisol-producing HPA axis (Radley, Morilak, Viau & Campeau, 2015). In animal studies, it has been shown that the hippocampus is also implicated in serotonin regulation and that regulatory deficits can be produced by exposure to chronic unpredictable stress (Luo, An, & Zhang, 2008). Serotonin, a neurotransmitter, influences mood states and in particular the capacity to inhibit prepotent responses – an important facet of impulsivity (Dalley & Roiser, 2012).

The Mesolimbic Pathway. The mesolimbic or “reward” pathway of the brain is also affected by chronic stress. Animal studies show that, in neonates, prolonged maternal separation and stimulus deprivation each induce brain changes affecting the production of dopamine (Brake, Zhang, Diorio, Meaney & Gratton, 2004). Dysregulation of dopamine channels contributes to particular facets of impulsivity such as difficulty tolerating delay of gratification and maladaptive perseveration in response to reward cues (Dalley & Roiser, 2012).

Genetic and Epigenetic Factors. As noted above, Zubin believed that *both* genetic predisposition *and* life event stressors contributed to increased vulnerability to psychiatric illness. It is beyond the scope of this paper to review the literature in genetics. However, in support of the transdiagnostic relevance of VSM, it bears mentioning that polymorphisms in four genetic loci increase the risk of autism, attention deficit-

hyperactivity disorder, bipolar disorder, major depressive disorder, autism, and schizophrenia (*Cross-Disorder Group of the Psychiatric Genomics Consortium*, 2013). What these genetic loci share in common is their involvement in regulating voltage-gated calcium channels. Calcium channels in the amygdala respond to cortisol secretions and the physiological stress response (Jöels & Karst, 2012).

It was once widely held that genetic traits are immutable. However, it is now known that environmental factors can alter the expression of genetic phenotypes through molecular mechanisms. This is referred to as *epigenesis*. Epigenetic factors have been implicated in changes in the regulation of serotonin (a neurotransmitter associated with mood) and cortisol (a hormone associated with the physiological response to stress; Uddin, Koenen, Aiello, Wildman, de los Santos et al., 2011).

Advances in Theory. VSM is strongly compatible with two more recent accounts of gene-environment interaction as it bears on life history exposure to stressors. The first of these is the *adaptive calibration model*, which posits that patterned neurophysiological changes occur in response to either high- or low-threat environments and constitute adaptations to these environments (Del Giudice, Ellis & Shirtcliff, 2011; c.f., Korte, 2005). The second is the *allostatic load model*, which also posits that environmental stressors can induce long-term changes in neurophysiology (c.f., McEwen, 2012). The two theories differ only in terms of emphasis, with the former focusing on etiology and the latter focusing on the deleterious effects of long-term exposure to stress.

According to the adaptive calibration model, certain behaviors that are widely viewed as “dysfunctional” or “maladaptive” are in fact adaptive responses to high-threat environments. For example, children who are raised in abusive households exhibit increased responsivity to threat-related cues such as

angry faces; one may readily conjecture that this is an adaptive response to the environment, even if it increases the risk of the child later developing anxiety disorder (McCrory, De Brito, Sebastian, Mechelli, Bird et al., 2011). Similarly, impulsive behavior, which prioritizes immediate smaller rewards over delayed larger rewards, may be adaptive in environments that are unpredictable or uncontrollable (Haselton, Bryant, Wilke, Frederick, Galperin et al. 2009). Adaptations to threatening or insecure environments become problematic because, once they established during critical period of human development, they become resistant to change, and may be reinstated by subsequent exposure to stress.

Allostasis is defined as “the process of achieving stability through change in anticipation of physiological requirements (Koolhaas, Bartomucci, Buwalda, de Boer, S.F., Flügge et al., 2011; p. 1297).” Whereas the term “stress” refers to a discrete response to challenging or threatening stimuli, allostasis refers to long-term adaptations. These adaptations take the form of stress-related changes to both the HPA axis and the sympathetic - adrenal - medullary (SAM) axis. The latter regulates glucocorticoids (e.g., cortisol) associated with “fight-or-flight” responses.

High allostatic load is associated with increased reactivity to stressors, intense and unstable affective states, and problems of self-regulation, and cognitive impairment (Beauchaine, Neuhaus, Zalewski, Crowell, & Potapova, 2011). Also, maternal depression and anxiety are linked to increased cortisol levels in neonates, operating through an epigenetic mechanism (Oberlander, Weinberg, Papsdorf, Grunau, Misri et al., 2008). As such, we will posit that inborn and acquired vulnerability, as described in VSM, may be framed in terms of allostasis.

Stress

In their conceptualization of stress, Zubin and Spring endorsed a Selyean position, which as they characterized it consists of life events creating strain, where “strain in turn sets in motion adaptive capacities to overcome the stress or contain the strain.” A more contemporary account of stress, and one that comports with the interactionist conceptual foundation of VSM, is provided by Koolhaas and colleagues (2011): “stress should be considered as a cognitive perception of uncontrollability and/or unpredictability that is expressed in a physiological and behavioral response (p. 1292).”

Controllability. Regarding the “controllable vs. uncontrollable” dimension of exposure to stress, much has already been written on this subject. A substantial portion of this literature is guided by the *learned helplessness paradigm*, which holds that repeated exposure to uncontrollable stressors produces a characteristic pattern of exaggerated fear conditioning, failure to escape from aversive stimuli, and neophobia. Here again, particular attention is given to corresponding neurogenetic changes in the hippocampus (Maier & Watkins, 2005).

Predictability. The “predictable vs. unpredictable” dimension of exposure to stress has arguably received less attention than the control dimension, although it does figure prominently in research on persons with PTSD. Heightened anxiety in anticipation of aversive events is recognized as an important clinical feature of PTSD, and data show that unpredictable aversive events elicit greater anxiety than predictable aversive events (Simmons, Flagan, Wittmann, Strigo, Matthews et al., 2013).

McEvoy and Mahoney (2012) propose that individual variation in intolerance of uncertainty is a useful focus in clinical research, described as “cognitive, emotional, and behavioral reactions to uncertainty that bias information processing and lead to faulty appraisals of heightened threat and reduced coping (p. 533).” McEvoy and Mahoney believe that intolerance of uncertainty is a transdiagnostic mechanism relevant to anxiety, depression, and other internalizing disorders.

The relationship between low predictability and increased stress were illuminated in an 18-year longitudinal study of workplace stress. The researchers uncovered a significant prospective association between frequency of exposure to self-reported unpredictable events (operationalized as low ability to anticipate “problems and disturbances” arising in one’s work) and risk of experiencing stress-related cardiac events (myocardial infarction; Väänänen, Koskinen, Joensuu, Kivimäki, Vahtera et al., 2008).

Violence. Koolhaas and colleagues do not include exposure to intentional harm in their formulation of stress. Exposure to violence may be predictable and controllable up to a point through appeasement strategies directed toward the aggressor, but is likely to elicit a stress response. As a distinctive source of vulnerability to psychopathology, victimization may foster an external locus of control, a hostile attribution bias in interpersonal situations, paranoia, and ideas of reference; each of which are correlates of psychotic disorders (Fisher, Schreier, Zammit, Maughan, Munafo et al., 2013). This holds particular relevance for correctional populations.

Acute Responses to Stress. Zubin and Spring defined coping as “problem solving and abstract thinking in situational dilemmas (p. 111).” This is consistent with the then-influential (and still-influential) conceptualization of coping as a voluntary and effortful behavior which follows cognitive appraisal of the

stressor (c.f., Lazarus & Folkman, 1984). According to Lazarus and Folkman's account, coping activities occur subsequent to exposure to a stressor and address post-exposure negative affective states.

One of the early critiques of Lazarus and Folkman's approach is still germane. Zajonc (1984) pointed out that exposure to a stressor activates pre-cognitive responses driven by emotional memory (i.e., the hippocampus) and the HPA axis. Examples of pre-cognitive, involuntary responses are emotional numbing (a subjective experience of being unable to access one's feelings) or extreme emotionality, cognitive interference (one's mind "going blank"), intrusive thoughts, and physiological arousal (c.f., Connor-Smith, Compas, Wadsworth, Harding Thomsen, & Saltzman, 2000). Hence, there is the concern that among persons with severe acquired and/or innate vulnerabilities, the ability to enact coping skills may be short-circuited by involuntary responses to stressors.

Zubin and Spring appeared to have recognized this. They posited that, apart from effortful coping activities, it is necessary to consider a range of stress-related competencies that are accumulated over the course of lengthy interactions with either a high- or low-threat environment. Their discussion of competencies brings to mind the set of responses that more contemporary authors refer to as self-regulation. Self-regulation encompasses automatic responses such as attention control, inhibitory control, delay of gratification, and planning (Evans & Kim, 2013).

In recent years, a strength model of self-regulation has gained prominence, according to which individuals possess finite capacity to exercise self-regulatory behavior and, when this capacity is exhausted, exhibit momentary failures of self-regulation (Baumeister, Vohs & Tice, 2007). Zubin and Spring likewise posited that individuals may encounter periods of "lowered psychological resistance" to minor stressors,

precipitating momentary breakdowns of coping efficacy and in turn increased vulnerability to psychopathological symptoms.

VSM: Moderating and Mediating Variables

The preceding section cited evidence in support of the basic assumptions of VSM as originally presented by Zubin and Spring. In this section, attention is given to how VSM may be further developed. Attention will be given to moderating variables such as individual differences in coping and self-regulation behavior, personality traits and mediating variables such as dysfunctional coping responses and *stress generation*, which are described below. The benefit of examining moderating and mediating variables is that it provides an improved fit between VSM and specific subpopulations and individuals.

Coping Responses

Coping responses, viewed in the tradition of Lazarus and Folkman's (1984) transactional model, are post-event effortful strategies deployed to modulate one's own affective responses to a stressor. Lazarus and Folkman posited that individuals typically engage in primary appraisal of the stressor as either a *threat* (that is, an expectation of unavoidable harm or loss) or a *challenge* (an expectation that one will experience growth by overcoming a difficult problem). Subsequently, they enact coping responses which consist of problem-focused and emotion-focused coping responses, the former aiming to address aspects of the stressful event over which the individual has some control, the latter aiming to address one's own stressor-related affective states. Lazarus and Folkman believed that, during a stressful episode, individuals enact both problem- and emotion-focused responses.

Studies inspired by the transactional model have drawn a connection between emotion-focused responses and increased emotional distress. Critics note that these findings may be misinterpreted: one could conclude that emotion-focused responses increase distress, but it is more likely that emotion-focused responses are confounded with increased distress (Austenfeld & Stanton, 2004). Moreover, distress reduction is not an appropriate criterion for determining whether or not a particular coping response is “adaptive.” Investigators who study emotional self-regulation behavior have observed that “awareness and acceptance of emotion,” “capacity to pursue goal-directed behaviours when distressed” and “willingness to experience difficult emotions” are associated with increased psychological adjustment (Pepping, O’Donovan, Zimmer-Gembeck, & Hanisch 2014, p. 130; c.f., Gratz & Tull, 2010).

Researchers who study coping responses have long sought to distinguish between adaptive and maladaptive coping responses, but this is not a simple task. “Relations between coping and adjustment,” Carver and Connor-Smith (2010) observe, are moderated by event-specific variation in the “nature, duration, context, and controllability of the stressor (p. 694).” This has implications for checklist measures of coping styles and efforts to identify individual differences in “preferred” or “trait-like” coping styles. In part because checklist measures are insensitive to situation-specificity of coping responses and the diversity of coping responses that are elicited during a single stressful event, there is low correspondence between checklist measures of coping and daily diary measures of event-specific coping responses (Todd, Tennen, Armeli, Carney, & Affleck, 2004).

