USING AN INTEGRATIVE APPROACH TO PROMOTE EQUITABLE OUTCOMES
FOR JUSTICE-INVOLVED WOMEN

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ABSTRACT

Anna Parisi: Using an Integrative Approach to Promote Equitable Outcomes for Justice-Involved Women
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Women have rapidly emerged as one of the fastest-growing criminal justice populations, with unique life experiences and challenges that have been found to impact the initiation and escalation of their criminal behavior. Although research has identified evidence-based principles that effectively reduce criminal justice involvement among the general correctional population, more needs to be learned about how these principles can be integrated with research on the needs of justice-involved women specifically. The three papers comprising this dissertation investigate gaps in research in order to advance our understanding of how to address the needs of justice-involved women. The first paper is a systematic review and meta-analysis of risk factors for women's recidivism. The second paper builds off of this review to investigate sources of variation in the relationships between women's risk factors and recidivism. The third paper explores whether the relationships between women's risk factors and recidivism are mediated by their engagement in substance use treatment. Findings suggest that women experience a wider breadth of risk factors than what is currently acknowledged by many of the correctional assessments and interventions delivered to this population. They also suggest that there are important sources of variation in the strengths of the relationships between women's risk factors and their subsequent recidivism, which are most often a result of the methodological characteristics of the primary studies examining these associations. Finally, results from this dissertation suggest that the relationships between women's risk factors and recidivism are not mediated by treatment engagement, although self-efficacy may be an important factor influencing women's ability

to engage in substance use services. Implications are discussed related to how these findings

can be used to inform future practices and services for women in the criminal justice system.

To the women whose lives have been impacted by the criminal justice system.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

α Cronbach's alpha

I^2 Percentage of observed variation in effect sizes that can be accounted for by true variance rather than sampling error or chance

σ_1^2 Amount of true variance in effect sizes reported by the same study

σ_2^2 Amount of true variance in effect sizes reported by different studies

τ Estimated standard deviation of true variance among effect sizes

k Number of independent studies

MLR   Maximum likelihood estimation with robust standard errors

N   Number of participants (n indicates subsample)

PTSD   Posttraumatic stress disorder

OR Odds ratio

r Correlation coefficient

RCT   Randomized control trial

RNR   Risk-need-responsivity model

WRNA   Women's Risk Needs Assessment

INTRODUCTION

Women are one of the fastest-growing correctional populations in the United States (U.S.) From 1980 to 2019, the number of incarcerated women increased by over 700% (The Sentencing Project, 2020), and estimates indicate that more than 1.2 million are currently under correctional supervision (Kaeble & Glaze, 2016). Although the overall incarceration rate in the U.S. has been declining since 2009, rates of jail incarceration among women continue to rise (Zeng, 2020). To address these issues, it is critical that correctional services address the drivers of criminal justice involvement among women.

Correctional services for justice-involved women are situated at the nexus of two bodies of literature. The first stems from the *risk-need-responsivity* (RNR) model, which has become the predominant framework for correctional assessment and rehabilitation in the U.S. (Bonta & Andrews, 2017). The RNR model is supported by an extensive body of research demonstrating its ability to guide effective correctional interventions for justice-involved individuals irrespective of their gender. Consequently, this framework is widely considered to be a *gender-neutral* perspective (Andrews et al., 2012; Wormith & Zidenberg, 2018).

Some correctional scholars have challenged the relevance of the RNR framework for justice-involved women, noting that much of its supporting empirical base was derived from samples of men and later generalized to women (Blanchette & Brown, 2006; Chesney-Lind & Pasko, 2012). Recently, empirical support has emerged for a *gender-responsive* perspective that is grounded in a feminist theoretical orientation and centered on understanding the unique circumstances that influence women's pathways in and out of the criminal justice system (Bloom et al., 2002; Covington & Bloom, 2007). An important

assumption of the gender-responsive perspective is that women face challenges that men do not and that these challenges impact their risk for criminal offending and should therefore serve as the focus of services delivered to this population (Covington & Bloom, 2007). These challenges are commonly referred to as *gender-responsive risk factors* and typically include experiences related to mental health, victimization, financial needs, housing safety, relationship dysfunction, and substance misuse (Van Voorhis et al., 2010; Wright et al., 2012).

Although extant research clearly supports the principles espoused by the RNR model, a growing body of research has provided evidence for the efficacy of services informed by a gender-responsive perspective (Owen et al., 2017). Consequently, a number of scholars have called for an *integrative perspective* for justice-involved women that incorporates findings from both gender-responsive and gender-neutral research (Blanchette & Brown, 2006; Blanchette & Taylor, 2009; Hubbard & Matthews, 2008). An integrative perspective builds on the extensive body of research demonstrating that the principles of the RNR model are effective for guiding assessments and interventions among men *and* women in the criminal justice system (Andrews & Dowden, 2006; Dowden & Andrews, 1999; Lovins et al., 2007; Rettinger & Andrews, 2010). However, this perspective also enriches the RNR model by incorporating empirical findings demonstrating that interventions targeting gender-responsive risk factors also effectively reduce recidivism among justice-involved women (Gobeil et al., 2016; Tripodi et al., 2011). Consequently, a central component of an integrative perspective is to build on the principles of the RNR model to accommodate gender-responsive risk factors in the rehabilitation of this population (Blanchette & Brown, 2006; Hubbard & Matthews, 2008; Voorhis, 2012).

An integrative research perspective of rehabilitation for justice-involved women provides the opportunity to expand and develop the evidence base of effective services for

this population. However, there remain gaps in research that present challenges to this integration. These gaps include (a) which risk factors should be targeted in correctional interventions that focus on recidivism among justice-involved women; (b) potential sources of variation in the strength of the relationships between risk factors and recidivism; and (c) how gender-responsive risk factors should be targeted in services delivered to justice-involved women.

Risk Factors

One gap in knowledge hindering the advancement of an integrative perspective has been conflicting research on whether gender differences exist related to the risk factors with the strongest relationships to recidivism. An established body of evidence supports the ability of the RNR model's *Central Eight* criminogenic risk factors (antisocial behaviors, antisocial personality patterns, antisocial cognitions, antisocial associates, family and marital circumstances, work and school-related problems, substance misuse, and lack of prosocial leisure and recreation activities) to effectively guide services for justice-involved individuals regardless of their gender (Andrews et al., 2012; Rettinger & Andrews, 2010). However, many scholars within the gender-responsive field assert that women's criminal offending can be more effectively addressed through interventions targeting gender-responsive risk factors (Gehring & van Voorhis, 2014; Van Voorhis et al., 2010). Nevertheless, even within gender-responsive literature, there is a lack of consensus regarding the number, nature, and predictive strength of these risk factors, many of which overlap with the Central Eight (Blanchette & Brown, 2006). Consequently, there is a need for synthesis and empirical evaluation of the literature on gender-neutral and gender-responsive risk factors to examine the strengths of their relationships with recidivism.

Sources of Variability in Risk Factors

A second gap in knowledge concerns the high degree of variability that has been documented in the literature examining risk factors for women's recidivism. This variability confounds our ability to understand the true nature of the relationship between risk factors and women's recidivism. Consequently, it is important to understand the factors that may be inhibiting our ability to accurately measure the strength of these associations. Past research has identified sources of variability that relate to (a) factors associated with the methodological characteristics of primary studies; (b) differences between study participants; and (c) how risk factors are conceptualized and measured. These study, sample, and risk-factor characteristics are therefore essential to examine in order to provide a more comprehensive understanding of the true relationship between risk factors and women's recidivism.

Targeting Risk Factors

A third gap in knowledge relates to the nature of the relationship between gender-responsive risk factors and recidivism among justice-involved women. Within the RNR framework, gender-responsive risks are considered *responsivity factors* that can hinder the ability of justice-involved women to engage in and benefit from correctional interventions that target the Central Eight (Andrews et al., 2012). Consequently, research aligned with the RNR model points to the value of targeting gender-responsive risk factors to facilitate engagement in correctional interventions. In contrast, supporters of a gender-responsive perspective often contend that gender-responsive risk factors are directly associated with criminal behavior and should therefore be prioritized in correctional interventions delivered to justice-involved women for the purpose of reducing recidivism (Hall et al., 2013; Van Voorhis, 2012)

Determining whether gender-responsive risk factors represent risk or responsivity factors is critical for ascertaining what role they play in correctional interventions delivered

to justice-involved women. Clarification of this relationship could inform which treatment targets should be prioritized to optimize the efficacy of interventions aiming to reduce recidivism among justice-involved women. This clarification could further lay the groundwork for the development of an integrative approach that offers guidance on how to incorporate gender-responsive risk factors into correctional interventions that address criminal justice involvement.

Dissertation Focus

This dissertation builds on existing evidence to promote a better understanding regarding how findings from gender-responsive research can be effectively integrated with the RNR model to guide equitable criminal justice outcomes among justice-involved women. It comprises three interrelated manuscripts addressing three specific aims that correspond to each of the gaps in research highlighted above.

Aim 1

Aim 1 was to evaluate the impact of gender-neutral and gender-responsive risk factors on women's criminal recidivism. To address this aim, a systematic review and meta-analysis of peer-reviewed and grey literature was conducted that addressed the following research questions: (1) What is the relationship between gender-responsive risk factors and recidivism among adult women in the U.S. criminal justice system?; (2) What is the relationship between gender-neutral risk factors and recidivism among adult women in the U.S. criminal justice system?; and (3) What risk factors (both gender-neutral and gender-responsive) have the strongest association with recidivism among adult women in the U.S. criminal justice system?

Aim 2

Aim 2 was to examine sources of variability in the magnitude of the relationships between gender-neutral and gender-responsive risk factors and women's recidivism. To

address this aim, a meta-regression approach was used to examine potential moderators of the relationships between (a) the risk factors that were examined in Aim 1 and (b) women's recidivism. This paper addressed the following questions: (1) To what extent do the effects of gender-responsive and gender-neutral risk factors on recidivism vary by study-level characteristics?; (2) To what extent to the effects of gender-responsive and gender-neutral risk factors on recidivism vary by sample-level characteristics?; and (3) To what extent do the effects of gender-responsive and gender-neutral risk factors on recidivism vary by risk-factor characteristics?

Aim 3

Aim 3 was to examine the nature of the relationships between (a) the gender-responsive risk factors that were identified as having the strongest associations with recidivism in Aim 1, and (b) criminal recidivism. To address this aim, an exploratory path analysis was conducted using secondary data. This path analysis examined engagement in substance use treatment as a potential mediator of the relationships between gender-responsive risk factors and criminal recidivism.

Organization of the Dissertation

The three papers in this dissertation address important gaps in research and provide findings that can be used to inform assessments and interventions for women enmeshed in the criminal justice system. All three papers were organized around a central theme but were prepared to be able to stand on their own and therefore contain repeated information when necessary. Each paper is presented in a separate chapter, after which a concluding chapter is presented in which the findings of these papers are discussed in light of their implications for future research, practice, and policies for justice-involved women.

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PAPER 1: WHAT ARE THE RISK FACTORS OF RECIDIVISM AMONG JUSTICE-INVOLVED WOMEN? A SYSTEMATIC REVIEW AND META-ANALYSIS

Women's involvement in the criminal justice system is at a global high. Much of the growth in women's rate of justice-involvement has been driven by the United States (U.S), which holds nearly one-third of the world's incarcerated women despite accounting for only four percent of its female population (Walmsley, 2017). Over 200,000 women are currently incarcerated in the U.S., and an additional one million are on probation or parole (Carson, 2020; Zeng, 2020). Although most incarcerated women eventually return to their communities, approximately two-thirds recidivate within the three years following their release (Alper et al., 2018). To reduce these numbers, it is essential to learn more about the factors placing women at risk for continued criminal offending.