The Mismatch Hypothesis. Emotion-focused responses are appropriate and adaptive when the individual is confronted by a truly uncontrollable stressor, but are problematic when marshalled in response

to controllable stressors (Troy, Shallcross, & Mauss, 2013). This idea may be traced back to Folkman's (1984) *mismatch hypothesis*, e.g., "If an event is appraised as uncontrollable when in fact it is controllable, the person is likely not to engage in necessary problem-focused coping (p. 849)." Hence, a medical patient who appraises her condition as uncontrollable may decide not to participate in treatment.

One may conjecture that persons who consistently appraise stressors as threats rather than challenges (even when, by an objective standard, it might be inappropriate to do so) will consequentially rely on emotion-focused responses to the exclusion of problem-focused responses. It is important to note, in this context, that the appraisal of a stressor as threatening may take place in a matter of milliseconds (Bardeen & Orcutt, 2011). Next, problems of self-regulation will be discussed, with attention given to the possibility that problems of self-regulation consist of pre-attentive biases toward appraising stressors as threats.

Problems of Self-Regulation

Self-regulation, as noted earlier, encompasses attentional and inhibitory control, delay of gratification, and planning (Evans & Kim, 2013). First, attention will be given to two examples of trait-like patterns of dysregulation. The first, *distress intolerance*, is linked to increased vulnerability to a range of psychopathological outcomes (Leyro, Zvolensky, & Bernstein, 2010). The second, *anxiety sensitivity*, is broadly relevant to the exacerbation of anxiety-related symptoms (Pynoos, Steinberg, & Piacentini, 1999), as will be discussed.

Distress Intolerance. *Distress tolerance* refers to trait-like individual differences in the "capacity to experience and withstand negative psychological states (Simons & Gaher, 2005, p. 83)." It is conceptually closely related to the clinically important construct of *experiential avoidance* (an unwillingness to remain in

contact with certain private experiences), but in terms of how these constructs are operationalized, distress tolerance is more amenable to research and evaluation applications (c.f., Schloss & Haaga, 2011).

Persons lacking in distress tolerance report an exaggerated level of aversion to negative psychological states and impaired ability to direct their thoughts away from feelings of distress. Simons and Gaher note that, “habitual avoidance of and marked efforts to inhibit the experience of emotional distress ... may interfere with the development of more adaptive approaches to managing and accepting distress as a common, though potentially difficult, component of life (p. 99).”

Notably, low distress tolerance is associated with depressive symptomatology and impulsivity (Anestis, Lavendar, Marshall-Berenz, Gratz, Tull et al. 2012). It is also linked to antisocial personality disorder (Daughters, Sargeant, Bornovalova, Gratz & Lejuez, 2008). Persons lacking in distress tolerance engage in maladaptive rumination (“brooding”), or a tendency to focus on one’s distress-related thoughts and experience (Magidson, Listhaus, Seitz-Brown, Anderson, Lindberg et al., 2013). Rumination limits working memory access to adaptive coping responses and contributes to reduced cognitive flexibility in distressing situations (Joormann, Levens, & Gotlib, 2011).

With respect to substance addiction, many researchers believe that negative reinforcement perpetuates substance use behavior. The aversive experience of withdrawal symptoms is alleviated by the self-administration of substances. In an important extension of that theory, the experience of aversive psychological states such as stress or negative affect may also cue substance use (Baker, Piper, McCarthy, Majeskie & Fiore, 2004). Persons who are intolerant of distress, as already noted, may fail to acquire adaptive coping responses for dealing with aversive psychological states. In addition, they may exhibit a

lower threshold for experiencing aversive states (Coughe, Bernstein, Zvolensky, Vujanovic, & Macatee, 2013). Distress intolerance may figure in maladaptive coping responses other than substance use.

Negatively-reinforced distraction coping figures in etiological accounts of obsessive-compulsive behavior (March, Franklin, Nelson & Foa, 2001), intentional self-injury (Nock & Mendes, 2008), and even hallucination (Beck & Rector, 2003). In more general terms, cognitive avoidance and suppression have been shown to be linked to a range of psychopathological outcomes (Aldao, Nolen-Hoeksema & Schweizer, 2010), where “avoidance” denotes a pre-attentive process and “suppression” denotes an effortful process of blocking thoughts or emotions.

Anxiety Sensitivity. Anxiety is associated with certain physiological responses (e.g., increased heart rate), cognitive changes (difficulty concentrating), and interpersonal consequences (social embarrassment). Fear of experiencing these symptoms is described in the literature as *anxiety sensitivity*. Anxiety sensitivity aggravates distress when an individual is anticipating or confronting an anxiety-provoking situation. Notably, anxiety sensitivity is strongly correlated with the previously-mentioned construct intolerance of uncertainty (Carleton, Sharpe & Asmundson, 2010). It has been suggested that anxiety sensitivity contributes to poorer adjustment-related outcomes among persons with PTSD, obsessive-compulsive disorder, generalized anxiety disorder, panic disorder and related conditions. In terms of etiology, it has been linked to childhood experience of exposure to uncontrollable stressful and/or traumatic events (Pynoos et al., 1999).

Personality Traits

In this review, emphasis will be placed on the empirically well-supported five factor model (FFM) identified by Costa and McCrae (1995). As reflected in Table 1, these consist of *extraversion* (sociability, warmth, assertiveness, positive affectivity), *neuroticism* (negative affectivity, anxiety, vulnerability, self-consciousness), *agreeableness* (altruism, compliance, modesty, straightforwardness), *conscientiousness* (dutifulness, self-discipline, deliberation, preference for order), and *openness to experience* (fantasy involvement, aesthetic sensibility).

Table 1. Five Dimensions of Personality and respective Coping Strategies

Trait	Description	Coping Strategies	Broad Self-Regulation Strategies (15)
<i>Neuroticism</i>	Negative emotions-depression, anxiety, or anger; tendency to be impulsive and self-conscious (10, 13)	<input type="checkbox"/> poorer outcomes overall (1-3) <input type="checkbox"/> an increase in end-of-day distress (4) <input type="checkbox"/> increased anger and depression on subsequent days (5)	↑ Situation Selection (Avoidance) ↓ Attention Deployment (Distraction) ↓ Cognitive Change (Re-Appraisal)
<i>Extraversion</i>	Positive emotions-sociable, warm, cheerful, energetic, and assertive (10, 13).	<input type="checkbox"/> problem-focused coping (6, 7) <input type="checkbox"/> adaptive forms of emotion-focused coping (6; 7), such as support seeking (6, 8, 9), positive thinking or reinterpretation (7, 9), and substitution and restraint (10).	↑ Situation Modification (Self-Assertion) ↓ Response Modulation (Suppression) ↓ Situation Selection (Avoidance)
<i>Openness</i>	Creative, imaginative, curious, flexible in thinking, and psychologically minded (14); Diversity of emotions, broad interests, preference for variety, unconventional values (10, 13).	<input type="checkbox"/> humor in coping (7); <input type="checkbox"/> positive reappraisal (9, 11); <input type="checkbox"/> think about or plan coping (9); <input type="checkbox"/> less likely to rely on faith (9, 10); <input type="checkbox"/> empathic with close family and friends suggesting an openness to their own feelings and to the feelings of others (11)	
<i>Agreeableness</i>	Altruistic, acquiescent, trusting and helpful (10, 13)	<input type="checkbox"/> cope in ways that engage or protect social relationships, e.g., seeking support (6, 11, 12) <input type="checkbox"/> positive reappraisal and problem solving (9, 12)	
<i>Conscientiousness</i>	Organized, reliable, hard-working, determined, and self-disciplined (10, 13)	<input type="checkbox"/> active, problem-focused strategies (6), such as planning, problem-solving, positive reappraisal, and suppression of competing activities (9).	↑ Attention Deployment (Distraction)
1: Mattlin, Wethington & Kessler, 1990 2: Holahan & Moos, 1987 3: Vitaliano, Mairuro, Russo, & Becker, 1987 4: Gunthert, Cohen & Armeli, 1999 5: Bolger & Zuckerman, 1995		6: Hooker, Frazier & Monahan, 1994 7: McCrae & Costa 1986 8: David & Suls, 1999 9: Watson & Hubbard, 1996 10: McCrae & Costa, 1987	11: O'Brien & DeLongis, 1996 12: Vickers et al., 1989 13: McCrae, 1992 14: Costa & McCrae, 1992 15: John & Gross, 2007

Personality traits are closely linked to prevailing emotional states. Revelle & Scherer (2009) note that “A helpful analogy is to consider that personality is to emotion as climate is to weather. That is, what one expects is personality, what one observes at any particular moment is emotion (p. 304).”

Another important aspect of personality is temperament. Distinguishing personality traits are formed and solidified gradually over the course of socialization, whereas individual differences in temperament are observed even in infancy. Temperament likely inflects life histories in a way that gives rise to distinctive personality traits. Some dimensions of infant temperament “are associated with positive behaviors, such as smiling and laughter” whereas some “are associated with more difficult behaviors, such as getting distressed by novel stimuli or limitations set by parents and crying inconsolably (Verhage, Oosterman & Schuengel, 2013; p. 844).”

Carver and Connor-Smith (2010) identify three dimensions of temperament that can be conceptually linked to the basic demands of adaptation and are influential in personality development. These are, “the tendency to approach desirable objects and situations (e.g., food), the tendency to avoid dangerous objects and situations (e.g., predators), and the capacity to regulate the approach and avoidance tendencies (p. 681).” Approach orientation is associated with extraversion and openness to experience; avoidance orientation is associated with neuroticism, and the capacity for self-regulation (inhibition / disinhibition) is associated with both agreeableness and conscientiousness (Carver & Connor-Smith, 2010; Markon, Krueger, & Watson, 2005).

Framing personality in terms of higher-order approach and avoidance tendencies is intuitively compelling because the twin tasks of seeking reward and avoiding distress are fundamental to learning and experience. A third element – the capacity to inhibit responses – is essential in situations involving risky choice, where an action may result in either gain or loss (c.f., Metcalfe & Mischel, 1999). In terms of individual life histories, high-threat environments may foster an attentional bias toward cues signaling threat or loss. This attentional bias results in increased accessibility of negative events stored in memory, selective attention to negative information in one's immediate environment, and pessimistic expectations regarding the future (MacLeod & Mathews, 1994; Shechner, Britton, Perez-Edgar, Bar-Haim, Ernst et al., 2012).

Carver and Connor-Smith's higher-order factors (approach, avoidance, and self-regulation) bring to mind any of a number of 3-factor models of personality that have been developed independently by a number of researchers. Gray and McNaughton (2000) proposed a model consisting of a behavioral approach system, an avoidance system, and a "fight/flight" system which relates to affective self-regulatory responses. In Eysenck's *psychoticism-extraversion-neuroticism* or PEN model, psychoticism relates to self-regulation, in that the measure of this construct taps impulsivity (Eysenck, Barrett, Wilson, & Jackson, 1992). Tellegen, Bouchard, Wilcox, & Segal, 1988) 3-factor model includes positive emotionality, negative emotionality, and constraint. Clark (2005) proposes that positive affectivity, negative affectivity, and disinhibition constitute higher-order factors which unify a wider range of personality types.

Personality and Coping Responses

Many taxonomies of coping responses have been developed since the 1980s. Moos (1997) asserted that these strategies may be aptly described as approach and avoidance, respectively. For Moos, approach coping strategies consist of task-oriented logical analysis, positive reappraisal, seeking guidance or social support, and problem solving. Avoidant coping strategies consist of cognitive avoidance, acceptance or resignation, seeking alternative rewards, and emotional discharge (i.e., "venting"). In Moos' classification, "seeking alternative rewards" refers to a strategy described elsewhere as "behavioral disengagement," or simply giving up (Carver, Scheier, & Weintraub, 1989).