To date, risk factors for criminal behavior have been primarily understood through the lens of the Risk Need Responsivity (RNR) model, which is widely used to guide the assessment and rehabilitation of justice-involved people in the U.S. The RNR model is grounded in the General Personality and Cognitive Social Learning (GPCSL) perspective, which asserts that the decision to engage in criminal behavior is primarily determined by a person's expectations regarding the costs and benefits of crime (Bonta & Andrews, 2017). The GPCSL maintains that these expectations are influenced by eight broad risk domains (the *Central Eight*), which are considered the most important drivers of criminal recidivism. These include antisocial behavior, antisocial attitudes, antisocial associates, antisocial personality patterns, family and marital circumstances, school and work environments, substance misuse, and low levels of prosocial leisure or recreational activities (Bonta & Andrews, 2017).

Gender-Neutral Perspective

An important premise of the GPCSL perspective and, by extension, the RNR model, is that it is a *gender-neutral* perspective of criminal behavior, which means that it assumes that the Central Eight risk factors are relevant for men and women. While advocates of the GPCSL acknowledge that the Central Eight are situated within larger social contexts related to gender, these gendered social contexts are thought to influence criminal behavior only to the extent to which they affect the Central Eight (Rettinger & Andrews, 2010).

The Central Eight play two key roles in the RNR model. First, assessment of these risk factors is used to determine a person's overall level of risk for reoffending. This risk level is subsequently used to match justice-involved individuals to appropriate correctional services, with higher-risk individuals recommended for more intensive services and vice versa (the *risk principle*). Second, the malleable aspects of these risk factors, also known as *criminogenic needs*, are used at treatment targets for interventions designed to reduce recidivism. The identification of criminogenic needs is an essential element for the model's *need principle*, which asserts that correctional interventions are most effective when they prioritize the risk factors that have been found to have the strongest associations with criminal recidivism (Bonta & Andrews, 2017).

A robust body of evidence supports the generalizability of the Central Eight to women through the risk and need principles of the RNR model. Primary studies and meta-analyses have shown that risk assessment instruments measuring the Central Eight accurately predict women's reoffending (Coulson et al., 1996; Desmarais et al., 2016; Gendreau et al., 1996, 2002; Greiner et al., 2015; Makarios et al., 2010; Olver et al., 2014; Pelissier et al., 2003; Rettinger & Andrews, 2010; Smith et al., 2009). Research has also shown that services that successfully reduce criminogenic needs are associated with subsequent reductions in both men's and women's recidivism (Bonta, 2019; Bonta & Andrews, 2017). In fact, one meta-

analysis of correctional interventions found that their effect on recidivism increased in proportion to the number of criminogenic needs they targeted (Andrews et al., 2006). By contrast, interventions that prioritized treatment targets other than the Central Eight were found to be associated with *increases* in recidivism (Bonta & Andrews, 2017). These findings suggest that the RNR model's need principle is enhanced—and the potential for iatrogenic harm reduced—by targeting the risk factors that are most salient to recidivism.

Gender-Responsive Perspective

Although research supports the use of the Central Eight within correctional assessments and interventions delivered to justice-involved women, a number of scholars have challenged the purported gender-neutrality of these risk factors, noting that they were formulated from studies that either did not include women or failed to disaggregate findings by gender (Blanchette & Brown, 2006; Hannah-Moffat, 2009). These critiques are supported by evidence documenting gender differences in men and women's pathways into the criminal justice system, their motivations for engaging in criminal behavior, and the types of offenses they commit (Blanchette & Brown, 2006; Bloom et al., 2002; Daly, 1992; DeHart, 2018). These differences have provided a foundation for the development of a *gender-responsive* perspective of correctional research that acknowledges the gendered context of women's offending and their unique life circumstances (Bloom et al., 2003; Covington & Bloom, 2007).

A central assumption of the gender-responsive perspective is that differences in the experiences of men and women in the criminal justice system are also reflected in their risk factors for recidivism (Blanchette & Brown, 2006; Bloom, 2002; Covington & Bloom, 2007; Olson et al., 2016; Van Voorhis et al., 2010). To this end, gender-responsive research points to a number of *gender-responsive risk factors* that are more prevalent among justice-involved women than their male counterparts and are considered by gender-responsive experts to more

accurately represent the drivers of their criminal justice involvement (Van Voorhis et al., 2010). Differences exist in gender-responsive research around how these risk factors are conceptualized and operationalized. However, literature in this area often points to the importance of mental health problems (Bronson, 2017; Lynch et al., 2014), parenting-related stress (Adams et al., 2017), a history of victimization (Kruttschnitt, 2013; Lowenkamp et al., 2001; Messina & Grella, 2006), dysfunctional relationships (Barrick et al., 2014; Bell et al., 2020), lack of stable housing (Morash et al., 2017), employment and financial problems (Holtfreter et al., 2004; Huebner et al., 2010), low self-efficacy (Saxena et al., 2016), and substance misuse (Andrews et al., 2012; Fazel et al., 2006) as risk factors for women's recidivism.

The construction of a collection of Women's Risk Needs Assessment (WRNA) instruments has contributed significantly to how gender-responsive risk factors are conceptualized and measured within gender-responsive literature. The WRNA are empirically based actuarial risk assessment instruments designed specifically to measure women's gender-responsive and gender-neutral criminogenic risk factors (Wright et al., 2012). The development of the WRNA instruments was informed by gender-responsive correctional literature as well as interviews and focus groups with justice-involved women and the practitioners supervising them (Salisbury & Boppre, 2016; Van Voorhis et al., 2010). Two types of WRNA assessments exist: (a) stand-alone instruments, and (b) trailer versions (WRNA-T) that can be used to supplement gender-neutral assessment instruments such as the Level of Service Case Management Inventory (LS/CMI; Andrews et al., 2004). Although both versions of the WRNA include subscales that are designed to measure gender-responsive risk and protective factors, the stand-alone instruments also include subscales that measure risk factors corresponding to the Central Eight (Salisbury & Boppre, 2016).

Because the standalone WRNA and the WRNA-T are intended to be delivered across multiple correctional settings, initial research on their construction, validation, and revalidation resulted in three separate versions of each instrument: probation, prison, and pre-release (Van Voorhis et al., 2012, 2013a, 2013b). The subscales in the most recently validated versions of the stand-alone instruments are shown in Table 1.1. Given the substantial heterogeneity in how gender-responsive risk factors are described and conceptualized within gender-responsive research, these subscales provide an important synthesis and an organizing structure for understanding the gender-responsive risk factors with the most empirical support for women's recidivism.

Studies have found that risk assessment instruments evaluating the Central Eight predict women's recidivism more accurately when they are delivered in conjunction with the WRNA-T, providing evidence for the importance of the gender-responsive risk factors this instrument is designed to measure (Van Voorhis et al., 2010; Wright et al., 2012). Further, construction and revalidation research has found that the stand-alone WRNA and the WRNA-T are significantly related to multiple measures of recidivism, including arrests, convictions, incarcerations, technical violations, and offense-related failures (Van Voorhis et al., 2012, 2013a, 2013b). However, this research has also identified considerable variation in the range of correlations for specific subscales, as well as in other measures of the instrument's overall predictive validity. Moreover, several studies evaluating gender-responsive risk factors using instruments other than the WRNA have not found that these risk factors significantly predict recidivism after controlling for the impact of the Central Eight risk factors (Andrews et al., 2012; Rettinger & Andrews, 2010). These findings suggest that more needs to be learned about the complex relationships between gender-responsive risk factors and women's recidivism.

Integrative Perspective

Empirical support for the RNR model combined with growing evidence for the importance of gender-responsive risk factors has resulted in increased calls for the development of an *integrative perspective* of correctional research in which findings from gender-responsive research are incorporated into the evidence base of the RNR model (Blanchette & Brown, 2006). An essential premise of an integrative perspective is that correctional risk assessment instruments and interventions should prioritize risk factors that are the most relevant for women's reoffending. However, differences concerning what the most relevant gender risk factors are have hindered the advancement of this theoretical integration.

The accurate identification and classification of criminogenic risk factors has two important implications for the development of an integrative perspective. First, the RNR model's risk principle rests on the assumption that justice-involved individuals will be assigned to appropriate levels of treatment based on valid and reliable risk assessment instruments (Andrews & Dowden, 2006; Bonta & Andrews, 2017). Research has found that the most effective instruments measure a comprehensive range of theoretically and empirically derived criminogenic risks and needs (Andrews et al., 1990; Lowenkamp et al., 2006). Thus, it is essential that assessment instruments used with justice-involved women measure the risk factors that are most relevant for their criminal offending. Second, the model's need principle is predicated on interventions prioritizing risk factors as treatment targets based on the strength of their relationship with recidivism (Andrews et al., 2006). Therefore, adherence to the model's need principle can be enhanced by identifying the risk factors that have the strongest relationships with women's recidivism.

Collectively, the aforementioned studies support the relevance of the Central Eight risks and needs in the assessment and rehabilitation of justice-involved women while

demonstrating the need to develop a clearer understanding of the role that gender-responsive risk factors play in women's recidivism. Although prior meta-analyses have examined women's risk factors for recidivism, they have limited their scope of findings to particular risk assessment instruments (Olver et al., 2014; Smith et al., 2009) or specific subpopulations of justice-involved individuals such as Aboriginal populations (Gutierrez et al., 2013) forensic outpatient populations (Eisenberg et al., 2019), individuals with mental health problems (Bonta et al., 2014), and adolescents (Scott & Brown, 2018). However, there is a pressing need for research that examines the determinants of recidivism among justice-involved adult women generally in order to identify the risk factors that are most salient for this population as a whole.

To address this need, the present study aimed to explore and extend existing research on criminogenic risk factors by way of a systematic review and meta-analysis evaluating the predictive accuracy of gender-neutral (the Central Eight) *and* gender-responsive risk factors. The research questions for this systematic review and meta-analysis are as follows: (1) What is the relationship between gender-responsive risk factors and recidivism among adult women in the U.S. criminal justice system? (2) What is the relationship between gender-neutral risk factors and recidivism among adult women in the U.S. criminal justice system? and (3) What risk factors (both gender-neutral and gender-responsive) have the strongest association with recidivism among justice-involved women?

Methods

The methodology for the present review was based on guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA; Moher et al., 2009), which are designed to facilitate transparent reporting. A comprehensive protocol was adapted from PRISMA guidelines and registered with PROSPERO, an international

prospective register for systematic reviews (Parisi & Wilson, registration number CRD42020187964).

Study Selection

Studies were considered eligible for the present review if they met the following criteria: (a) included women over the age of 18 with current or previous justice involvement in the U.S.; (b) included at least one follow-up period with a measure of recidivism as an outcome; (c) included sufficient statistical information to allow for the calculation of an effect size; (d) included a measure assessing at least one risk factor for recidivism; (e) evaluated samples in the U.S.; and (f) were published in English. All studies, including grey literature (unpublished manuscripts, dissertations, government reports) were eligible for inclusion. No restrictions were applied to methodology or dates of publication. The primary outcome examined in this systematic review and meta-analysis was criminal recidivism, which was broadly defined to include evidence of any additional criminal justice contact following an initial offense.

Search Procedures

After developing the review protocol and establishing study eligibility criteria, a systematic, computerized literature search strategy was developed in consultation with a university social science reference librarian (Moher et al., 2009). Search strings included a combination of free-text and controlled vocabulary that was tailored for five databases: PychInfo, Web of Science, Sociological Abstracts, and Proquest Criminal Justice. This process resulted in five separate lists of search terms. Key terms for all search strings related to women, risk factors, and recidivism. A full list of search terms used in each database is presented in Appendix A.