Connor-Smith and Flachsbart (2007), in a meta-analysis, tested the hypothesis that approach- and avoidance-oriented coping are associated with extraversion and neuroticism respectively, and found evidence in support of this. Agreeableness is also associated with approach-oriented coping, and in particular, seeking social support and guidance. Among persons scoring high in neuroticism, negative affective states engendered by stressful situations are highly salient, drawing attention toward the experience of negative affect and cuing avoidant coping strategies; this, in turn, becomes a dominant and inflexibly-applied response to stressors (Vollrath, 2001).

To date, relatively little has been published that has explicitly sought to differentiate neuroticism and the third dimension of 3-factor models of personality, namely disinhibition, in addressing the relationships between personality traits and coping responses. However, it has been observed that (low) conscientiousness is moderately correlated with disinhibition (Whiteside & Lynam, 2001). Connor-Smith and Flachsbart found that persons who both score high in neuroticism and score low in conscientiousness

are more likely to engage in dysfunctional avoidant strategies. The inattention and disorganization facets of attention deficit hyperactivity disorder are moderately correlated with (low) conscientiousness (Clark, 2005).

Personality and Psychopathology

Several potential explanations have been offered to explain how personality might relate to psychopathology (Compas, Connor-Smith, & Jaser, 2004). According to the *scar model*, acute psychopathology alters personality. Investigators have failed to find evidence that people who recover from depression exhibit personality change (Beevers, Rohde, Stice, & Nolen-Hoskema, 2007; De Fruyt, Van Leeuwen, Bagby, Rolland & Rouillon, 2006). However, in the case of PTSD, the *International Classification of Diseases* lists “enduring personality change” as a diagnostic feature. In a study of PTSD among persons wrongfully convicted of crimes, Grounds (2004) found evidence of marked personality change, as reported by partners of PTSD sufferers, consisting of shifts from positive to negative emotionality.

According to the *spectrum model*, one may regard various psychiatric conditions as extreme manifestations of normal personality types. It is worth noting that very high correlations have been observed between neuroticism and trait measures of depressive symptomatology. This has prompted some observers to question whether they are in fact two distinct constructs (Ormel, Rosmalen & Farmer, 2004). The more likely explanation in this instance, as will be discussed shortly, is instrumentation bias.

According to the *vulnerability model*, personality traits increase the risk of certain mental disorders. Taking the example of neuroticism, one may envision that children possessing this trait are especially sensitive to parental criticism or low perceived controllability or predictability of environmental contingencies. The relationship between neuroticism and psychopathology will depend on the rate of

exposure to these contingencies, the individual's responses to them, and the presence or absence of protective factors (c.f., Compas et al., 2004).

In order to weigh the relative merits of the spectrum and vulnerability models, Fried, Nesse, Zivin, Guille and Sen (2014) conducted a study of medical students during their residency training. Medical residents experience long work hours, sleep deprivation, loss of autonomy, and often face extreme emotional situations; past studies have shown a marked increase in depressive symptoms over the course of residency programs. Fried et al. observed a prospective association between measured neuroticism and predicted increases in depressive symptoms including loss of interest in activities, poor concentration, changes in appetite, psychomotor agitation or retardation, problems relating to sleep, self-blame, and suicidal thoughts. As these findings show, measuring time-varying depressive symptoms helps elucidate the substantive distinction between depression and neuroticism.

Disinhibition and Antisocial Behavior.

Antisocial behavior often consists of behaviors that incur a risk of punishment (ex., criminal acts) or otherwise produce harm to oneself or others. For this reason, researchers have pursued the theory that antisocial behavior may be explained in terms of an unusually low responsiveness to punishment cues. This is frequently assessed using a passive avoidance task where the target behavior consists of avoiding an environment in which aversive stimuli have been delivered in the past (ex., Newman & Kosson, 1986). One may posit that early life experience may result in desensitization to punishment or fear-related stimuli. Consistent with this, a robust association exists between measured antisocial behavior and low resting heart

rate – a physiological measure believed to be indicative of low autonomic responsiveness to threat-related stimuli (Portnoy & Farrington, 2015).

In some instances, rather than low responsiveness to punishment cues, antisocial behavior may represent an atypical response to punishment cues. Recent brain imaging findings have revealed a pattern of heightened responsiveness to punishment cues among persons with antisocial personality disorder (Gregory, Blair, Ffytche, Simmons, Kumari et al., 2015). This might be explicable in terms of learning theory, where it has been observed that, through counter-conditioning, aversive stimuli may become paired with rewards such that aversive stimuli trigger reward-seeking behavior (Avila, Parcet, Ortet & Ibanez-Ribes, 1999).

Generally, negative affective states are identified with avoidance and disengagement, and positive affective states are identified with approach and engagement. An important exception to this pattern is anger, which is sometimes associated with intensified approach behavior (Harmon-Jones, 2003; Carver, 2004). Persons raised in environments where personally valued needs are frequently thwarted are more likely to exhibit aggression, externalizing behavior and deceitfulness (Vansteenkiste & Ryan, 2013).

Childhood conduct disorder and adult antisocial behavior have been linked to exposure to a coercive parenting style. Coercive parenting refers to the use of verbally and/or physically hostile and aggressive tactics to secure a child's compliance with parental rules. These parenting tactics are reinforced by the child's temporary capitulation. The coercively parented child may experience shame, invalidation, and perceived inadequacy. Also, the child may learn that antagonistic interpersonal interactions are normative and that the satisfaction of needs is achieved through hostile and aggressive behavior. Exposure to coercive

parenting is associated with childhood interpersonal aggression and cruelty to animals as well as adult interpersonal violence (Dadds, 2008).

Psychopathy. Antisocial behavior is one component of Eysenck's psychoticism construct. It is also a component of the trait known as psychopathy. The *Psychopathy Checklist – Revised* (Hare, Harpur, Hakstian, Forth, Hart & Newman, 1990) is a widely-used measure of psychopathy and regarded by some as "gold standard." However, it does exhibit a notable psychometric flaw. Because the measure includes items relating to criminal activity, criterion contamination exists (c.f., Shultz, Whitney & Zickar, 2014); "contamination" refers to content overlap between a construct and the outcome that the construct will be used to predict or explain. Two-factor solutions for the PCL-R yield a callous / unemotional subscale (CU; ex., lack of remorse, shallow affect and "superficial charm") and an unstable / antisocial subscale (UA; ex., impulsivity, irresponsibility, and lack of realistic goals), with items tapping past criminal behavior loading on the second factor.

Even though the subscales of the PCL-R are moderately correlated with one another, it has been suggested that the two subscales represent two distinct pathways to psychopathic behavior. CU is associated with instrumental aggression and attenuated responses to fear, and UA is associated with reactive aggression and an exaggerated fear response (Blair, 2010; Fanti, Panayiotou, Chrysostomos, Michael & Georgiou, 2015). Other researchers have shown that UA is associated with deficits in executive function (e.g., response inhibition, planning) whereas CU is not (Baskin-Sommers, Brazil, Ryan, Kohlenberg, Neumann et al., 2015).

The *Psychopathic Personality Inventory* (Patrick, Poythress, Edens, Lilienfeld & Benning, 2006) addresses some of the limitations of the PCL-R. It is free of criterion contamination and assesses distinctive “primary” and “secondary” forms of psychopathy. The subscales consist of *fearless dominance* (e.g., assertiveness, stress immunity, and fearlessness) and *impulsive antisociality* (e.g., blame externalization, impulsive nonconformity, and egocentricity). Interestingly, educational attainment and income are directly associated with fearless dominance and inversely associated with impulsive antisociality. Impulsive antisociality is associated with lower verbal intelligence (Benning, Patrick, Hicks, Blonigen & Kruger, 2003).

Adult Attention Deficit Hyperactivity Disorder (ADHD). Although it is a clinical diagnosis rather than a personality trait, adult ADHD warrants inclusion in a discussion of disinhibition and antisocial behavior. Fourteen percent of correctional facility inmates in one study exhibited symptoms of adult ADHD and half had a history of childhood ADHD (Young, Adamou, Bolea, Gudjonsson, Müller et al., 2011). Among long-term inmates, 40% exhibit adult ADHD (Ginsberg, Hirvikoski & Lindefors, 2010). The PCL-R subscale UA, but not CU, is higher among persons with adult ADHD (Retz, Boureghda, Retz-Junginger, Philipp-Wiegmann & Rösler, 2013). Persons with adult ADHD exhibit an elevated lifetime prevalence of mood disorders and psychosis, anxiety disorders, antisocial disorders, and substance dependence disorders (Asherson, Akehurst, Kooij, Huss, Beusterien et al., 2013). Asherson et al. comment that adult ADHD may be misdiagnosed as bipolar disorder or other mood or personality disorders; they also note that it is underdiagnosed both in community and correctional populations.

Personality in Relation to VSM

Personality traits almost certainly moderate the association between exposure to stress and episodes of psychopathological symptoms. For example, persons who score high in neuroticism, as a group, may be more susceptible to psychopathogenic breakdowns in self-regulation and coping ability under conditions of increased stress. It is also quite likely that mediation effects exist, such that the pathways between exposure to stress and episodes of psychopathology are expressed in terms of the selection of coping responses. More complex associations are plausible; under moderated mediation, personality predicts the selection of coping response, and under mediated moderation, the efficacy of the selected coping response is influenced by personality. Also, if a stressor induces a momentary self-regulatory deficit – such as reduced working memory capacity – this may inflect both the selection of coping responses and the efficacy of the response; one may conjecture that persons scoring high in neuroticism or disinhibition are particularly likely to experience momentary self-regulatory deficits.

Personality and Stress Generation. Acknowledging that exposure to stress, stressor severity, and situation-specific selection of coping strategies are all time-varying phenomena, Bolger and Zuckerman (1995) employed a repeated measures daily diary methodology to test both the differential exposure and differential reactivity hypotheses. The former posits that persons scoring high in neuroticism, as compared to other persons, will experience more frequent stressful events. The latter posits that persons scoring high in neuroticism will experience relatively extreme emotional responses to stressors. Bolger and Zuckerman found support for both of these hypotheses.

Given the association between neuroticism and depression, Hammen's (2006) observations are relevant to this line of discussion. She has developed the theory that persons suffering from clinical depression increase their own exposure to stress (e.g., by engaging in problematic interpersonal exchanges), display high reactivity to stress (e.g., through self-critical or catastrophizing responses) and limit their own exposure to stimuli known to confer a stress-buffering effect (e.g., by discounting positive experiences). Trait hostility contributes to a similar pattern of stress generation; in particular, antagonistic interpersonal behavior elicits in-kind antagonistic responses from others (Sahl, Cohen & Dasch, 2009).

Interpersonal Problems. A more fine-grained look at the relationship between personality traits and stress generation may be achieved by evaluating a range of problematic interpersonal styles. Using subscales derived from the *Inventory of Interpersonal Problems* (Horowitz, Rosenberg, Baer, Ureno & Villasenor, 1988). Miller and Pilkonis (2006) found that persons scoring high in neuroticism are more likely than other individuals to exhibit high interpersonal sensitivity, ambivalence, aggression, need for approval, and lack of sociability.

Socioeconomic Variables

According to VSM, childhood exposure to unpredictable and/or uncontrollable environments is stressful and, over time, contributes to increased stressor reactivity and allostatic load. This, in turn, has long term impacts in terms of vulnerability to psychopathology. The likelihood that an individual will experience an unpredictable and/or uncontrollable environment is influenced by socioeconomic status (SES). Over many years, much has been written on the subject of socioeconomic influences on stress and health,

and will not be reviewed here. However, advances in the sophistication with which socioeconomic factors are conceptualized warrants discussion.