Results from the search process can be found in Figure 1.1. The initial search yielded 19,024 manuscripts, of which 11,773 were removed as duplicates. Titles and abstracts of

7,251 manuscripts were reviewed by the author. Manuscripts that did not clearly meet eligibility criteria were removed, and the full text of all remaining manuscripts was evaluated by the author to determine whether they met eligibility criteria ($n = 372$).

To identify literature that was not captured during the initial search, substantive experts within the correctional field were contacted, and the reference lists of all manuscripts that were eligible for inclusion were manually searched (i.e., reference harvesting) by the author. This process led to the identification of 11 additional manuscripts, resulting in a final sample of N = 57.

Data Extraction

Data extraction took place in two steps. First, an electronic data extraction form was developed, which can be found in Appendix B. This form was used to extract data related to study and sample-characteristics, as well as effect sizes from the risk factors reported by every study in order to prepare them for subsequent quantitative analysis. Second, in with prior meta-analyses of risk factors, extracted risk factors were then grouped into 19 *risk domains,* which refer to clusters of risk factors that are similar in nature (Assink et al., 2015; Eisenberg et al., 2019; Gubbels et al., 2019). To align with the research questions of this review, these risk domains were grouped into gender-neutral risk domains and gender-responsive risk domains. Additionally, a third grouping of "other" risk domains were created, which referred to risk domains that were not consistent with gender-responsive or gender-neutral literature but were nonetheless reported with sufficient frequently to enable their examination. All risk domains were designed to be mutually exclusive, with extracted risk factors categorized only under one domain.

Data extraction was conducted by the primary author, who also developed an initial coding structure that linked each risk factor to one of the risk domains developed for this review. These initial classifications were reviewed by a second member of the research team,

and discrepancies in coding were resolved through mutual discussion. Following this review process, a final coding classification system was developed, with details available in Table 1.2.

Risk Domains

Gender-neutral risk domains corresponded to the Central Eight risk factors (antisocial behavior, antisocial attitudes, antisocial associates, antisocial personality patterns, family and marital circumstances, school and work environments, substance misuse, and low levels of prosocial leisure or recreational activities) as they are described in the Psychology of Criminal Conduct, which represents the seminal text on the RNR model (Bonta & Andrews, 2017). Gender-responsive domains were coded to align as closely as possible to the subscales listed in the revalidated versions of the stand-alone probation, prison, and pre-release versions of the WRNA (Van Voorhis et al., 2012, 2013a, 2013b). For WRNA subscales that reflect strengths (e.g. self-efficacy), risk factor domains were created to reflect *low* levels of these protective attributes. To ensure that all domains were mutually exclusive, risk domains for gender-responsive risk factors were only created for subscales that did not overlap with the Central Eight. Finally, "other" risk domains reflected risk factors that were not consistent with either gender-responsive or gender-neutral perspectives but were analyzed by at least three studies. Although social support is sometimes conceptualized as a gender-responsive risk factor for women (e.g. Barrick et al., 2014b; Cobbina et al., 2010), it is not included on WRNA subscales and therefore was included in the "other" category. In total, 19 risk domains were identified: eight gender-neutral domains, six gender-responsive risk domains, and five "other" risk domains. Details regarding each domain and its coding criteria can be found in Table 1.2.

Notably, the gender-responsive risk domains of mental health and victimization encompass multiple subscales of the WRNA. Victimization incorporates three subscales

(victimization as a child, victimization as an adult, and sexual victimization at any age), and mental health covers three subscales (depression, psychosis, and posttraumatic stress disorder [PTSD]). Because studies often reported risk factors that did not fit within these specific subscales (e.g. general mental health measures or scales measuring both physical and sexual abuse), the decision was made to collapse them into broader risk domains. However, average effect sizes from subsets of studies that corresponded with these subscales were reported as subdomains.

Quality Assessment

The methodological strengths and limitations of included manuscripts were assessed by the author using the Mixed Methods Appraisal Tool (MMAT), a quality assessment tool that enables the simultaneous appraisal of diverse research designs. The MMAT comprises 25 questions encompassing five different methodological categories: qualitative studies, quantitative randomized controlled trials, quantitative non-randomized studies, quantitative descriptive studies, and mixed methods studies. All manuscripts were appraised by the author using MMAT questions specific to their methodological category.

Calculation of Effect Sizes

Effect sizes were extracted by the author from the statistics reported in each study. Although most individual studies reported odds ratios (*OR*s), many studies contributed more than one effect size to the present analysis, and the majority of individual effect sizes were reported using the Pearson produce-moment correlation coefficient (*r*). Consequently, Pearson's *r* was selected as the effect size metric for the present analysis. When *OR*s were reported, they were transformed into a Pearson's *r* using formulas provided by Borenstein et al (2011). When area under the normal curve values (AUC) were reported, they were transformed into Pearson's *r* using the Ruscio formula (2008). Following conversion, correlations were transformed into Fisher's *z* values to normalize the distribution and

converted back into Pearson's *r* for final presentation (Borenstein et al., 2011). Whenever possible, unadjusted (bivariate) effects were extracted and used in the analysis, as comparing differentially adjusted effect sizes can limit the ability to estimate the true effects of risk factors on recidivism, and prioritizing bivariate effects for analysis is consistent with how risk factors are commonly analyzed in meta-analyses of recidivism (e.g. Assink et al., 2015; Geerlings et al., 2020; Katsiyannis et al., 2018; Yukhnenko et al., 2019)

Given a 50% base rate of recidivism, Pearson's *r* values of .1, .3, and .5 are typically interpreted as small, medium, and large effects, respectively. However, these values require adjustment when base rates of recidivism are smaller or larger than 50%, which is common when examining recidivism outcomes (Rice & Harris, 2005). Therefore, the base rate of recidivism was estimated for the total sample (23.1%,), and formulas provided by Rice and Harris (2005) were used to calculate adjusted *r* thresholds for small, medium, and large effects (.084, .206, and .320, respectively).

Data Analysis

Following the systematic review process, separate meta-analyses were conducted for each of the 19 identified risk domains to evaluate the strength of their association with recidivism. All meta-analyses were conducted using random effects models rather than fixed effect models given the expectation of significant heterogeneity among sample populations and study characteristics. For reference, fixed effect models assume that the studies in a meta-analysis share a common, true effect size. Therefore, these models account for variance arising from within-study heterogeneity (Borenstein et al., 2010). By contrast, random effects models assume that included studies represent a random sample of all studies meeting eligibility criteria and that observed estimates of the true effect can vary across studies. Consequently, random effects models allow for true variation of effects between studies by accounting for two levels of variance: variance resulting from sampling error among

individual studies and variance of effect sizes between studies in a meta-analysis (Borenstein et al., 2010).

Dependent Effect Sizes

Most studies included in this analysis reported more than one effect size for each risk factor. For example, studies often used multiple instruments to measure the same risk factor or provided effect sizes for multiple risk factors that could be clustered under a single risk domain. However, using more than one effect size per study violates the assumption of independence that underlies traditional two-level random effects models, because effect sizes generated from the same study are likely to be more similar to one another than effect sizes from different studies (Lipsey & Wilson, 2000). To address this dependency, three-level random effects models were used for risk domains in which studies contributed more than one effect size (Assink & Wibbelink, 2016, Cheung, 2014).

Like traditional two-level random effects models, three-level models estimate the sampling variance of individual effect sizes (level 1) and variance in effect sizes from different studies (level 3). However, three-level models also estimate an additional source of variance stemming from differences in multiple effect sizes drawn from the same study (level 2; Cheung, 2019; Fernández-Castilla et al., 2020; Van den Noortgate et al., 2015; Van Den Noortgate & Onghena, 2003). This approach is recommended over other methods for managing dependent effect sizes such as pooling effects or picking only one effect size per study, as it accounts for the nested structure of meta-analytic data and enables the extraction of multiple effect sizes from each study in a non-aggregated form, thus maximizing statistical power (Assink & Wibbelink, 2016).

Meta-Analyses

Meta-analyses for each risk domain were conducted in three stages. First, intercept-only two- and three-level random effects models were fitted to the data to obtain the overall

strength of the association between each risk domain and recidivism. Separate meta-analyses were performed for each risk domain, as each domain represented a substantively different risk factor for recidivism.

Second, the heterogeneity of effect size estimates was examined. For two-level models, two variance components were used to assess heterogeneity: the I^2 statistic (the percentage of the observed variation in effect sizes that can be accounted for by true variance rather than sampling error or chance; Borenstein et al., 2011), and τ (the estimated standard deviation of the true variance among effect sizes; Borenstein et al., 2011). For three-level models, heterogeneity was assessed by calculating three variance components: σ_1^2 (the amount of true variance in effect sizes reported by the same study), σ_2^2 (the amount of true variance in effect sizes reported by different studies), and the I^2 statistic, which was partitioned across levels 2 and 3 in order to provide an estimate of the percentage of variance at each level of analysis (Cheung, 2019). The variance at level 1 (i.e., sampling variance) was treated as known and calculated using the formula provided by Cheung (2014, p. 2015). For two-level models, I^2 values above 25% were considered to reflect high levels of heterogeneity. For three-level models, independent log-likelihood ratio rests were conducted to compare the fit of a model in which both σ^2 values were freely estimated to the fit of a model in which either σ_1^2 or σ_2^2 was fixed to zero. Significant results from these tests were interpreted as meaning that there was more variability in effect sizes at level 2 and/or 3 than could be explained by sampling variance or random chance (Assink & Wibbelink, 2016).

For domains in which I^2 statistics exceeded 25% (for two-level models) or significant log-likelihood ratio tests were observed (for three-level models), a third step of subgroup analyses was performed. The goal of this step was to investigate potential study- and sample-level characteristics that may have contributed to the heterogeneity in effect sizes within risk domains (Higgins et al., 2003, 2019).

All models were estimated using the Restricted maximum-likelihood (REML) estimator (Pastor & Lazowski, 2018). Additionally, the Knapp-Hartung adjustment was used in order to minimize the likelihood of Type I errors and provide a more conservative estimate of effects (Knapp & Hartung, 2003). For context, the Knapp-Hartung adjustment modifies the calculation of standard errors in random and mixed-effects models so that test statistics of individual coefficients are based on the t distribution and model coefficients (i.e., omnibus tests) were tested using the F distribution rather than the z distribution, which is appropriate only for fixed-effect meta-analyses (Knapp & Hartung, 2003).

Subgroup Analyses

To assess the potential influence of study and sample characteristics on average effect sizes, a series of subgroup analyses were employed. Four specific subgroup analyses were conducted to assess the influence of (a) publication status (peer-reviewed versus non-peer-reviewed manuscripts), (b) analysis type (bivariate versus multivariate), and (c) the racial composition of study samples (predominantly non-White samples versus predominantly White samples). Additionally, subgroup analyses were performed to compare effect sizes that were reported in Pearson's r and those converted from other metrics.

Publication Bias

Three approaches were used to assess for publication and other sources of bias within each risk domain. First, subgroup analyses were conducted to examine the potential influence of publication status on mean effect sizes for risk domains that were found to have significant levels of heterogeneity. Second, contour-enhanced funnel plots were generated and visually inspected for asymmetry. Third, formal tests of funnel plot asymmetry were carried out by conducting Egger's tests for two-level random effects models and modified Egger's tests for three-level random effects models. To conduct modified Egger's tests, three-level models were respecified to include the standard error of effect sizes as a moderator, which is

recommended when working with three-level meta-analyses (Viechtbauer, 2015). The intercepts from these modified tests were then examined to determine whether they significantly deviated from zero at $p < .05$, with significant values implying that the relationship between study precision and sample size was asymmetrical and therefore biased (Lin & Chu, 2018).

Statistical software

All analyses were conducted using the "rma" and "rma.mv" functions of the *metafor* package (Viechtbauer, 2010) in the program R Studio (Version 1.2.5033, RStudio Team, 2019). Three-level models were estimated according to the R syntax outlined by Assink and Wibbelink (2016).

Results

Study Selection and Characteristics

The search procedure yielded 57 eligible manuscripts completed between 1998 and 2019. Consistent with prior three-level meta-analyses, when manuscripts reported effect sizes for multiple independent samples or multiple manuscripts reported on the same sample of participants, each sample was treated as an independent study for coding and analysis (e.g. Assink et al., 2015) This process resulted in a total of $k = 64$ studies from which $u = 784$ effect sizes were extracted. Key characteristics of included studies and their corresponding manuscripts are detailed in Table 1.3.

Most manuscripts (N = 57) were peer-reviewed publications ($n = 37$, 64.91%), although 20 (35.09%) were classified as non-peer-reviewed gray literature. Eleven manuscripts reported results for a sample that overlapped with at least one other manuscript in this review, and eight manuscripts reported results for more than one sample of participants.

Individual studies (N = 64) evaluated a total of 77,519 participants. Sample sizes ranged from 26 to 31,742 (*M* = 1,211.23, *Mdn* = 218). Fifty-five studies provided information on the mean age of their sample, which ranged from 26.90 to 42.76 (*M* = 35.17, *Mdn* = 34.05). Fifty-eight studies provided specific information on the ethnic and racial composition of their sample. Among these 58 studies, 42 (72.41%) indicated that their sample was predominantly White, ten (17.24%) reported a predominantly African American or Black sample, four (6.90%) reported a predominantly "Non-White" sample, one (1.72%) reported a predominantly Hispanic/Latinx sample, and one (1.72%) reported a predominantly Native Hawaiian sample.

Most of the 64 studies in this review (*n* = 57, 89.06%) assessed recidivism among women in community settings, although seven (10.94%) investigated recidivism that occurred in institutional settings. Twenty-two studies (34.38%) used measures of recidivism that encompassed multiple forms of criminal behavior (e.g. probation/parole violations, arrests, and incarceration) following initial criminal justice involvement. The remaining studies assessed only one type of recidivism outcome, including arrests (*n* = 17, 26.56%), incarcerations (*n* = 14, 21.88%), prison misconducts (*n* = 7, 10.94%), convictions (*n* = 3, 4.69%), and new charges (*n* = 1, 1.6%). All studies used longitudinal designs, and 60 (93.75%) provided specific information regarding the exact months or days of their follow-up periods, which ranged from 3 to 96 months (*M* = 21.40 months, *Mdn* = 12 months).

Methodological Characteristics

Figure 1.2 illustrates the quality of the 57 included manuscripts as assessed using the MMAT. Forty manuscripts used quantitative, non-randomized designs and were assessed under this MMAT methodological category. Among these 40 manuscripts, the methodological quality was determined to be high overall: the majority (*n* = 27, 67.50%) were assessed as meeting 80% or more of the criteria specific to their methodological

category. The primary weakness among these manuscripts was a lack of detail regarding whether the sample was representative of the overall target population. Sixteen manuscripts were categorized as quantitative descriptive. The quality of these manuscripts was assessed as moderate, with half ($n = 8$, 50%) meeting 80% or more of the criteria specific to this category. Strengths of these manuscripts included the use of appropriate statistical analyses to answer research questions, However, only five manuscripts provided enough information to determine whether their sample or samples were representative. Finally, one manuscript used a randomized control trial (RCT) design. This manuscript met 60% of the assessed criteria, as the authors did not provide information regarding the comparability of groups at baseline or whether assessors were masked to intervention conditions.

Risk Domains

This analysis included a total of 19 risk domains (eight gender-neutral, six gender-responsive, and five "other") and 784 effect sizes (352 gender-neutral, 366 gender-responsive, and 66 "other"). Details of each risk domain can be found in Table 1.2. Eight gender-neutral risk domains corresponded to the RNR model's Central Eight risk factors (antisocial behavior, antisocial attitudes, antisocial associates, antisocial personality patterns, family and marital circumstances, school and work environments, substance misuse, and low levels of prosocial leisure or recreational activities). Six gender-responsive risk domains matched WRNA subscales associated with housing safety, financial needs, victimization, mental health problems, low self-efficacy, and parental stress. Finally, five "other" risk domains included age, race (non-White versus White), cohabitation (living with another person versus living alone), service-related needs, and lack of social support.

Meta-Analyses

Results from all meta-analyses are reported in Table 1.4. Sixteen risk domains were estimated using three-level random effects models and three were estimated using two-level

random effects models, as studies in the two-level models each contributed only one effect size. Forest plots for all risk domains can be found in Appendix C, which illustrate how effect sizes and 95% confidence intervals are distributed around the mean effect size for each domain.

Mean effect sizes for risk domains are reported using Pearson's *r*. Given that the base of recidivism in the present sample was 23.1%, values of .084, .206, and .320 can be used as criteria for interpreting these effect sizes as having small, medium, or large effects, respectively (Rice & Harris, 2005).

Gender Neutral Risk Domains

Significant average effect sizes were found for all gender-neutral risk domains with the exception of leisure/recreation, which was non-significant (*r* = .032, 95% CI: [-.034, .098]). Effect sizes for the remaining domains ranged from *r* = .147 (antisocial personality pattern) to *r* = .075 (family/marital). Using adjusted interpretation guidelines for Pearson's *r*, five domains had a small effect on recidivism (antisocial personality pattern, substance misuse, education/employment, antisocial behavior, antisocial associates), and two (antisocial attitudes, family/marital) had effect sizes that fell below the threshold of .084, suggesting that their impact on recidivism was very small.

Gender-Responsive Risk Domains

All six gender-responsive domains were found to have positive and significant effects on recidivism. Mean effect sizes ranged from *r* = .114 (financial needs) to *r* = .071 (parental stress). However, only two domains (housing safety and financial needs) could be considered as having a small effect on recidivism using the adjusted interpretation guidelines for Pearson's *r*, as the remaining mean effect sizes were below the threshold of .084.

With respect to specific subdomains associated with victimization and mental health, the magnitude of effect sizes was found to vary according to the type of victimization or

mental health symptom reported. The subdomains of psychosis (r = .146, 95% CI: [.067, .223]) and depression (r = .082, 95% CI: [.033, .132]) yielded mean effects that were larger than the average effect of the mental health domain as a whole (r = .080, 95% CI: [.053, .106]). Conversely, effect sizes for the PTSD subdomain were non-significant. The subdomains of child victimization (r = .078, 95% CI: [.045, .110]) and adult victimization (r = .081, 95% CI: [.047, .114]) produced slightly larger average effect sizes than the victimization domain as a whole (r = .075, 95% CI: [.052, .097]). However, the subdomain for sexual victimization was not found to be significant (r = .074, 95% CI: [-.003, .151]). These findings indicate that while victimization and mental health may be broadly related to women's recidivism, it is possible that the strength of their effects is impacted by the type of victimization and mental health problems experienced.

Other Risk Domains

None of the risk domains classified as "other" were significant, suggesting that neither service needs, age, cohabitation status, race, or social support were associated with future criminal offending.

Assessment of Bias

Inspection of contour enhanced funnel plots (see Appendix D) and results from Egger's tests (see Table 1.4) indicated significant asymmetry in 12 out of 19 risk domains (six gender-neutral, six gender-responsive). These findings suggest that publication or other potential causes of bias may have influenced the effect sizes evaluated in the present review (Egger et al., 1997). To further evaluate the potential for bias arising from publication status, subgroup analyses were conducted among risk domains that demonstrated high levels of variance to examine differences in the magnitude of effect sizes between published versus unpublished manuscripts. These results are presented below.

Subgroup Analyses

Fifteen risk domains (eight gender-neutral, four gender-responsive, and three "other") were found to have significant variance as indicated by (a) significant log-likelihood tests at level 2 or 3; or (b) I^2 values above 25%. These findings suggest that the observed variance in effect sizes within and/or between studies in these domains exceeded what could be explained by sampling variance or random error (Assink & Wibbelink, 2016). To explore this heterogeneity, subgroup analyses were conducted, which are displayed in Table 1.5.

Four of the 15 risk domains found to have significant variance did not have a significant overall mean effect on recidivism (leisure/recreation, age, race, service needs). Further, every subgroup examined among these domains also yielded non-significant effects, suggesting that these null findings were robust across the study and sample characteristics examined. Additionally, although the mean effect of antisocial attitudes was significant as a whole, when effect sizes were divided into subgroups for analyses, both subgroups often yielded non-significant mean effects. This suggests that this risk domain was likely insufficiently powered for subgroup analysis. Therefore, results from subgroup analyses are narratively summarized for ten risk domains: antisocial personality pattern, antisocial associates, substance misuse, education/employment, antisocial behavior, family/marital circumstances, housing safety, mental health, low self-efficacy, and victimization.

Turning first to publication status, larger mean effect sizes were observed among published manuscripts for three risk domains (education/employment, antisocial behavior, family/marital), and unpublished manuscripts for four risk domains (antisocial personality pattern, mental health, victimization, and low self-efficacy). Mean effect sizes among published and unpublished manuscripts were equivalent for the risk domains of antisocial associates and substance misuse. For the domain of housing, effect sizes from unpublished manuscripts were found to be smaller and non-significant compared to those from published manuscripts.

Results from subgroup analyses also suggested some variation in mean effect size with respect to conversion status. Re-estimation of mean effects with the omission of converted effect sizes did not change the substantive findings for any risk domain. However, differences in mean effect sizes between converted and unconverted effect sizes were found. Unconverted effect sizes produced slightly larger effect size estimates than converted effect sizes for seven risk domains (antisocial personality pattern, substance misuse, education/employment, antisocial behavior, antisocial associates, family/marital, mental health), and produced a slightly smaller mean effect for the domain of housing. Converted effect sizes also yielded smaller and non-significant mean effects than unconverted effect sizes for the domain of victimization.

It should be noted that all unconverted effect sizes were derived from models with no covariates, whereas converted effect sizes were largely estimated from multivariate analyses. As a result, converted effect sizes may have produced smaller estimates due to the attenuating influence of model covariates. In fact, effect sizes derived from studies that estimated risk factors using multivariate models were non-significant for seven risk domains (antisocial personality pattern, education/employment, antisocial associates, family/marital, housing safety, mental health, victimization), and were significant but smaller than bivariate effect sizes for the domains of substance misuse and antisocial behavior.

Average effect size estimates also differed in terms of the racial composition of study samples. Mean effect size estimates from studies with predominantly White samples were often larger than those found for predominantly non-White samples (substance misuse, education/employment, victimization). Further, mean effect sizes were non-significant among studies with predominantly non-White samples for the risk domains of antisocial personality pattern, antisocial behavior, antisocial associates, mental health, and housing safety.

However, effect size estimates from predominantly non-White samples were larger for the risk domain of self-efficacy and family/marital circumstances.

Discussion

The present systematic review and meta-analysis is the first to compile and quantitatively synthesize literature on both gender-neutral and gender-responsive risk factors for adult women's general recidivism. Results from this analysis suggest that among the 19 risk domains examined, the strongest risk factors for women's recidivism are antisocial personality patterns, financial needs, antisocial associates, and substance misuse. These findings suggest that while some gender-neutral risk factors play a central role in women's recidivism, justice-involved women also have risk factors for recidivism that extend beyond those identified in the RNR model, which should be addressed in correctional services delivered to this population.