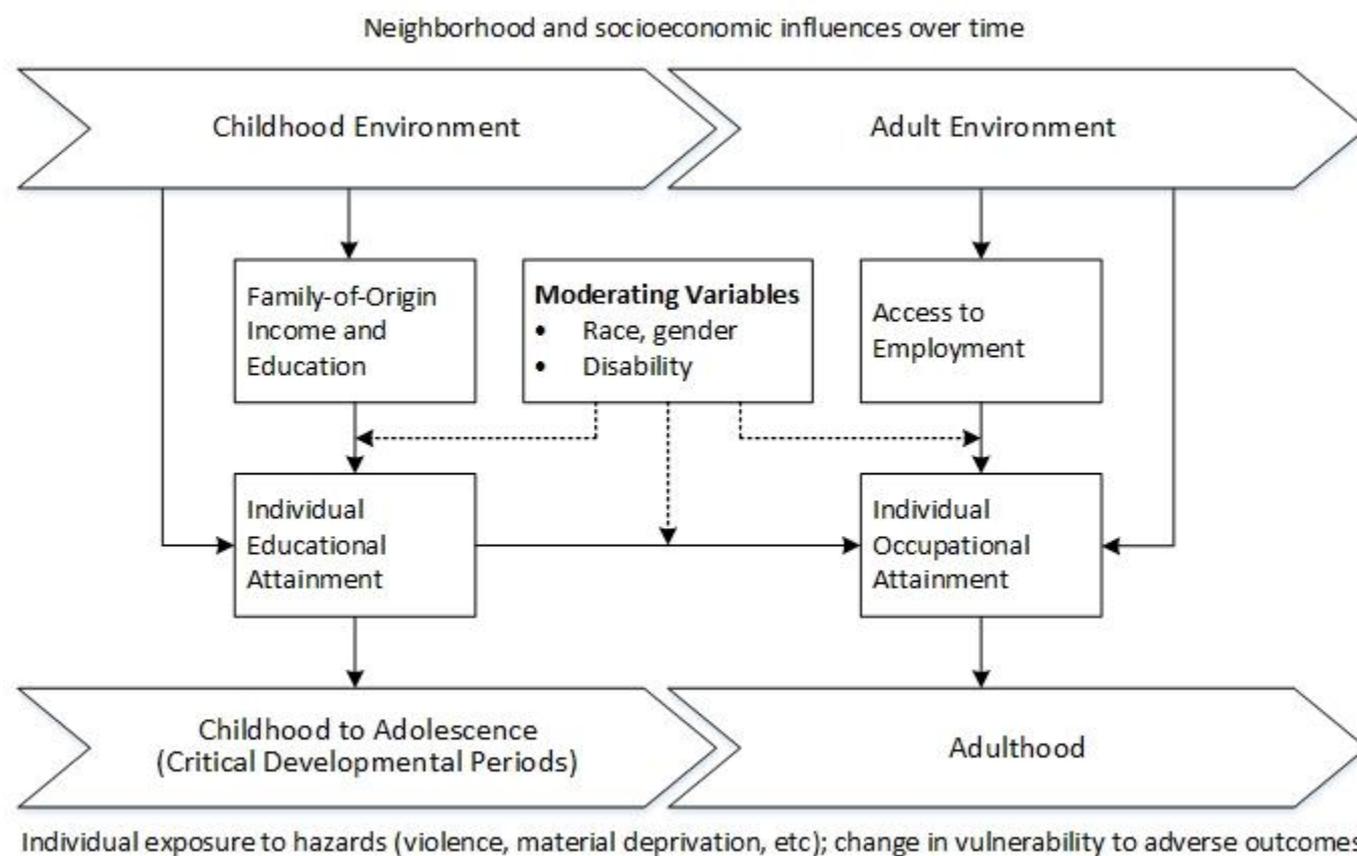
Historically, socioeconomic factors are represented in studies using a single indicator usually consisting of neighborhood income or education or measures of individual income or education, accompanied by racial/ethnic minority status. However, neighborhood- and individual-level socioeconomic variables are conceptually and empirically distinguishable sources of influence on health- and stress-related outcomes. For example, the effect of neighborhood-level average income may in some cases be buffered by relatively high family income, and thus their respective influences operate in an interactive, multilevel fashion. Certain variables that may be counted as “socioeconomic” are often overlooked; a particularly salient example is disability. Persons who experience disability are at increased risk of poverty (Walls & Dowler, 2015) and persons of low SES are more likely to become disabled (Minkler, Fuller-Thomson & Guralnik, 2006).

De facto racial /ethnic neighborhood segregation constrains the social mobility of minority members through its impact on the quality of local schools and municipal services, and through its impact on the quality and availability of health care resources and job opportunities (Acevedo-Garcia, Osypuk, McArdle & Williams 2008). Socioeconomic influences on stress and health may occur at different levels of analysis (e.g., individual, household, or neighborhood) through various causal pathways (e.g., through direct or indirect exposure to hazards or increased vulnerability to their effects), and have different impacts on different segments of the community (e.g., by race, age group, and/or gender; Braveman, Cubbin, Egerter, Chideya, Marchi et al., 2005). Illustrating interaction effects, Braveman et al. point out that, in one study, black and

Mexican American adults at every level of education were found to have lower average incomes than white adults at the same level of education; also, neighborhood-level access to health care as well as neighborhood and individual factors impacting level of education – in that educational level bears on health literacy -- may each contribute to low healthcare utilization. A multilevel and multivariable conceptualization of SES (see Figure 1) is plausible and warrants a more sophisticated approach than seen in the past for operationalizing the effects of socioeconomic factors.

Figure 1

Complexity of socioeconomic factors



A Vulnerability-Stress-Resilience Model

Resilience has been defined as a “dynamic process encompassing positive adaptation within the context of significant adversity (Luthar, Cicchetti, & Becker, 2000, p. 543).” The concept of resilience emerged as investigators observed that some individuals who are at high risk of psychopathology – as a result of exposure to sources of vulnerability such as outlined above -- nonetheless exhibit positive psychosocial adjustment. The terms “resilience” and “protective factors” are sometimes used interchangeably in the literature; here, the term “protective factor” will be used to describe putative component causes of increased resilience. An extended discussion of resilience-conferring protective factors is provided in a companion article (this issue), and will only be briefly summarized here.

Protective factors germane to persons with a history of psychiatric illness include psychopharmacology, problem solving and interpersonal skills, and social support (Gutierrez & Scott, 2004; Jones, Sellwood & McGovern, 2005). Improved adjustment is also observed among individuals who develop realistic plans for the future and exhibit *personal structure* – i.e., by maintaining regular daily routines, making and keeping plans, and organizing their time (Hjemdal, Friberg, Stiles, Rosenvinge & Martinussen, 2006).

Expanding on these themes, Whitley, Gingerich, Lutz and Mueser (2009) propose that illness management and recovery programming aimed at persons with severe mental illness requires a multicomponent approach consisting of, “providing psychoeducation to improve understanding about mental illness and treatment, using cognitive behavioral approaches to improve medication adherence, providing training in the prevention of psychiatric relapses, using social skills training to strengthen social

support and buffer stress, and teaching coping skills to reduce the severity and distress of persistent symptoms (p. 202).”

In light of the attention given to distress intolerance, it bears mention that the effects of distress intolerance on performance can be ameliorated by interventions designed to increase *attentional control*. Persons who possess this skill are able to “disengage and shift attention away from emotionally distressing stimuli (Bardeen, Tull, Dixon-Gordon, Stevens, & Gratz, 2015; p. 80).” This speaks to the benefits of mindfulness-based psychosocial interventions, in which attentional control is a core component (c.f., Pepping et al., 2014).

Howells, Tennant, Day and Elmer (2010) point out that “self-regulatory breakdown ... leading to impulsivity is widely recognized as an important causal influence for many forms of [criminal] offending (p. 6).” Mindfulness training, Howells et al. believe, may be an effective means of promoting improved anger management skills and more adaptive emotional regulation strategies among offenders with personality disorders. Indeed, preliminary findings suggest that mindfulness training may reduce mood disturbance and hostility and improve self-esteem among incarcerated offenders (Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007).

VSM and Correctional Populations

Social factors create socioeconomic (SES) inequality and resultant disparities in the incidence and prevalence of physical and psychiatric illness. The same social factors contribute to community-level variation in criminal activity. The result is a high concentration of physical and psychiatric illness in correctional populations.

Common Factors for Crime and Poor Health

According to several leading theories in the field of criminology, cognitive deficits, low self-control, and negative emotionality (neuroticism) are important predictors of criminal propensity (Savolainen, Paananen, Merikukka, Aaltonen, & Gissler, 2013). These three factors also loom large in empirical studies of the determinants of premature mortality and morbidity. To put this in perspective, Lee and Paxman (1997) showed that roughly half of all preventable deaths result from behavior and lifestyle choices such as “tobacco use, sexual behavior, eating habits, sedentary life style, use of alcohol and other drugs, violent and abusive behavior, and other risk-taking behaviors that lead to injury (p. 17).”

Numerous studies in the field of public health and related disciplines have shown that neuroticism is an important predictor of physical and psychiatric illness. It is a vulnerability factor for a psychological disorders, increases reactivity to stressors, and predisposes individuals to engage in unhealthy behavior (c.f., Feltman, Robinson & Ode, 2009; Lahey, 2009).

Persons who score high in neuroticism often – but not invariably – score high in measures of impulsivity. One of the distinguishing features of impulsivity is low self-control and as Savolainen note, this variable has garnered considerable interest among investigators seeking to identify personality correlates of criminal activity. At the same time, impulsivity is of interest to investigators who study risk-taking and other forms of health-compromising behavior (c.f., Cooper, Agocha, & Sheldon, 2000). And certain behaviors that are linked to impulsivity – for example, illicit substance use, interpersonal violence, reckless driving, and impaired driving – are equally of interest to both criminologists and health psychologists.

It is essential to recognize that the impact of these personality variables on life-course trajectories is influenced by SES. Persons with low SES families of origin are less likely to achieve higher SES later in life if they exhibit high neuroticism (Jonassaint, Siegler, Barefoot, Edwards, & Williams, 2011). The widely-observed association between impulsivity and antisocial behavior is of significantly greater magnitude in low SES communities as compared to more affluent communities (Lynam, Caspi, Moffitt, Wikström, Loeber et al., 2000). Lee and Paxman observed that behavioral and lifestyle risk factors for early mortality and morbidity are highly concentrated in “communities where poverty rates are high, housing is inadequate, educational services are inadequate, social support services are inadequate, and jobs are not available (p. 17).”

Thus far, attention has not been given to the third key predictor of criminal propensity, namely, cognitive deficits. These are also associated with unhealthy behavior and exacerbate the effects of low SES on health-related outcomes (Grossman, 2006; Rindermann & Meisenberg, 2009). This will be discussed at further length in connection with intelligence and educational attainment.

Right now, social determinants of inequality will be considered in relation to both criminological and health outcomes. Diderichsen, Evans and Whitehead (2001) arrayed social determinants into four broad categories. These are (1) social stratification, (2) differential exposure to hazards, (3) differential vulnerability, and (4) differential consequences. Each of these mechanisms will be explained below.

Social Stratification

This refers to multiple processes by which individuals are assigned to different social positions, as it bears on wealth, status, and access to resources. Diderichsen and colleagues note that “a person from a minority ethnic group may be more likely to have, on average, lower educational attainment, fewer

employment opportunities, and less income than a person of the majority ethnic group. In the United States this process has resulted in the concentration of African Americans in urban neighborhoods with high levels of poverty and little opportunity (either educational or employment, p. 16).”

Racialized Mass Incarceration. Historically, the literature on social stratification has neglected the role of incarceration. In recent years experts have come to regard incarceration as (1) an important driver of social inequality, (2) operating on a massive scale, and (3) disproportionately impacting the life prospects of racial and ethnic minority communities (Wakefield & Uggen, 2010).