Gender-Neutral Risk Domains

Significant overall effect sizes were found for all gender-neutral risk domains with the exception of leisure/recreation, which was found to have a positive yet non-significant relationship. The strongest mean effect was observed for the domain of antisocial personality pattern, and the weakest was observed for family/marital circumstances. These results affirm findings from prior reviews exploring the predictive validity of gender-neutral criminogenic risk factors among justice-involved women, which have found that exposure to these risk factors is associated with increases in subsequent recidivism (Olver et al., 2014; Rettinger & Andrews, 2010; Smith et al., 2009). They further suggest that the strongest gender-neutral risk factors for women include antisocial personality patterns, antisocial associates, substance misuse, and education/employment. However, these findings stand apart from prior research that suggests that among the gender-neutral risk factors, the *Big Four* risk factors of antisocial behavior, antisocial cognitions, antisocial personality patterns, and antisocial

associates have the strongest relationships with recidivism (Bonta & Andrews, 2017). By contrast, the present findings affirm recent studies in the gender-neutral literature, which have found no differentiation in the predictive strength of the Big Four and remaining gender-neutral risk factors (e.g. Grieger & Hosser, 2014; Gutierrez et al., 2013; Olver et al., 2014).

The non-significant mean effect size for the domain of leisure/recreation diverges from prior research on gender-neutral risk factors, which has identified this domain as one of the strongest predictors of recidivism (Bonta & Andrews, 2017). However, null findings in the present review find precedence in prior studies suggesting that women have lower levels of risk in this domain than men (Holsinger et al., 2003; Manchak et al., 2009; Olver et al., 2014; Raynor, 2007). Moreover, advocates of the RNR model have noted that the domain of leisure/recreation remains "woefully unexplored" (Bonta, 2019, p. 148)—an observation corroborated by the present review, which identified only 10 studies meeting inclusion criteria that evaluated this risk domain.

Gender-Responsive Risk Domains

The present findings also support the association between gender-responsive risk factors and recidivism. Results found that all gender-responsive risk factors were significantly and positively associated with future criminal offending. Whereas the strongest effects were observed within the domain of financial needs, the weakest effects were found for parental stress. However, a different picture came into view when the subdomains associated with mental health and victimization were examined. Slightly stronger effects were associated with adult victimization than child victimization, and non-significant effects were found for sexual victimization specifically. However, given that sexual victimization represents a more specific form of victimization than victimization occurring in childhood or adulthood generally, these findings may have been impacted by the relative rarity of this particular type of victimization. Moreover, symptoms of psychosis emerged as a stronger

predictor of recidivism than any other risk domain, including mental health problems as a whole. However, given the small number of studies that measured psychosis in isolation from other mental health symptoms ($k = 5$), these findings should be interpreted cautiously.

Overall, results from this analysis suggest that the strongest gender-responsive risk factors for women's recidivism are financial needs, housing safety, mental health, and low self-efficacy. These findings corroborate prior meta-analyses that have found both psychological problems and financial concerns to be predictors of recidivism for women (Eisenberg et al., 2019; Olver et al., 2014), and provide important supporting evidence for the importance of housing safety as a recidivism risk factor, which has been unexplored meta-analytically among justice-involved women. Although prior meta-analyses have examined self-efficacy as a risk factor, it has been collapsed into a broader risk domain of personal distress (Gendreau et al., 1996; Katsiyannis et al., 2018). Therefore, the present review also represents an important step forward for disentangling the unique impact of self-efficacy on the recidivism of justice-involved women.

Other Risk Domains

No significant effects were found concerning race, age, living with another person, or having a lack of social support on women's recidivism. Given that the mean effect sizes for antisocial associates and family/marital conflict were both found to be significant, null findings for the domain of social support suggest that the *quality* of relationships may be a more important predictor of recidivism than whether social support is actually received.

Subgroup Analyses

Subgroup analyses suggest that the strength of effect sizes observed among many of the risk domains in the present analysis were influenced by study and sample characteristics. Several notable findings from these analyses emerged.

First, unconverted effect sizes were associated with stronger effects for most risk domains. However, this may have been because unconverted effect sizes were all estimated from bivariate models, whereas converted effect sizes were estimated from models that often included covariate estimates. In line with this, effect sizes derived from multivariate studies were non-significant for seven of the evaluated risk domains, suggesting that mean effect sizes were heavily influenced by model covariates present when estimating the association between risk factors and recidivism.

Second, notable findings surfaced with respect to the racial composition of study samples. These findings suggest that although the risk domain of race (being non-White) did not significantly predict recidivism, racial identity may impact the *strength* of gender-responsive and gender-neutral risk factors. Effect sizes from studies evaluating predominantly non-White samples were smaller than those evaluating predominantly White samples for nearly every risk domain examined. Further, the mean effects for antisocial personality pattern, antisocial associates, mental health, and unsafe housing were found to be non-significant for predominantly non-White study samples. The findings are consistent with prior meta-analyses (Assink et al., 2015; Leticia Gutierrez et al., 2013; Olver et al., 2014) that have found that although race is not in itself a risk factor for offending, the effects of different risk domains on recidivism often differ for individuals of different racial and ethnic backgrounds. They also suggest that the risk domains evaluated in the present study may not be the strongest predictors of recidivism among women who do not identify as White, suggesting an urgent need for future research to further examine the factors influencing recidivism among racially and ethnically diverse samples of justice-involved women in the U.S.

Practice, Research, and Policy Implications Toward an Integrative Perspective

Findings from the present review have several important implications for the assessment and treatment of women in the U.S. correctional system. First, findings from this review support the importance of all but one of the Central Eight Risk factors for women's recidivism, providing evidence for their use in assessment instruments and their role as treatment targets in correctional interventions delivered to women (Bonta & Andrews, 2017). Second, results from this analysis suggest that in order to develop an integrative perspective, the risk and need principles of the RNR model should be expanded to include a specific focus on the gender-responsive risk factors that were found to be significant in this analysis.

With respect to the risk principle, findings suggest that actuarial instruments used to assess the criminogenic risk levels of justice-involved women should assess both the Central Eight risk domains *and* the domains of financial needs, housing safety, mental health, low self-efficacy, victimization, and parental stress. In terms of the need principle, results suggest that correctional services aiming to reduce recidivism may be most effective if they incorporate gender-responsive risk factors as treatment targets. In particular, the present results highlight that women's economic disenfranchisement is significantly associated with their ongoing criminal behavior. These findings lend support to the gender-responsive principles outlined by Bloom and colleagues in 2003, which assert that correctional services delivered to women should provide comprehensive, wraparound support that includes linkages to community resources that can help alleviate burdens associated with financial strain (Bloom et al., 2003). When delivered in conjunction with a CBT-based approach that also targets the Central Eight criminogenic needs that are most relevant for women's recidivism (Bonta & Andrews, 2017), such services could address women's criminogenic needs in a comprehensive and gender-responsive manner. However, this latter point should be interpreted with caution, as more research is needed to better understand whether the gender-responsive risk factors that were found to be significant in the present review function

as true dynamic criminogenic needs. Although many were associated with recidivism, it is possible that reductions in these risk factors may not correspond to subsequent reductions in recidivism.

Third, there is a need for research that examines *how* the gender-responsive risk factors examined in the present analysis impact recidivism. For example, proponents of the RNR model suggest that gender-responsive risk factors impact recidivism through their effects on engagement in correctional interventions—a claim that remains underexplored in criminal justice research (Bonta, 2019; Bonta & Andrews, 2017). Further, prior studies have found that associations between mental health and criminal recidivism may be due to higher levels of criminogenic risk factors present among justice-involved individuals with mental illnesses (Matejkowski & Ostermann, 2015; Wilson et al., 2014). Consequently, future studies should assess how (a) changes in the gender-responsive risk factors identified in the present review correspond with subsequent changes in criminal behavior, and (b) how interventions targeting these risk factors impact future criminal behavior, as both types of studies can reduce the threat of bias from alternative explanations that could otherwise account for the relationship between observed risk factors and criminal offending (Bonta & Andrews, 2017).

Fourth, researchers should foreground racial and ethnic differences when exploring associations between risk factors and women's criminal recidivism. Although gender-responsive research has emphasized the importance of acknowledging issues of race in correctional services delivered to women (Bloom, 2002), practical guidelines regarding how this goal is to be achieved are in need of further development (Boppre, 2019). Additionally, the predictive validity of risk assessment instruments—gender-responsive or otherwise—remains underexplored for racial and ethnic minority subpopulations. It is also possible that additional risk factors that were not explored in the present analysis may have been able to

better account for the recidivism among this population. Altogether, results from the present meta-analysis suggest that future research is urgently needed in order to identify recidivism risk factors for women of diverse racial and ethnic backgrounds, ensure that existing risk assessment instruments are accurately assessing their level of criminogenic risk, and determine how correctional services and policies can be made more responsive to the needs of this population.

Finally, the significant heterogeneity observed among many of the risk domains identified in the present study underscores the importance of future research examining specific characteristics of studies and samples that may impact the magnitude of effect sizes observed in the present analysis. Such research has the potential to advance knowledge of how factors such as outcome measures, follow-up times, assessment instruments, covariates examined, and the nature of prior offenses may account for the variation in effect sizes.

Limitations

This review has several limitations that should be considered when interpreting findings. Studies were limited to U.S. samples and therefore may not generalize to justice-involved women in other countries. Although the study protocol was comprehensive and designed to identify published and unpublished literature, it is possible that the studies identified in this review are not representative of all studies on hypothesized risk factors for women's recidivism. Moreover, the search, selection, and data extraction process were all carried out by one researcher. Consequently, it is possible that relevant research may have been missed.

The categorizations of risk domains associated with gender-responsive and gender-neutral literature were informed by extant research and risk assessment instruments. However, the diversity of studies in this review means that many of the risk factors reported by individual studies may not have optimally mapped onto how these risk factors were

conceptualized within gender-responsive and gender-neutral literature. Although risk domain classifications were reviewed by two members of the research team, other researchers may have coded individual risk factors in a different manner.

The present review also does not permit inference about causality, as the vast majority of included studies were observational. Further, many of the risk factors examined in this analysis co-exist and influence one another. However, because each risk factor was evaluated in a separate meta-analysis, it was not possible to examine combinations of risk factors or control for concurrent exposure to multiple risk factors. Therefore, future research should assess the influence of each of the risk factors identified in the present study in isolation as well as collectively to determine their unique contributions to recidivism. This point is particularly important given results from subgroup analyses indicating that effect sizes derived from multivariate analyses were associated with non-significant effects for seven risk domains.

Results from Egger's tests and inspection of funnel plots yielded evidence that publication bias (or other sources of bias) may have influenced the effect sizes in this meta-analysis. Consequently, caution is warranted when interpreting pooled effect sizes. It should also be noted that methods for assessing publication bias were originally developed for non-dependent effect sizes. Although modified Egger's tests were used to account for this, results from the funnel plots do not take into account effect size dependency and should be interpreted in light of this limitation (Peters et al., 2008).

Evaluation of the methodological quality of included manuscripts suggested that the majority of studies in this review were of moderate to high quality. However, manuscripts consistently lacked the information needed to determine whether participants were representative of the target population. In fact, only 19 manuscripts provided this information, which may have limited the external validity of the present review.

Finally, although the majority of gender-responsive and gender-neutral risk domains were statistically significant, they were all relatively small in magnitude. Although mean effect sizes were smaller than those found in prior literature examining specific assessment instruments or subpopulations of women, they are comparable to recent meta-analyses of recidivism predictors among U.S. adults (Katsiyannis et al., 2018). Further, prior meta-analyses have found that the Central Eight are stronger predictors of recidivism among Canadian samples than U.S. samples (Andrews et al., 2011; Gutierrez, 1994). Therefore, it is possible that limiting the analysis to U.S. samples may have influenced the strength of the mean effects observed in this review. Regardless, the small magnitude of mean effect sizes highlights a need for future research on factors beyond individual behavior that may also influence women's recidivism, such as policies impacting law enforcement efforts and sentencing practices (Owen et al., 2017). Such efforts can be used to inform the development of a more holistic strategy for reducing women's justice involvement.

Conclusions

The present review highlights two key findings. First, this review contributes to a well-established body of literature highlighting the predictive validity of all but one of the Central Eight risk domains. Second, significant and substantial effects were found for all of the examined gender-responsive risk factors. Collectively, these results suggest that exposure to gender-responsive *and* gender-neutral risk factors is associated with future criminal behavior, providing support for the importance of an integrative perspective of correctional rehabilitation that incorporates findings from gender-responsive and gender-neutral literature (Blanchette & Brown, 2006; Van Voorhis, 2012). Findings from the present study provide an important step forward for understanding which risk factors are the most relevant for justice-involved women. They further organize and provide direction for future research on how

these risk factors can be used to advance and improve risk assessments and intervention

strategies for women in the U.S. correctional system.

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PAPER 2: EXPLORING THE STUDY, SAMPLE, AND RISK FACTOR CHARACTERISTICS MODERATING THE RELATIONSHIPS BETWEEN WOMEN'S RISK FACTORS AND RECIDIVISM

The ability to accurately identify the factors that drive criminal behavior is integral to correctional theory, research, and practice. Risk factors for recidivism have been explored in depth over the past 40 years, providing an empirical foundation for correctional services and policies in the United States (U.S.). However, much of the supporting evidence for these factors is based on samples of justice-involved men (Blanchette & Brown, 2006; Hannah-Moffat, 2009; Salisbury et al., 2017). As a result, a growing body of research has begun to explore women's risk factors for recidivism and whether they differ from those of men.

It is well-established that women engage in less criminal activity than men (Becker & McCorkel, 2011; S. Brown et al., 2019; Steffensmeier & Allan, 1996). Women comprise a relative minority of the total correctional population—representing only 8% of people in prison (Carson, 2020) and 23% of individuals supervised in the community (Kaeble & Alper, 2020). Women also accounted for fewer than one-third (27.8%) of all new arrests in 2019 and had lower numbers of arrests than men across nearly every category of crime (Federal Bureau of Investigation [FBI], 2019). However, evidence suggests that the gender gap in crime narrows when examining *repeated* criminal behavior (Olson et al., 2016; Skeem et al., 2016). For example, cross-state estimates of individuals released from state prisons in 2005 found that within three years, 62.9% of women were arrested compared to 72.5% of men (Alper et al., 2018). Similar estimates were found among a 1994 cohort of people released from state prisons, which found that over the course of three years, 57.2% of women and 67.8% of men were re-arrested for a new crime (Deschenes et al., 2007).

The high rate of recidivism among justice-involved women is associated with significant individual and societal costs. In 2018, the average annual fee to incarcerate one person in federal prison was $36,299.75, or approximately $100 per day (Bureau of Prisons, 2018). In addition to being expensive, women's criminal justice involvement has harmful effects on their physical and psychological health. For example, women often enter correctional institutions with extensive histories of trauma, mental health concerns, and physical health problems (Daly, 1992; DeHart, 2018; DeHart et al., 2014; Green et al., 2016; Lynch et al., 2012), which are often exacerbated during confinement (Belknap et al., 2016; McConnell, 2017). Overcrowding, conflict with staff, separation from family, and lack of access to needed programming are common experiences in prison and have been found to increase women's risk for psychological distress, self-harm, and suicide (Fedock, 2017; Sharkey, 2010; Wright et al., 2012).

The criminal justice involvement of women also has a detrimental impact on their children. Over 60% of women in state prisons (Glaze & Maruschak, 2010) and 80% of women in jails (Swavola et al., 2016) have minor children, and the majority report being the primary caretaker of their children prior to their incarceration (Glaze & Maruschak, 2010; Swavola et al., 2016). Consequently, women's incarceration is often highly disruptive to their families. Research has found that the children of imprisoned mothers are more likely than those of imprisoned fathers to live with their grandparents or be placed into foster care (Cecil et al., 2008). In fact, increases in female imprisonment are estimated to account for approximately 30% of the rise in U.S. foster care caseloads between 1985 and 2000 (Swann & Sylvester, 2006). Although mothers on probation and parole may have greater physical proximity to their children, they also experience parenting challenges such as negotiating child custody status, managing parenting-related financial costs, and navigating the dual

requirements associated with motherhood and community supervision (Adams et al., 2017;
Barnes & Stringer, 2014; Brown & Bloom, 2009; Fedock et al., 2018; Godboldt, 2019).

Risk Factors

The costs and collateral consequences of women's criminal justice involvement
underscore the importance of understanding the factors that contribute to their recidivism. To
date, correctional services in the U.S. have largely been guided by the risk-need-responsivity
(RNR) model, which has been framed as a *gender-neutral* perspective, because it is believed
to apply equally to justice-involved men and women. (Bonta & Andrews, 2017). The RNR
model represents the culmination of decades of meta-analytic research and primary studies
(Andrews & Bonta, 2010; Bonta & Andrews, 2017)**,** which have found that although
correctional interventions as a whole are associated with modest reductions in recidivism,
there is significant heterogeneity in the efficacy of individual programs (Andrews, Bonta, et
al., 1990; Andrews, Zinger, et al., 1990; Bonta & Andrews, 2017). Exploration of this
heterogeneity led to the discovery that programs that induced changes in particular treatment
targets are associated with the largest reductions in recidivism (Dowden & Andrews, 2000).
These treatment targets, known as the *Central Eight,* include antisocial behavior, antisocial
attitudes, antisocial associates, antisocial personality patterns, family and marital
circumstances, school and work environments, substance misuse, and low levels of prosocial
leisure or recreational activities (Bonta & Andrews, 2017).

Since the initial identification of the Central Eight, subsequent meta-analyses have
affirmed that these factors are not only the most effective correctional treatment targets, but
also represent some of the strongest *predictors* of recidivism among justice-involved
individuals (Bonta et al., 2014; Bonta & Andrews, 2017; Gendreau et al., 1996; Grieger &
Hosser, 2014; Gutierrez et al., 2013; McGuire, 2004; Olver et al., 2014). Moreover, because
the RNR model is a gender-neutral perspective, the Central Eight are considered by many

scholars to be gender-neutral risk factors. As a result, the Central Eight have come to serve two key roles in the application of the RNR model to women. First, assessment of these risk factors is considered essential for determining men *and* women's level of risk for reoffending, which is then used to match them to appropriate levels of correctional services (the *risk principle*). Second, the RNR model asserts that if interventions delivered to men and women aim to reduce recidivism, they must target the malleable aspects, or *criminogenic needs* associated with the Central Eight (the *need principle;* Bonta & Andrews, 2017).

Gender-Responsive Risk Factors

Scholars have noted that the studies contributing to the development of the Central Eight have largely either evaluated predominantly male samples or have not disaggregated their findings by gender (Van Voorhis, 2012). Although subsequent studies have found that the Central Eight are also predictive of women's offending (e.g. Andrews et al., 2012; Dowden & Andrews, 1999; Lowenkamp et al., 2006; Olver et al., 2014; Smith et al., 2009), evidence also suggests that women experience a wider breadth of risk factors than what is recognized within gender-neutral literature. For example, women are more likely than men to have experiences related to trauma, mental health problems, financial needs, problems with housing safety, low self-efficacy, and parenting-related stress (Salisbury et al., 2017; Van Voorhis et al., 2010; Voorhis, 2012), which have been found to increase their subsequent criminal justice involvement (Adams et al., 2017; Holtfreter et al., 2004; Salisbury & Van Voorhis, 2009; Van Voorhis et al., 2010; Wright et al., 2012, 2012). However, there has been considerable variation in the estimated strength of the associations between these risk factors and recidivism, fueling an ongoing debate regarding which risk factors are the most relevant for women's recidivism (Andrews et al., 2012; Olson et al., 2016; Rettinger & Andrews, 2010; Voorhis, 2012).

Meta-Analyses

      Meta-analytic research is the empirical core of the RNR model, helping to develop and refine it based on findings from an ever-expanding body of correctional literature (Shaffer & Pratt, 2009). Yet because women comprise a relatively small proportion of the overall correctional population, they have often been underrepresented in meta-analytic syntheses of this literature. However, this has changed in recent years, as the sharp rise in women's criminal justice involvement over the past few decades has paralleled their growing representation in correctional scholarship (Kruttschnitt, 2016). This increase has made possible meta-analytic explorations of how both gender-neutral and gender-responsive risk factors influence women's recidivism.

      A recent meta-analysis of risk factors for women's recidivism found support for the relevance of both gender-neutral and gender-responsive risk factors (Parisi, 2021). In fact, among the 19 domains of risk that were examined, the four that were found to have the strongest relationships with recidivism were antisocial personality patterns, financial needs, antisocial associates, and substance misuse (Parisi, 2021). Results from this analysis are detailed in Table 2.1, which provides an overview of the mean effects of all 19 risk domains. Overall, these findings suggest the importance of an *integrative* perspective of correctional research that incorporates gender-responsive risk factors into the well-supported principles of the RNR model (Blanchette & Brown, 2006). However, this analysis also found significant variation in the effect sizes reported from primary studies, which suggests that outside factors may be influencing the strength of relationship between the gender responsive and gender neutral risk factors and women's criminal justice recidivism.

Exploring Heterogeneity

      Meta-analyses are often used in correctional research to evaluate the strength of the relationships between risk factors and recidivism (Bonta, 2019; Bonta & Andrews, 2017;

Gendreau et al., 1996; Katsiyannis et al., 2018). A key advantage of this technique that it synthesizes findings across primary studies into a single estimate of the mean effect of a given risk factor. However, it is often the case that there is considerable variation in the effect sizes reported by primary studies. When this occurs, a secondary and less-explored advantage of meta-analysis is the ability to explore potential sources of this variance (i.e., *heterogeneity*; Lipsey, 2003). Examinations of heterogeneity are made possible through moderation analyses, which allow researchers to examine how different study and sample characteristics (i.e., *moderators*) may influence the overall mean effect sizes generated through meta-analyses (Borenstein et al., 2011; Pratt, 2010). Consideration of moderators within meta-analyses is critical, as it has implications as to whether effect sizes "reflect empirical reality or are mainly a methodological artifact" (Pratt, 2010, p. 158). Consequently, there have been growing calls for an increased focus on such analyses within the context of correctional research (Shaffer & Pratt, 2009).

Evaluation of moderators in meta-analyses has played a foundational role in the development of the RNR model's core principles (Dowden & Brown, 2002; Landenberger & Lipsey, 2005; Lipsey, 2009; Lipsey et al., 2001; Olver et al., 2014; Wilson & Lipsey, 2007), including their applications to diverse groups of justice-involved individuals (Bonta et al., 2014; Gutierrez et al., 2013). More recently, moderation analyses have been extended to meta-analytic research on justice-involved women, and have helped to identify characteristics associated with powerful intervention effects among this population (Gobeil et al., 2016). However, few studies have examined moderators of gender-responsive and gender-neutral risk factors for women's recidivism. Nevertheless, this type of research is critical to identify sources of variability in effect size estimates from primary studies.