In terms of criminal justice outcomes, bias against African Americans is perhaps most conspicuous with respect to minor drug offenses. Even though blacks are as a group less likely to be drug users than whites, their drug use is far more likely to be detected by police (c.f., Gelman, Fagan & Kiss, 2007; Ridgeway & MacDonald, 2009). The drug-related incarceration rate of black adults is 256.2 per 100,000 as compared to 25.3 per 100,000 for white adults -- a tenfold difference (Fellner, 2009). At low to moderate levels, removal rate (community-level arrests and convictions) reduces neighborhood crime, but high removal rates are associated with increased community disorganization and increased crime (Clear, Rose, Waring & Scully, 2003). In communities that are home to large numbers of formerly incarcerated persons, policing practices are more aggressive, leading to strained relations between the police and community members and the stigmatization of law-abiding community members (Fagan, West, & Holland, 2003). Women who are economically dependent on men who are incarcerated will subsequently face an increased risk of eviction and, in turn, a deteriorating standard of living (Desmond, 2012).

Differential Exposure

Differential exposure refers to the varied consequences of stratification, such as neighborhood environment, the quality of local schools, and so on. Evans and Kim (2013), in a review, report that low socioeconomic status (SES) children are exposed to numerous social and physical stressors. In terms of family environment, they are more likely to face “family conflict and turmoil, family dissolution, maternal depression ... as well as elevated parental harshness and diminished parental responsiveness.” In terms of residential environment, they are “more likely to live in homes that are more chaotic, with greater structural problems, noise, crowding, toxins, and allergens (p. 44).”

Evans and Kim note that the cumulative impact of these varied stressors mediates the link between poverty and chronic physiological stress and contributes to increased aggression, anxiety, and depression. Childhood family poverty and childhood neighborhood poverty each predict a higher incidence of childhood neglect, PTSD, major depressive disorder, and criminal activity (Nikulina, Widom, & Czaja, 2011).

Poverty and Mental Illness. A substantial international body of evidence indicates that “mental ill-health and poverty interact in a negative cycle. This cycle increases the risk of mental illness among people who live in poverty and increases the likelihood that those living with mental illness will drift into or remain in poverty (Lund, De Silva, Plagerson, Cooper, Chisholm et al., 2011; p. 1502).” Persons with mental illness encounter problems such as unemployment, homelessness, and criminal justice system involvement more frequently than other individuals, “because they live in a world in which these problems are endemic, not just because they are mentally ill (Draine, Salzer, Culhane, & Hadley, 2002; p. 565).”

Education and Intelligence. In health disparities research, educational attainment is sometimes used as an indicator of SES. However, it is important to note that the effects of limited formal education on health-related outcomes are more pronounced than the effects of low income (Herd, Goesling, & House, 2007). Also, it is unclear *how* education improves health; education might exert this effect by increasing income and social status, by conferring non-cognitive skills acquired in the educational system such as perseverance and increased perceptions of personal control, or by conferring specific knowledge in the areas of health literacy and knowledge (Cohen & Syme, 2013). Low educational attainment may in some cases be attributable to undiagnosed mental health problems such as ADHD (Asherson et al., 2013). It is also important to note that, although educational attainment and intelligence are associated with one another, they are not the same thing.

Historically, researchers have questioned whether intelligence (as measured by an IQ test) is an inherited trait that is insusceptible to environmental influence or is modifiable through education, but recent data suggests that schooling provided to adolescents does increase intelligence (Brinch & Galloway, 2011). Low parental SES may affect intelligence indirectly through infant malnutrition (Isaacs, Gadian, Sabatini, Chong, Quinn et al., 2008), risk of preterm delivery (Pickett, Ahern, Selvin & Abrams, 2002), low birth weight (Lahat, Van Lieshout, Saigal, Boyle & Schmidt, 2015), exposure to environmental pollution (Perera, Weiland, Neidell & Wang, 2014), maternal alcohol or tobacco use (Jacobson, Jacobson, Sokol, Chiodo & Corobana, 2004), and exposure to either an enriched or impoverished stimulus environment (Gottlieb & Blair, 2004), among other factors.

A longitudinal study of 422 male youth has shown that low intelligence – *after controlling for race and SES* – is predictive of delinquent behavior among youth and criminal offenses among adults (Loeber, Menting, Lynam, Moffitt, Stouthamer-Loeber et al., 2012). In considering why intelligence might predict criminal activity, low intelligence is specifically associated with a facet of executive function involved in updating working memory (i.e., preserving task-relevant information when distracted), a function that is closely linked to self-regulation (Friedman, Miyake, Corley, Young, DeFries et al., 2006). This may shed light on the observed association between low IQ and impulsive physical aggression among adolescents with conduct disorder (Barker, Vitaro, Lacourse, Fontaine, Carbonneau et al., 2010).

Differential Vulnerability

Evans and Kim observe that, according to parent and teacher ratings, low SES children are more likely to struggle with delay of gratification, attentional control, and working memory capacity. Adults living in poverty experience similar handicaps. In a provocative thesis, researchers have suggested that the demands of poverty – securing income and housing, working irregular shifts, contending with the threat of crime, living in crowded conditions and so on – deplete finite cognitive resources and in turn increase the rate of self-regulatory failures. The consequences of self-regulatory failure are themselves stressful, manifesting as reduced use of preventive health care, low adherence to treatment regimens, failure to keep appointments, inattentive parenting, and poor financial management (Mani, Mullainathan, Shafir & Zhao, 2013). Stress magnifies the salience of proximal rewards (which may include cigarettes, alcohol, or unhealthy food choices) and it also magnifies the salience of minor hassles (as it relates to health, hassles

include adhering to medications, keeping appointments, or exercising restraint over situational temptation; c.f., Dang, Xiao, & Dewitte, 2015).

Differential Vulnerability of African Americans. Even when controlling for SES, African Americans tend to exhibit higher allostatic load (based on a measure of 10 biomarkers) than whites (Geronimus, Hicken, Keene, & Bound, 2006). Geronimus et al. speculate that this is attributable to racial discrimination. However, “racial discrimination” is a broad construct and takes in proximal variables such as personal exposure to prejudice as well as distal variables such as social inequality. One potential mechanism linking African American status to allostatic load is birth outcome. African Americans are significantly more likely than members of other racial / ethnic groups to bear low birthweight offspring. Stress, poverty and neighborhood segregation increase the risk of low birthweight offspring (Grady, 2006). Low birthweight children, in turn, exhibit characteristic problems of HPA axis over-reactivity and hypercortisolism (Rondó, Ferreira, Nogueira, Ribeiro, Lobert et al., 2003).

Geronimus et al. did not consider whether incarceration history might account in part for the higher allostatic load of African Americans. Yet, “incarceration has become pervasive among recent cohorts of low-educated black men. With lifetime risks of imprisonment of around 70%, the added risks of jail incarceration, probation, criminal conviction, and arrest would make criminal justice involvement nearly universal for this group (Western & Muller, 2013; p. 183).”

The effects of allostatic load on stress-related illness is moderated by perceived control, such that persons living in a low SES environment but report high perceived control are no more subject to stress-related physical illness than their high SES counterparts (Hatch, 2005). Incarceration, re-incarceration, the

experience of post-release supervision under parole or probation, and restrictions on employment and housing among persons with a criminal history each have profound impacts on perceived and actual personal autonomy and control (Massoglia, 2008; Purtle, 2013).

Differential Consequences

Didrichsen et al. (2001) argues that, among those who experience adverse health outcomes, members of low SES groups face more severe challenges in terms of access to and affordability of medical treatment, ability to adhere to treatment, and the economic consequences of disability. Speaking to this point, persons of low SES are less likely than more affluent individuals to get paid time off from work to visit a provider. They may also face difficulties finding *Medicaid*-approved providers who are accepting new patients, particularly in neighborhoods where *Medicaid*-approved providers are in high demand. And despite the *Patient Protection and Affordable Care Act*, many remain uninsured (Price, Khubchandani, McKinney, & Braun, 2013). Persons with chronic illness also face challenges finding employment opportunities and retaining their jobs (Boyd & Fortin, 2010).

Persons with a history of substance use face a higher risk of relapse in neighborhoods in which illicit drugs are readily available (Wooditch, Lawton, & Taxman, 2013). Persons with mental illness (PMI) who also have a history of substance use, particularly in low-SES communities, are targeted by drug dealers who recognize their vulnerability (Drake, Wallach, & McGovern, 2014).

Mandated Inequality. Persons with a criminal history are, by law, lose certain civil rights, parental rights, public benefits, and employment and housing opportunities (Chin, 2012). Chin notes that the

Supreme Court has increasingly recognized that so-called “collateral consequences” of incarceration constitute a form of punishment which many criminal defendants fail to anticipate when they are sentenced to a prison term, and which severely limit the individual’s life prospects. Yet, this problem has yet to be systematically addressed by the legal system.

Clinical Perspective

Thus far, this review has provided basic principles and advances in theory and research relating to VSM. Subsequently, social determinants of physical and psychiatric illness and criminal involvement have been discussed. In this section, attention will turn to the challenges of applying these findings to individuals with a history of incarceration and psychiatric illness. Topics will include the experience of prisonization, familial and social consequences of incarceration, the use of correctional facility administrative data in case formulation, and the selection of appropriate assessment tools.

Prisonization

The term “prisonization,” introduced by Donald Clemmer in 1940, refers to “the taking on” by inmates, “in greater or lesser degree, of the folkways, mores, customs, and general culture of the penitentiary (p. 270),” resulting in the formation or deepening of criminal thinking patterns and antisociality. Clemmer implicated both the processes by which a new inmate will come to adopt the values of fellow inmates and the perverse effects of the institutional environment on increased dependency. In practice, the term “prisonization” has been used loosely to characterize characteristic incarceration-related

changes in attitudes and behavior. Clemmer's deviant socialization hypothesis has been supplemented by other accounts, and the more prominent of these will be summarized below.

Deviant Socialization Model. Recidivism rates among low-risk offenders (i.e., those with relatively short criminal histories or less serious criminal offenses) tend to be higher if, during their time in prison, they are placed together with high-risk offenders (Pritikin, 2008). Persons who find themselves interacting with violent and coercive peers learn that it is necessary to project a persona of toughness and retaliate violently to minor social transgressions if they are to avoid becoming victimized (Berg, Stewart, Schreck & Simons, 2012). In a large-scale study of persons incarcerated in Britain and Wales, a quarter of all heroin users reported that their drug use first started in prison (Boys, Farrell, Bebbington, Brugha, Coid et al., 2002).

Deprivation Model. Sykes (1958) asserted that, because incarceration deprives inmates of personal security, autonomy and other basic needs, inmates will devise strategies to mitigate these losses. So, for example, inmates form gangs for the sake of mutual protection. This model has less empirical support than the other models discussed here, partly because of methodological difficulties. In weighing the relative merits of the deprivation and deviant socialization model, gang membership could be counted in support of either model, and it is a matter whether the behavior is framed in terms of deviance or in terms of collective action. Efforts to test the deprivation model by considering variables such as perceived prison conditions in relation to disciplinary infractions (e.g., Hochstetler & DeLisi, 2005) do not address Sykes' premise that inmate misconduct may be understood as either adaptive or functional responses to conditions of confinement.

Importation Model. According to this model, antisocial behavior is present among inmates prior to their entering correctional facilities. Evidence suggests that persons who belong to gangs prior to incarceration remain in the same gangs or join new gangs while incarcerated (DeLisi, Berg, & Hochstetler, 2004). There is no question that “prisonization” is attributable in part to pre-existing behavioral problems among members of the correctional population; however, the importation model is severely limited by the omission of social and physical environmental variables.

Institutionalism Model. As noted above, Clemmer believed that the prison environment fosters dependency among inmates. The phenomenon of “institutional syndrome” or *institutionalism* was widely observed among residents of public psychiatric institutions prior to the de-institutionalization movement and helped inspire that movement. It is distinguished by, “apathy, lethargy, passivity, and the muting of self-initiative; compliance and submissiveness; dependence on institutional structure and contingencies; social withdrawal and isolation; an internalization of the norms of institutional culture; and a diminished sense of self-worth and personal value (Johnson & Rhodes, 2007; p. 228).” As it bears on prison inmates, Haney (2001) observes:

Correctional institutions force inmates to adapt to an elaborate network of typically very clear boundaries and limits, the consequences for whose violation can be swift and severe. Prisons impose careful and continuous surveillance, and are quick to punish (and sometimes to punish severely) infractions of the limiting rules. The process of institutionalization in correctional settings may surround inmates so thoroughly with external limits, immerse them so deeply in a network of rules and regulations, and accustom them so completely to such highly visible systems of constraint that internal controls atrophy or, in the case of especially young inmates,

fail to develop altogether. Thus, institutionalization or prisonization renders some people so dependent on external constraints that they gradually lose the capacity to rely on internal organization and self-imposed personal limits to guide their actions and restrain their conduct. If and when this external structure is taken away, severely institutionalized persons may find that they no longer know how to do things on their own, or how to refrain from doing those things that are ultimately harmful or self-destructive (n.p).

Coping Model. According to Toch (1985) correctional environments, by their very nature, “tax coping competence (p. 66),” particularly for persons with a history of mental illness. He observes that the psychologically vulnerable person is surrounded by dangerous and unpredictable individuals, exposed to noise and over-stimulation alternating with periods of under-stimulation, and has only very restricted contact with family members. Apart from acute psychopathological episodes, frequent episodes of primitive or maladaptive coping responses manifest among inmates, particularly among PMI. For example, non-suicidal self-injury occurs among 48% of incarcerated persons and 61% of incarcerated PMI; this vastly exceeds the rate observed in the general population (4%; Dixon-Gordon, Harrison & Roesch, 2012).

Cnaan, Draine, Frazier & Sinha (2008) believe that the predominant coping strategy employed by inmates is apathy. Apathy has been defined as the absence of or severe reduction in self-initiated action, and manifests in part as loss of interest in pleasurable activities, lack of insight, impaired cognitive function, low participation in the activities of daily living (e.g., maintaining hygiene, nutrition, and so on), and low medication adherence. It is only moderately correlated with symptoms of depression (van Reekum, Stuss & Ostranger, 2005). In this respect, the coping and institutionalism models overlap, in that both implicate apathy as a key dimension of prisonization.

Expanded Coping Model. To more fully specify the social environment within prisons, as it contributes to the inmate's coping responses and in turn a distinctive prisonization phenomenon, one may consider the coping responses of correctional staff members. The prison environment is stressful not only for inmates but for staff members as well. As illustrated by the Stanford Prison Experiment of the 1970s (c.f., Zimbardo, 2004), persons who are placed in role of guard monitor the environment for threats against themselves and experience fears of insurrection and retaliation by prisoners. This, in turn, gives rise to problematic patterns of interpersonal behavior. Excessive help-seeking or attention-seeking behaviors by inmates are sometimes perceived as "manipulative" or "needy" behavior by correctional staff members, and this contributes to occupational stress (Bowers, 2003).

Inmates who are not compliant with prison rules may be singled out for persecution by correctional officers or subjected to harsh physical abuse (Haney, 2008). Nurses and other staff members have described a "circle of stress" in correctional environments "whereby low morale and staff shortages increased stress levels, which in turn increased staff sickness rates, reduced staffing levels, further lowered the morale of remaining staff and led to more stress and staff sickness (Nurse Woodstock & Ormsby, 2003; p. 3)." Staff member stress will likely affect their interactions with inmates, and the effects of these strained interactions may contribute to the elicitation of prisonized behavior.

Individual Vulnerability

Adapting Wong's (2006) framework to persons with mental illness (PMI) and a history of incarceration, one may categorize diagnostically-relevant sources of vulnerability within biological,

psychological and social domains. Literature found supporting these variables, specific to incarcerated populations when possible, is briefly discussed in the following section, and has been added to the framework. The results are summarized in Table 1a and 1b and portrayed schematically in Figure 2.

Table 1a: Individual Vulnerability Factors

Biological Domain	Psychological Domain	Social Domain
<p>Childhood Risk Factors</p> <p>HPA and SAM Axis Reactivity - Biomarker data (if available) - Parental stress - Low birthweight - Preterm birth - Temperament Hx early childhood sexual or physical abuse; material deprivation; social adversity</p> <p>Adult Risk Factors</p> <p>Age of onset of s/s, behaviors Hx of violence Hx of substance abuse Hx of mental illness Family hx of mental illness Premature aging (allostatic load)</p> <p>Measures: BASIS-R Substance Use Subscale</p>	<p>Personality Variables</p> <p>Five Factor Model Personality Traits Aggression (Buss-Perry or OAS-M Aggression scores) Impulsivity (UPPS Impulsivity Scale) Anxiety Sensitivity Distress Intolerance</p> <p>Psychiatric Illness</p> <p>DSM Diagnosis Axis 1; co-occurring disorders; Personality disorders</p> <p>Measures: BASIS-R Psychotic Behavior; Self-Harm</p> <p>Coping Responses / Self-Regulation</p> <p>E.g. COPE, Brief COPE measures</p>	<p>Interpersonal Skills Social Support Religion</p> <p>Interpersonal Deficits Interpersonal Problems (BASIS-R subscale, Interpersonal Problems Inventory)</p> <p>Self-stigma</p>

Adapted from Wong, D. (2006). Clinical Care Management of People with Mental Illness. Hartworth Press. P.32.

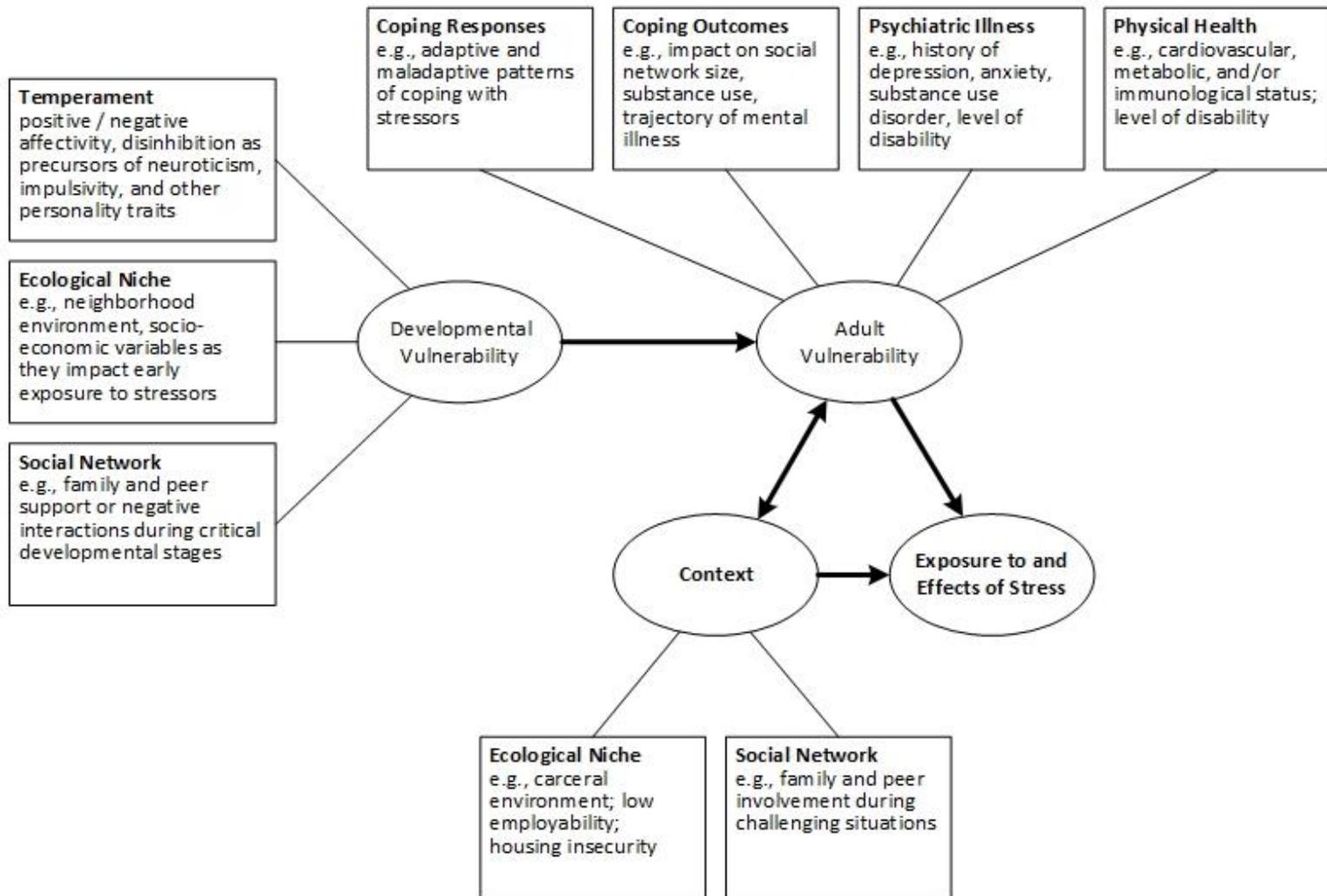
Table 1B: Socioeconomic / Environmental Risk Factors

Sociodemographic Variables	Prison Environment	Community Environment
<p>Personal Characteristics Age, Gender, Race Personal educational attainment and income Family-of-origin educational attainment and income Neighborhood average educational attainment, income</p> <p>Family System Characteristics Marital status Family Characteristics: Children housing Housing density Poverty Employment status Disability/SSI</p> <p>Social Support - emotional support - instrumental support - informational support - appraisal support</p>	<p>Prisonization-normal adaptation effects -dependence -hyper vigilance -emotional over control -social withdrawal -incorporate exploitive norms -diminished sense of self-worth -retraumatization - apathy</p> <p>Behavior Dysfunction Excessive, inappropriate and lack of behavior performance</p> <p>UR System indicators: Discipline hx during prior incarcerations Criminal behavior Offense severity Disciplinary tickets Risk scores</p> <p>Family Stress Separation, Length of incarceration; number of incarcerations; support network burn-out, inmate employment status</p> <p>Social Support While In Prison - Frequency of visits, letters, phone-calls - Relationships with inmates and staff</p> <p>Ecological Stressors Prison environment (noise, overcrowding, pollutants, organizational factors/ stressors)</p>	<p>Interpersonal Stress Prisonization-related deficits in interpersonal function; negative interactions</p> <p>Social Withdrawal</p> <p>Social stigma</p> <p>Employability Correctional System Indicators : Vocational need Discharge plan</p> <p>Access to Treatment</p> <p>Social Support in Community</p> <p>Ecological Stressors Poor disorganized communities with limited resources (poor housing, pollutants, alcohol/drugs readily accessible, weapons accessible, little social cohesion)</p>

Adapted from Wong, D. (2006). Clinical Care Management of People with Mental Illness. Hartworth Press. P.32.

Figure 2

Biopsychosocial Vulnerability-Stress Model of Mental Illness in Corrections Populations



Biological Domain

Attention has already been given to the impact of early life exposure to stressors and changes in the HPA axis and other stress-responsive brain regions. Childhood abuse and exposure to violence and trauma are examples of stressors that have the potential to induce brain changes, particularly but not exclusively during critical periods of child development. Thus, evaluating the client's early life history may provide

important clues regarding biological factors contributing to increased vulnerability to psychopathology. Factors included in the biological domain include substance use, higher order personality factors, and observable manifestations of lifetime allostatic load.