Potential Moderators of Risk Factors for Women's Recidivism

Prior studies have often produced conflicting findings regarding the association between gender-responsive risk factors, gender neutral risk factors, and women's recidivism (e.g. Dowden & Andrews, 1999; Gendreau et al., 1996; Holtfreter & Cupp, 2007; Reisig et al., 2006; Rettinger & Andrews, 2010). Consequently, more needs to be learned about *study characteristics* that may be contributing to the variability of effect size estimates reported in primary studies. Further, although some meta-analyses have examine gender as a moderator of the predictive validity of recidivism risk factors (Katsiyannis et al., 2018; Olver et al., 2014), there is a need for research examining how differences between women impact their risk factors for recidivism. Because women do not represent a homogenous group, examination of *sample characteristics* could enable a more nuanced understanding of how the RNR model's risk and need principles can be applied to diverse subpopulations of justice-involved women, such as women who have been charged with violent crimes. Finally, because studies often operationalize risk factors in different ways, moderation analyses provide an opportunity to examine how different *risk factor characteristics* may influence their impact on recidivism. To this end, prior research has identified several study, sample, and risk factor characteristics that may moderate the impact of risk factors on the recidivism of justice-involved women.

Study Characteristics

Publication Year. Prior meta-analyses have found differences in the statistical significance of risk factors for recidivism depending on the period of publication that is examined. For example, a recent meta-analysis conducted by Katsiyannis and colleagues (2018) examined predictors of adult recidivism from the 1994 to 2015 as a follow-up to a prior meta-analysis of risk factors published by Gendreau and colleagues in 1996. Although Gendreau and colleagues originally identified 18 statistically significant risk factor domains,

Katsiyannis and colleagues found that only 11 of these domains were significant when examined in this more recent time period. These findings suggest that the significance of some recidivism risk factors may vary with respect to the year in which primary studies are published (Gendreau et al., 1996; Katsiyannis et al., 2018).

Peer-Review Status. Publication bias is a common issue in meta-analysis, with evidence suggesting that in general, studies reporting significant and larger effect sizes are more likely to be published than similar studies reporting smaller effect sizes or null findings (i.e., the *file-drawer* problem; Borenstein et al., 2011; Rothstein et al., 2005). Several approaches can be used to assess for the potential for publication bias in meta-analyses, including funnel plots and Egger's tests (Rothstein et al., 2005). However, moderation analyses can also be used as a supplemental tool to compare the mean effect sizes from published and unpublished studies, and have been conducted in prior meta-analytic reviews of risk factors for recidivism (e.g. Dowden & Brown, 2002).

Follow-Up Period. Prior studies of the Central Eight risk factors have found that longer follow-up periods are associated with increased predictive strength of risk assessment instruments, as the opportunity to recidivate increases the longer this data is collected (Andrews et al., 2011).

Covariates. Primary studies often differ with respect to whether they report bivariate or multivariate effect sizes, as well as the type and number of covariates that are estimated in multivariate models, all of which can increase the heterogeneity of the effect sizes that are ultimately synthesized in a meta-analysis (Higgins et al., 2019). Although excluding studies that report multivariate effect sizes can reduce this heterogeneity, this approach limits the number of studies available to analyze and can bias mean effect sizes (Voils et al., 2011). Consequently, moderation analyses are recommended to examine how different types of covariates may impact effect size estimates of primary studies (Voils et al., 2011). Two

covariates that have been identified as having an influence on the association between risk factors and recidivism are whether individuals are receiving treatment services (Gendreau et al., 1996) and whether models statistically adjust for multiple risk factors (Greiner et al., 2015), suggesting their importance as potential moderators.

Validated Assessment Instrument. An essential principle of the RNR model is that risk levels should be assessed using empirically validated measures, as non-validated measures or clinical judgement alone are less accurate methods of assessing an individual's risk of reoffending (Bonta & Andrews, 2017). The use of valid and reliable measures is also critical for the assessment of gender-responsive risk factors, particularly with respect to experiences of victimization (Macy, 2008). Consequently, whether or not risk factors are measured using empirically validated instruments may impact the strength of their relationship with recidivism.

Type of Recidivism. There is no agreement in the literature on the best measure of recidivism. Rather, studies engage many different ways to measure recidivism, which can influence the conclusions drawn from correctional research (Ostermann et al., 2015) and limit comparison of recidivism outcomes across studies (Andersen & Skardhamar, 2017). Consequently, past meta-analyses of risk factors for recidivism have identified the outcome used to measure recidivism as an important moderator to examine (Eisenberg et al., 2019).

Sample Characteristics

Sample Mean Age. Research has found conflicting results with respect to how age relates to women's recidivism. Whereas some studies have found positive associations between age and recidivism (Stuart & Brice-Baker, 2004), others have found that women's risk for recidivism decreases with age (Olson et al., 2016), suggesting the need to examine how the mean age of study samples may impact the relationship between risk factors and recidivism.

Sample Racial/Ethnic Identity. Racial and ethnic diversity is a significant consideration when examining risk factors for criminal justice involvement. Prior research on the Central Eight has found that these risk factors are relevant to racial and ethnic minority individuals, although these populations have been found to have higher levels of criminogenic risks overall (Olver et al., 2014). However there is a need to better understanding of how the effect of gender-responsive and gender-neutral risk factors on recidivism may be conditioned by the *intersection* of race and gender (Ropes Berry et al., 2020). Women of color are disproportionately represented in the criminal justice system and have been found to be arrested and incarcerated at higher levels than their White counterparts. For example, in 2019, Black women and Hispanic/Latinx women were incarcerated at rates far exceeding those of White women (83 and 63 vs 48 per 100,000 women, respectively; Carson, 2020). Consequently, the racial and ethnic composition of study samples is important to examine to determine its potential influence on the impact of risk factors on women's recidivism.

Violent Offense. When women recidivate, it is most often for property- or drug-related crimes (Huebner et al., 2010). Within the U.S. criminal justice system, women represent a small proportion of those arrested and sentenced for a violent offense. According to the National Crime Victimization Survey (NCVS), only 21.4% of reported violent incidents are committed by women (Morgan & Truman, 2019). However, research suggests that women who commit violent crimes represent an important correctional subpopulation (Kubiak et al., 2012), with rates of recidivism that are often lower than women who commit other types of offenses (Stuart & Brice-Baker, 2004). Moreover, women's violence is often linked to people they know, and can occur in the context of intimate partner violence (Macy et al., 2012; Owen et al., 2017; Rizo et al., 2018). Therefore, the percentage of women in

study samples whose present offenses are classified as violent may have an important impact on the strength of different risk factors on recidivism.

Risk Factor Characteristics

Risk factors often describe broad domains that can in fact represent more specific areas of risk. For example, although personal and emotional problems have been examined as a risk factor for recidivism (Gendreau et al., 1996), scholars have noted that examining broad domains related to general mental health may fail to capture the specific influence of particular mental health disorders such as depression, anxiety, or psychosis on women's recidivism (Van Voorhis et al., 2010). Moreover, although victimization is also often examined broadly as a risk factor, research suggests that there may be differences between how victimization as a child, adult, or sexual victimization at any age impact women's recidivism (Van Voorhis et al., 2008). In order to shed light on how mental health and experiences of victimization impact women's criminal behavior, it is therefore important to examine whether effect sizes vary among studies based on either specific mental health disorders or forms of victimization.

The Current Study

In light of the research highlighted above, the goal of the present study was to examine whether the aforementioned factors influenced the strength of the association between gender-responsive and gender-neutral risk factors and recidivism. To accomplish this goal, meta-regression was used to investigate potential moderators of the relationships between gender-responsive and gender-neutral risk factors for women's recidivism. This analysis addressed the following questions: (1) To what extent do the effects of gender-responsive and gender-neutral risk factors on recidivism vary by study-level characteristics? (2) To what extent do the effects of gender-responsive and gender-neutral risk factors on recidivism vary by sample-level characteristics? (3) To what extent to the

effects of gender-responsive and gender-neutral risk factors on recidivism vary by risk-factor characteristics?

Methods

This study is an extension of a prior meta-analysis by the author (Parisi, 2021). Therefore, the methods used to conduct the meta-analysis in the present study are described in this earlier manuscript, including the search process, inclusion/exclusion criteria, coding framework for risk domains, and statistical methods for calculating mean effect sizes. Details of this process are briefly summarized below.

Search Process

The methodology for the systematic review and meta-analysis was based on guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA; Moher et al., 2009). Studies were considered eligible for the present review if they met the following criteria: (a) included women over the age of 18 with current or previous justice involvement in the U.S.; (b) included at least one follow-up period with a measure of recidivism as an outcome; (c) included sufficient statistical information to allow for the calculation of an effect size; (d) included a measure assessing at least one risk factor for recidivism; (e) evaluated samples in the U.S.; and (f) were published in English. Both published and unpublished literature were included, and recidivism was defined as any criminal justice contact following an initial offense.

A systematic, computerized literature search strategy was developed that included a combination of free-text and controlled vocabulary tailored to five databases: PychInfo, Web of Science, Sociological Abstracts, and Proquest Criminal Justice. The author conducted title and abstract searches and full-text reviews to identify articles meeting inclusion criteria. To identify additional literature not captured in the initial search, several experts in the gender-

responsive field were contacted, and reference harvesting methods were used. This process

resulted in a final sample of N = 57 manuscripts evaluating k = 64 primary studies.

Coding

Extracted data included information related to study characteristics and reported risk

factors. These risk factors were then coded into 19 *risk domains* reflecting gender-responsive

risk factors, gender neutral risk factors (the Central Eight), and "other" risk factors that did

not correspond to either body of literature. Data extraction and coding were conducted by the

author, and all risk domains were examined by another member of the research team, who

provided feedback on initial categorizations of risk factors. All risk domains were

subsequently re-coded by the author to incorporate this feedback, resulting in the final coding

structure used for the present analysis.

Effect Size Calculation

Pearson's r was selected as the effect size metric for analysis, as it was the most

commonly reported effect size among primary studies. Effect sizes reported in other metrics

were converted using formulas outlined by Borenstein et al (2011) and Ruscio (2008).

Bivariate effect sizes were prioritized for extraction and analysis and adjusted effect sizes

were extracted when calculation of unadjusted effects was not possible. *R* values were

transformed into Fisher's z for analysis and then converted back into Pearson's r for

presentation (Borenstein et al., 2011).

Pearson's r values of .1, .3, and .5 are typically interpreted as small, medium, and

large effects when base rates of recidivism are approximately 50%. However, these values

require adjustment when base rates for recidivism are higher or lower than 50%, which is

common within correctional research (Rice & Harris, 2005). Given that the base rate of

recidivism in the present sample was 23.1%, values of .084, .206, and .320 were used as

criteria for interpreting effect sizes in this analysis as having small, medium or large effects, respectively (Rice & Harris, 2005).

Meta-analyses

A separate meta-analysis was conducted for each of the 19 risk domains examined in this study, as each domain represented a distinct risk factor for recidivism. All meta-analyses were estimated using random effects models, which assume that the true effect of a given relationship varies across studies (Borenstein et al., 2010). Random effects models most frequently estimate two levels of variance: sampling variance and the variance of effect size between studies. A crucial assumption of this two-level structure is statistical independence, meaning that each study should contribute only one effect size (Cheung, 2019). However, many studies in the present analysis reported more than one effect size that could be coded under a single risk domain, violating this assumption of independency and resulting in a nested structure in which multiple effect sizes were clustered within primary studies (Van den Noortgate et al., 2013).