Substance Use. The risk relationship between substance use and psychiatric disorder is almost certainly reciprocal, with psychiatric disorder predicting later substance use and substance use modifying the course of psychiatric disorder. Early life stress induces long-term changes in the mesolimbic pathway (relevant to dopamine regulation), and this is believed increase individual vulnerability to substance use (Brady & Sinha, 2005).

Dopamine dysregulation is implicated in psychiatric conditions ranging from depression and ADHD to schizophrenia. It is noteworthy, then, that chronic alcohol use exacerbates dopamine dysregulation (Kashem, Ahmed, Sarker, Ahmed, Hargreaves et al. 2012). In light of findings such as these, Brady and Sinha's hypothesis that substance use may be an intrinsic feature of certain psychiatric disorders – that is, playing a key role in maintaining symptoms and militating against recovery – warrants careful consideration. According to research cited by Sandor (2009), even though measured antisocial personality disorder discriminates between persons who are alcohol dependent and those who are not, this is not true of formerly alcohol dependent persons who have been abstinent for at least 5 years.

Temperament. Earlier, we presented a 3-factor model of temperament consisting of *disinhibition*, *avoidance* (negative affectivity), and *approach* (positive affectivity). Insofar as temperament is shaped by prenatal epigenetic factors and early life experience, it is appropriate to acknowledge temperament as belonging to the biological domain.

Weathering. Geronimus (1992) observed early mortality and physical symptoms of accelerated aging among persons in low SES communities and speculated that persons who experience adversity suffer greater biological wear and tear, which she described as “weathering.” Subsequent research has provided abundant support for this hypothesis. Chronic activation of the SAM and HPA axes results in increased secretion of stress hormones, leading to accelerated cell aging (attributable to chronic elevation of cytokine levels) and shorter lifespan. Biomarkers of high allostatic load include indicators of metabolic (e.g., insulin, glucose, cholesterol), cardiovascular (blood pressure), and immune (fibrinogen, c-reactive protein) function (Juster, McEwen & Lupien, 2010). From a clinical standpoint, premature onset of age-related medical symptoms provides insight into the life history of the patient and may help inform clinical assessment.

Psychological Domain

The elements of the biological domain outlined above provide a very general sense of the individual’s vulnerabilities. However, individuals differ with respect to their resilience to adverse outcomes even at high levels of vulnerability. Also, one may expect there to be individual differences in terms of level of progression and temporal variation in level of stress as it bears on psychopathology. For example, persons who score high on neuroticism may be at increased risk for depression, but not everyone who scores high on this variable will be depressed.

Five Factor Model Personality. When examining personality in clinical assessment or practice-based research, Widiger (2002) has proposed a four step process. The steps are (1) assess five-factor model (FFM) personality traits, (2) identify whether there are specific impairments secondary to extreme traits, (3)

determine to what extent this leads to lowered functional capacity, and (4), match the client profile to a personality disorder. Examples of specific impairments are distress tolerance and anxiety sensitivity; these constructs each demonstrate *incremental validity* when assessed alongside neuroticism, meaning that they provide additional information that is not captured by neuroticism (Gonzalez Zvolensky, Vujanovic, Leyro & Marshall, 2008; Leyro, Zvolensky & Bernstein, 2010).

Impulsivity. Adding to the utility of the FFM is the fact that responses can be re-purposed to assess impulsivity. Whiteside and Lynam's (2001) Urgency- (lack of) Premeditation- (lack of) Perseverance – Sensation Seeking (UPPS) measure of impulsivity is constructed from FFM items and is a valid and reliable measure of impulsivity. The interaction of *Lack of Premeditation* (failure to consider the consequences of one's actions) and *Negative Urgency* (tendency to exhibit impulsive behavior when experiencing negative affective states) subscales was found to be predictive of non-suicidal self-injury and suicidality in a sample of residential drug users (Lynam, Miller, Miller, Bornovalova & Lejuez, 2011).

The UPPS scale also accounts for 64% of variance attributable to borderline personality disorder (Whiteside, Lynam, Miller & Reynolds, 2005). One study found that nearly 30% of newly-incarcerated offenders exhibit borderline personality disorder (Black, Gunter, Allen, Blum, Arndt et al. 2007).

Impulsivity is one element of a diagnosis of borderline personality disorder, and persons with this disorder exhibit a high risk of self-injury. It is also frequently comorbid with PTSD (Leichsenring, Leibing, Kruse, New & Leweke, 2011).

Mental Health Status. Researchers have identified a range of factors that are associated with psychological adjustment and sensitive to treatment-related change. The *Revised Behavior and Symptom*

Identification Scale (BASIS-R; Eisen, Normand, Belanger, Spiro & Esch, 2004) is a brief screening instrument which taps self-reported symptoms of depression, interpersonal problems, psychotic symptoms, drug/alcohol use, emotional lability, and self-harm. This instrument has been used in correctional populations, distinguishing different levels of function among incarcerated PMI with or without comorbid substance use (Pollack, Cramer & Varner, 2000), and detected clinically meaningful change among participants in a jail diversion program (Stainbrook, Penney & Elwyn, 2015).

Aggression. Aggression is of particular interest in the correctional population. The *UPPS Impulsivity Scale*, in particular the Lack of Premeditation and Sensation Seeking subscales, is predictive of aggressive behavior (Derefinko, DeWall, Metze & Walsh, 2011). Likewise, the *Psychopathic Personality Inventory*, discussed earlier, is predictive of aggression (Edens, Poythress & Watkins, 2001).

However, for a specific research purpose, an investigator may wish to use a measure that is specific to aggression. To date, use of standardized measures of aggression and comparisons with community and mental health populations is not well documented. The *Buss-Perry Aggression Scale* (Buss & Perry, 1992), a well standardized measure of aggression, has been used the most frequently with inmate populations (Smith, Waterman & Ward, 2006; Diamond, Wang & Buffington-Vollum, 2005; Wang & Diamond, 1999). The *Overt Aggression Scale-M* (Coccaro, Harvey, Kupsaw-Lawrence & Herbert, 1991) is another standardized aggression scale found in research on aggression in corrections populations (e.g., Sevecke, Lemkuhl & Krischer, 2009; Burns, Bird, Leach, & Higgins, 2003).

In addition, behavioral measures of aggression are available to researchers who have access to correctional department administrative data. An incarcerated person's history of disciplinary infractions is relevant in this regard, as well as past criminal offenses where violence is indicated (e.g., assault).

Prisonization. Haney (2001) observes that examples of prisonized behavior include interpersonal dependency, hypervigilance, emotional over control (for fear of exposing a weakness), social withdrawal and isolation (as a survival skill), an internalization of exploitive norms and diminished self-worth. There is overlap between these symptoms (e.g., hypervigilance, emotional over control) and those of PTSD, and some individuals may have symptoms warranting a clinical diagnosis of PTSD. The *Davidson Trauma Scale* (DTS, Davidson, Book, Colket, Tupler, Roth et al. 1997), a measure of posttraumatic symptoms, is a suitable instrument for examining most of these aspects of prisonization.

Others have identified apathy is an important feature of prisonization (Cnaan et al., 2008). One validated measure of this construct is the *Apathy Evaluation Scale* (AES, Marin, Biedrzycki, & Firinciogullari, 2001), which assesses loss of interest in activities, low initiative, and asociality.

Coping Responses. Standardized instruments found in the literature documenting stress, coping and psychopathology are based upon early work of Lazarus and Folkman and include the *Ways of Coping Checklist* (Aldwin, Folkman, Shaefer, Coyne & Lazarus, 1980), the *Coping Strategies Inventory* (Tobin, Holroyd Reynolds & Wigal, 1989); and the *Coping Inventory for Stressful Situations* (Endler & Parker, 1990). The *COPE* scale (Carver et al., 1989) and the *Brief COPE* (Carver, 1997) were designed to resolve ambiguities in *Ways of Coping Checklist* items. Subscales consist of active coping (taking steps to improve the situation), planning (devising steps to take in the future), positive re-framing, seeking emotional support, seeking instrumental

support, acceptance, humor, religion, self-distraction, denial, venting, self-blame, substance use, behavioral disengagement.

Carver et al. (1989) found that factors associated with lower anxiety include active coping, planning, positive re-framing, and acceptance. Factors associated with greater anxiety are venting, denial, mental disengagement and behavioral disengagement. The selection of coping responses is influenced by personality. Persons who score high in neuroticism or who score low on agreeableness tend to engage in disengagement and venting responses; persons who score high on conscientiousness are more likely to rely on religion and are relatively less likely to rely on substance use (Panayiotou, Kokkinos, & Kapsou, 2014).

The *Brief COPE* has been used in correctional populations. In a study of juvenile offenders adjusting to incarceration, social support seeking was found to be associated with a reduction in internalizing and externalizing symptoms. Acceptance was also associated with internalizing symptoms, whereas denial was associated with increasing severity of symptoms. Active coping was associated with a reduction in violent infractions among youth with a history of violence (Shulman & Cauffman, 2012).

Prisoners in medium- and maximum-security prisons were administered the *Brief COPE*. The investigator found social support to be negatively associated with serious infractions whereas religion and venting emotions were positively associated with infractions (Rocheleau, 2014). Given that religion tends to be associated with greater adjustment (as will be discussed below), Rocheleau's finding regarding religion is unusual; she speculates that persons turn to religion only after other coping responses have been tried without success, suggestive of the possibility that the individual is confronting a particularly taxing stressor.

Personality Disorders and Clinical Diagnosis. Psychiatric diagnosis, assessment of co-occurring disorders and presence of personality disorders are to be determined by highly skilled forensic clinicians. Its psychometric limitations notwithstanding, the Screening Version of the *Psychopathy Checklist-Revised* (PCL-SV, Hart, Cox & Hare, 1995) designed to complement the PCL-R (Hare, 1991) is routinely used in forensic settings to measure traits of psychopathic personality disorder (Morrissey, Mooney, Hogue, Lindsay & Taylor, 2007).

Social domain

Social interactions may provide a source of stress. Attention has already been given to neuroticism and its relationship to stress generation, manifesting as interpersonal conflict and the perception of being negatively evaluated by others. Persons who score low on every facet of FFM agreeableness – which relates to the level of trust, empathy, and cooperativeness exhibited during interpersonal interactions – will likely exhibit psychopathy (Ross et al., 2008). Negative social interactions – consisting of undermining behaviors, angry criticism, hassling, domineering, and mistrust – may be more deleterious than no social support at all (Heaney & Israel, 2008).

Having said that, social support is likely causally related to improved health, the capacity to cope effectively with stress, and reduced exposure to stress. Heaney and Israel conclude that social support satisfies basic human needs for companionship, intimacy, and a sense of belonging. It leads to new social contacts and the acquisition of problem-solving skills, reduces environmental uncertainty and unpredictability, fosters perceived personal control, and supports positive reappraisal of stressors.

Social support takes various forms, including: (1) *emotional support*: provision of empathy, love, trust, and caring, (2) *instrumental support*: provision of tangible aid and services to a person in need, (3) *informational support*: provision of advice, suggestions, and knowledge, and (4) *appraisal support*: provision of constructive feedback and affirmation. Social networks may be distinguished in terms of size, level of bi-directionality, the strength of individual bonds, and geographic distance of members.

In conceptualizing social support, one must appreciate that social supports are probably structured, perceived, and received differently in different populations. The characteristics of social support for seriously mentally ill people and those who have been incarcerated are different from those for the general population. Network structure is an essential support component for re-entry, given that PMI and persons who have been incarcerated tend to benefit from structure and predictability in their lives (Friestad & Hansen, 2005; Silver & Teasdale, 2005).

Religion. Religious practice among incarcerated persons is viewed with some suspicion by correctional staff, owing to instances – which may or may not be representative but are highly salient – in which professed religious faith is used to shield gang activity, secure external resources, obtain political influence, or to create a positive impression in the eyes of parole board members. Also, non-Christian faiths and faiths tied to radical political views may be received with relatively little toleration by prison administrators (Thomas & Zaitzow, 2006).

From a pragmatic standpoint, questions have been raised regarding the efficacy of religious faith in reducing the risk of recidivism. Historically, studies have failed to show an association between religious participation and reduced recidivism; it has also been noted, however, that these studies are

methodologically weak. More rigorous studies do suggest that religion is a protective factor with respect to recidivism. However, it is more likely to have an impact on low-level offenders as opposed to persons convicted of serious crimes, and tends to be more effective among women as opposed to men. Apart from recidivism, religious involvement may promote recovery from substance abuse (Dodson et al., 2011). Kerley, Matthews, and Blanchard (2005) found that religious belief and attendance were directly associated with reduced arguing and indirectly associated with reduced fighting among inmates.

McCullough and Willoughby (2009), in a review, cite evidence that religion provides a valuable context for building social support networks. Communities of like-minded individuals help individual members adhere to standards of conduct that promote increased self-regulation of impulsive behavior. Religious practice offer specific guidance on adaptive coping responses such as positive reappraisal.

Stigma. Stigmatization, whether one's personal concept of stigma or a collective social stigma, as a concept or variable, has to be considered in this model. Stigma involves recognition of cues that a person has, resulting in activation of stereotypes, and prejudice or discrimination against that person (Corrigan, 2004). Derived from social identity theory, stigma is a process in which people use social constructs to judge or label someone who is different or disfavored (Overton & Medina, 2008). Being PMI, a substance user, and a former inmate are all sources of stigma, and many former inmates are subject to this "triple stigma" and consequently are at high risk of homelessness, parole violations, and recidivism (Hartwell, 2004).

Gender. Starting in adolescence, women experience a greater burden of internalizing disorders manifesting as depression and anxiety, whereas men experience a greater burden of externalizing disorders including antisocial personality and substance abuse, and are more likely to be aggressive and have

difficulty forming close relationships and maintaining social support networks. These differences are presumably influenced by sociocultural constructions of masculinity and femininity (Rosenfield & Mouzon, 2012). Among newly incarcerated persons, women are less likely to have a history of substance use but are also less likely to seek treatment for substance use, possibly owing to gender-based stigma and limited availability of community-based female-only groups. In this population, there is a higher prevalence of anxiety, borderline personality features, and trauma-related symptoms among women as compared to men (Drapalski et al., 2009).

Environmental Stress Factors

Regarding family stressors, parallels can be drawn between burdens associated with individuals who suffer mental illnesses and those who are incarcerated, and certainly those individuals who have the experience of both events. Because many prisons are located in rural settings, families and friends of individuals who are incarcerated must cope with the challenge of maintaining a relationship with the incarcerated individual. To maintain a connection with this person is often an additional economic burden, particularly if the incarcerated person is serving a longer sentence, if visits are discouraged (for any number of reasons), or if the economic, physical, and emotional hardships associated with traveling to and from the prison are just too great a burden (Cooke, 2002). Unfortunately, when a parent goes to prison, any cohesion in the family system is disrupted. Burden on the social service system through foster placement for children, for example, is costly as is the additional financial stress to relatives and aging grandparents as they often do not receive similar remuneration as caregivers (Geller, Garfinkel, Cooper, & Mincy, 2009).

In a study of caregivers in Quebec, Provencher, Perreault, St. Onge, and Rousseau (2003) found that caregivers were 3 times more likely to experience severe psychological distress than reported by those in the general population. This result is consistent with the high prevalence rate of psychological distress in caregivers reported in other studies (Braman, 2004; Saunders, 2003). Uncertainties in caregiving competence as well as conflicts related to multiple roles assumed by caregivers add to the burden of psychological distress felt by caregivers (Provencher et al., 2003). Of critical importance to caregivers are balancing family life and respecting individual needs of family members. In today's managed care environment, caregivers perceive themselves as managers who closely monitor behavioral changes in their ill relatives. In this process, caregivers are left with little time for themselves, lack assistance, and face profound stress.

Only the study by Provencher et al. (2003) examining a stress model of caregiving for mental illness could be found, and no models were found in the literature for caregivers, mental illness and incarceration. However, an examination of the Provencher et al. study is useful to this discussion. These authors propose that primary stressors for caregivers are related to the challenging and problematic behavior of the individual, and secondary stressors are derived from the difficult consequences that emerge from assuming caregiving functions – namely, objective and subjective burdens. In their model, moderators referred to resources that help family members to deal with the caregiving stressors, such as informal and formal social supports. These supports were defined as family and friends, access to health care resources, and the number and types of services.

As mentioned earlier, incarceration has been shown to impose stress upon family relationships, and particularly upon marital and relationship strain. The longer the prison term, the more difficult it becomes

for formerly incarcerated persons to maintain relationships and restore relationships with partners upon release. This is especially true of those who exhibit the effects of prisonization. Emotional over-control, social withdrawal, and apathy militate against the restoration of intimate partner bonds as well as parental relationships (NeSmith, 2015).

Challenges In Terms of Successful Community Reintegration

The 20th century in the US has been noted by some as the “era of incarceration” because an estimated 7 million or more Americans are under some form of correctional supervision, including probation and parole (Webb, 2007; Rodriguez & Webb, 2007; Walmsley, 2006). The high incarceration rate raises several serious questions that have been posed to a Special Hearing of the Joint Economic Committee of the U.S. Senate in 2007, underscoring the fact that the rate of growth of spending on corrections in state budgets has exceeded that for education, health care, social services, transportation and environmental protection. Witnesses advocated for diversion of individuals who are not threats to public safety into serious and structured community based alternatives to prison (Jacobson, 2007). Prevention strategies, such as increasing high school graduation rates, neighborhood-based law enforcement initiatives and increases in employment and wages to effectively reduce crime are promoted over the greater use of prison (Albert, 2007; Lounsbury & Stoltz, 2007; Western, 2007).

The impact upon the individual is portrayed in a statistic showing that more than half of all inmates who are released are re-incarcerated within three years (Jacobson, 2007). The strain of trying to adjust in the community after incarceration is not an easy task. After release from prison, offenders face many barriers, often called “invisible punishments” (Nolan, 2007) because they are frequently denied parental rights,

driver's licenses, student loans, the right to vote, and they experience the biases that come from having been incarcerated or treated for a mental illness, such as poor public housing, limited employment opportunities (even with skills), and difficulties accessing health care. Transitioning from a world where all decisions are made for them, to an environment where these many decisions and choices need to be made, they can be overwhelmed by feelings of intense stress and worry.

Social/Environmental Variables. The variables for inclusion identify family characteristics (marital status, number of children, relatives living in the home, number of friends and social support network, distance to social units and level of support from social units, employment status, disability) that would be obtained from self-report upon intake assessment or records if available. Disability and vocational need would be determined from a more detailed interdisciplinary assessment. Included under this section of the model would be the length of separation due to prolonged incarceration and the number of incarcerations. Social stigma is viewed from how society views the individual, as a convict, as a mentally ill individual, as a drug addict, certainly influences the outcomes upon re-entry with regard to employment, housing and successful reintegration into the community.

Discussion

In this paper, a biopsychosocial vulnerability stress model was applied to the corrections population and provides a framework that can be utilized by an interdisciplinary team of clinicians and researchers collaborating to improve clinical services and patient care outcomes. The vulnerability stress model was particularly useful for an examination of the available evidence in the literature, as well as the gaps as it translates to the inmate population. The corrections population is sufficiently similar to community and

hospitalized psychiatric samples to provide for translation of the evidence as found in the literature, and, where possible, to include studies that involved inmate populations. What emerged from this discussion were the complexities of such a model, reflective of the complexities of the mentally ill inmate population, and the gaps yet to be demonstrated through research.

The framework provided by this model has begun to capture a picture of the general characteristics of the correctional population. A large number of inmates have mental disorders and co-occurring substance-abuse disorders that bring them into the criminal justice system. A large proportion of the population is male and of minority race. These individuals generally have challenging personality styles, and exhibit impulsive and aggressive behaviors, with a smaller number who are violent. The inmate population appears to have a low tolerance to stress and exhibits poor coping and decision-making skills. Personal resources and supports appear to be inadequate, with issues of poverty, low levels of education, poor vocational skills and poor employment histories. For individuals with extensive lengths of incarceration, or repetitive patterns of incarceration, social networks are even more fragmented and challenged than for the population in general. Reunification with family members is among one of the many emotional demands upon the inmate upon re-entry. Within this framework, interventions can be tailored for individual vulnerabilities, gathering momentum from mediators, moderators, and strengths that can be found in each individual.

Among the next steps would be to begin to apply data to the model to see how it works initially with offender populations, and to see how the model needs to be refined. This research could begin with descriptions or collective case studies of inmate groups by age, race and gender and use of data that are

available through record review or utilization review. It would be expected that the younger inmates, particularly males, would have higher levels of aggression and greater difficulty with adjusting to the prison environment, and similarly, have a harder time with re-entry success. Would their utilization of health services be different than that for others of the same gender? We expect a high number of individuals with co-occurring disorders, but what is the significance of the addition of selected medical conditions that might influence behavior and coping? Which individuals are more receptive to clinical interventions and benefit from them? Are there mediators or moderators in the model that we can identify that not only reduce stressors but work to enhance treatment effect? From the model, can we improve matching treatments (such as stress reduction intervention which taps spirituality or teaching recognition of personal stressors and coping strategies) to the individual.

This framework offers yet another systems-based opportunity: to identify standardized measures that could be incorporated into the health care structure of a corrections system that would be useful to both clinicians and researchers. Challenges exist in utilizing technology to reduce burdens to the limited number of clinicians while still meeting the full potential for conducting quality evaluation and research studies. The value of standardized measures has not been missed, since work on the reliability and validity of measures continues. A gap in the literature exists in the publication of standardized instrument scores on corrections populations, or comparisons with mental health and community samples. Further, many corrections systems have endeavored to tailor and standardize instruments for their specific needs, but this makes it difficult to draw comparisons with community samples, particularly when the standard of care in corrections is to be equivalent to that provided in a community setting (Poster, 1992).

The use of the model to support clinical intervention studies to enhance the individual's adaptation (behavioral or medical) while incarcerated and to support re-entry into the community can guide clinical practice. The role of nursing, for example, can be greatly enhanced in corrections to promote this agenda, but the evidence of nursing interventions must be demonstrated in these environments. Nursing roles have the opportunity for many "teachable" moments that can support, enhance and promote inmate health, adherence to medical and mental health regimens as well as behavioral plans. The relationship between nursing interventions and patient outcomes is well documented (Schubert, Glass, Clarke, Aiken, Schaffert-Witviliel, Sloan & De-Geest, 2008). The expectation for nurses to participate in correctional settings in this manner has not always been recognized or desired (Shelton, 2009). As in many other healthcare settings, nurses in correctional settings need to be retooled for the future. There is a large gap in knowledge about evidence-based practices in correctional nursing and evidence-based treatment in correctional settings.

Conclusion

The clinical usefulness of the adapted biopsychosocial vulnerability-stress model is striking in that it is set up as a matrix in which variables can be selected from multiple levels for consideration in development of clinical programming, evaluation of clinical services, or development of a research study. It easily provides for a flexibility to be expanded upon as it is discussed and applied. A framework such as this might guide the development of a quality improvement and informatics system in corrections, or be used to provide a basis of understanding about the shared population between a Department of Corrections and the health care providers.

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