To account for this nested structure, 16 risk domains in which studies contributed more than one effect size were estimated using three-level random effects models (Assink & Wibbelink, 2016), and three risk domains in which each study contributed only one effect size were estimated using two-level random effects models (Borenstein et al., 2011). Three-level random effects models extend two-level random effects models by accounting for three levels of variance: sampling variance from individual effect sizes, (level 1) variance between multiple effect sizes drawn from the same study (level 2), and variance between effect sizes from separate studies (level 3; Cheung, 2019; Fernández-Castilla et al., 2020; Van den Noortgate et al., 2015; Van Den Noortgate & Onghena, 2003).

All 19 meta-analyses were conducted in three steps. First, intercept-only two- and three-level models were estimated to determine the overall mean effect of each risk domain

on recidivism. Second, the heterogeneity of effect sizes from primary studies was calculated to determine whether it was large enough to warrant moderation analyses. Methods for estimating heterogeneity differed depending on whether random effects models had two or three levels.

For two-level models, heterogeneity among effect sizes from primary studies was examined by calculating I^2 and τ statistics (Borenstein et al., 2011). When the I^2 statistic exceeded 25%, this was interpreted as signaling the presence of moderate-to-high variance in effect sizes that justified further investigation of moderators (Higgins, 2003). For three-level models, an overall I^2 statistic was estimated and partitioned across levels 2 and 3 to provide an estimate of the variance within and between studies. The variance at level 1 (sampling variance) was treated as known and calculated using the formula provided by Cheung (2014, p. 2015). Two separate one-tailed log-likelihood ratio tests were estimated to compare the deviance of models estimating the variance at level 2 (σ_1^2) and level 3 (σ_2^2) with models in which either parameter was constrained to zero (Assink & Wibbelink, 2016). Significant log-likelihood tests were interpreted as indicating that the variance in effect size estimates reported by the same study (level 2) or from different studies (level 3) was larger than what could be explained by sampling variance or chance and should be explored through a third step of analyzing potential moderating variables (Van den Noortgate et al., 2015). Fifteen risk domains had I^2 values that exceeded 25% (for two-level models), or significant log-likelihood ratio tests (for three-level models), indicating that there were large enough levels of variation between effect sizes to merit investigation of moderators that may explain this heterogeneity. These studies were used as the basis for the present analysis.

Moderator Analyses

Meta-regression was performed for the 15 risk domains that had significant levels of heterogeneity to examine potential moderators that may have contributed to within- or

between-study variance (Assink & Wibbelink, 2016). A total of 20 dichotomous and continuous potential moderating variables were coded from available data reported in primary studies and used as predictors for meta-regression. Of these 20 moderators, 14 reflected study and sample characteristics that have been identified as sources of variation in meta-analyses generally or in the estimation of risk factors specifically. These variables were tested across all risk domains. The remaining 6 of the 20 moderators reflected risk factor characteristics: three specific potential moderating variables were examined for the domain of mental health, and three specific potential moderators were examined for the risk domain of victimization. These six potential moderators were only evaluated for their respective domain. All categories of potential moderating variables (study, sample, and risk-factor characteristics) are described below.

Potential Moderators

Study characteristics:

- Publication status (dichotomous): whether a study corresponded to a manuscript published in a peer-reviewed journal. When more than one manuscript reported on a single study, this study was considered to be peer reviewed if at least one manuscript was published.

- Publication year (continuous): the year a manuscript was published.

- Follow-up in months (continuous): the number of months reported for study follow-up periods.

- Controlled for risk (dichotomous): whether the effect size reported for the relationship between risk factors and recidivism was estimated in a model that controlled for other risk factors.

- Controlled for treatment participation (dichotomous): whether the effect size reported for the relationship between risk factors and

68

recidivism was estimated in a model that controlled for women's participation in treatment.

- Validated assessment tool (dichotomous): Whether a risk factor was measured using a validated assessment tool.

- Arrest outcomes (dichotomous): Whether a study measured recidivism solely based on the presence of new arrests.

- Conviction outcomes (dichotomous): Whether a study measured recidivism solely based on a conviction(s) for a new offense.

- Incarceration outcomes (dichotomous): Whether a study measured recidivism solely based on a subsequent incarceration.

- Misconduct outcomes (dichotomous): Whether a study measured recidivism solely based on the presence of misconducts or behavioral infractions while incarcerated.

- Mixed recidivism outcomes (dichotomous): Whether a study measured recidivism using several different indicators of recidivism. For example, a recidivism outcome was considered to be mixed if participants were considered recidivists if they were re-arrested *or* re-convicted.

Sample characteristics:

- Age (continuous): the mean age of study samples.

- Violence (continuous): the percentage of women whose current offense was violent.

- Sample racial/ethnic identity (continuous): the percentage of White women in study samples.

Risk factor characteristics:

- Mental health:

    o Depression (dichotomous): whether a risk factor in the mental health domain solely measured depression.

    o Psychosis (dichotomous): whether a risk factor in the mental health domain solely measured psychosis.

    o Posttraumatic stress disorder (PTSD; dichotomous): whether a risk factor in the mental health domain solely measured PTSD.

- Victimization:

    o Victimization as a child (dichotomous): whether a risk factor in the victimization domain solely measured victimization that occurred during childhood.

    o Victimization as an adult (dichotomous): whether a risk factor in the victimization domain solely measured victimization that occurred during adulthood.

    o Sexual victimization (dichotomous): whether a risk factor in the victimization domain solely measured sexual victimization, which may have occurred at any age.

Analysis of Moderators

Both univariate and multivariate meta-regressions were performed on risk domains that were found to have significant heterogeneity to determine whether any of the above variables moderated the mean effect of each risk domain on recidivism. To test the impact of potential moderating variables on the relationship between risk domains and recidivism, each variable's distribution was first examined to determine whether a sufficient number of studies were present to conduct a moderation analysis. As recommended by Fu et al. (2011) variables were only tested as moderators when each level of dichotomous moderators

contained at least four studies, and at least six studies were available for continuous moderators. As a result, potential moderators were not tested for the risk domain of "service-related needs" given that only $k = 3$ studies reported on risk factors that were categorized into this domain. Therefore, 14 study-and sample-level variables were tested as potential moderators for 14 risk domains (antisocial personality pattern, antisocial associates, substance misuse, education/employment, antisocial behavior, antisocial attitudes, family/marital, leisure/recreation, housing safety, mental health, low self-efficacy, victimization, age, and race), three risk factor-level variables were tested as potential moderators for the risk domain of mental health, and three risk factor-level variables were tested as potential moderators for the risk domain of victimization, for a total of 20 potential moderators.

Moderation analyses were conducted in three steps. In the first step, dummy variables were created for dichotomous variables, and continuous variables were centered around their means. In the second step, univariate meta-regressions were conducted in which potentially moderating variables were added as covariates into separate intercept-only two and three-level meta-analytic models. In the third step, moderating variables that were found to be significant in univariate analyses were tested simultaneously in a multivariate meta-regression model to determine their combined effect on their respective risk domain. Because moderating variables are often interrelated, it can be difficult to determine their unique impact on an overall mean effect size when estimated separately (Lipsey, 2003). Therefore, the purpose of this third step was to test the effect of each moderator while holding the other moderators constant to control for potential cofounding, thus enabling examination of their unique influence on the relationships between risk factors and recidivism (Assink & Wibbelink, 2016).

All models were estimated using the Restricted Maximum-Likelihood (REML) estimator (Pastor & Lazowski, 2018). Additionally, the Knapp-Hartung adjustment was used in order to minimize the likelihood of Type I errors (Knapp & Hartung, 2003). Because of this adjustment, regression coefficients of individual moderating variables were tested using a *t* distribution, and omnibus tests that group mean effect sizes were equal to zero followed an *F* distribution (Knapp & Hartung, 2003).

Statistical software

All analyses were conducted using the "rma" and "rma.mv" functions of the *metafor* package (Viechtbauer, 2010) in the program R Studio (Version 1.2.5033, RStudio Team, 2019). Three-level models were estimated according to the R syntax outlined by Assink and Wibbelink (2016).

Results

The meta-analysis in the present study examined 57 manuscripts describing a total of $k = 64$ unique studies from which $u = 784$ effect sizes were extracted. These effect sizes reflect the effects reported by primary studies and were used to calculate overall mean effects in the meta-analysis. Individual studies (N = 64) evaluated a total of 77,519 participants. Information about the aggregate characteristics of included studies and their samples can be found in Table 2.2.

An overview of the mean effects and variance components of all risk domains is presented in Table 2.1. Each effect represents the total mean effect of the risk domain on recidivism. Given that the base of recidivism in the present sample was 23.1%, values of .084, .206, and .320 can be used as criteria for interpreting effect sizes as having small, medium or large effects, respectively (Rice & Harris, 2005).

Overall, mean effects were estimated for 19 separate risk domains: eight corresponded to the RNR model's Central Eight risk factors (antisocial behavior, antisocial

attitudes, antisocial associates, antisocial personality patterns, family and marital

circumstances, school and work environments, substance misuse, and low levels of prosocial

leisure or recreational activities), six domains reflected gender-responsive risk factors

(financial needs, housing safety, mental health, low self-efficacy, abuse, and parental stress),

and five domains examined "other" risk factors that did not correspond with either theoretical

perspective (lack of social support, cohabitation, service needs, age, and race). Although the

majority of risk domains were estimated using three-level models, three (antisocial attitudes,

leisure/recreation, and age) were estimated using two-level models, as studies in these

domains each contributed only one risk factor.

Heterogeneity

In total, eight gender-neutral risk factors (the Central Eight), four gender-responsive

risk factors (housing safety, mental health, low self-efficacy, abuse), and three "other" risk

factors (service needs, age, and race) demonstrated evidence of heterogeneity as indicated by

significant log-likelihood tests or I^2 statistics that exceeded 25%. However, because the

domain of service needs included only $k = 3$ studies, it was excluded from moderation

analyses, as sufficient numbers of studies were not available to examine continuous or

categorical moderators (Fu et al., 2011).

Moderation Analyses

To investigate differences in effect sizes within and/or between studies for each risk

domain, moderation analyses were performed for the 14 risk domains for which

heterogeneity was detected and enough studies were available for analysis. These analyses

are detailed in Table 2.3, where moderators are classified by study, sample, and risk-factor

characteristics.

Up to 20 separate moderation analyses were conducted for each of the 14 risk

domains: 14 reflected study- or sample-level characteristics, three represented risk factor

characteristics specific to the domain of mental health, and three represented risk factor characteristics specific to the domain of victimization. Each moderation analysis represents a unique row in Table 2.3. When a row/moderating variable is missing for a given risk domain, this because there were not enough studies reporting on this moderating variable to permit analysis of its effects.

Study-Level Characteristics

Publication status, publication year, length of follow-up periods, adjusting for risk factors, adjusting for treatment participation, use of validated assessment instruments, reporting mixed recidivism outcomes, and reporting arrest outcomes were all found to moderate the strength of the relationship between at least one risk domain and women's recidivism. Conversely, using conviction or incarceration as a measure of recidivism was not found to moderate any risk domain's relationship to recidivism.

Publication Status. Publication status was found to moderate the relationship between victimization and recidivism, such that larger mean effects were observed among unpublished studies ($r = .117$, 95% CI [.081, .155]) compared to published studies ($r = .054$, 95% CI [.031, .077]).

Publication Year. Publication year was found to moderate the effect of antisocial attitudes on recidivism ($F[1, 8] = 13.888$, $p = .006$), suggesting that the association between this risk factor and recidivism increased as studies were more recently published.

Follow-up in Months. The effect of antisocial behavior on recidivism was moderated by the length of follow-up period of primary studies ($F(1,71) = 4.072$, $p = .004$), indicating that longer follow-up periods were associated with slightly lower effects of antisocial behavior on recidivism. However, this effect was no longer significant when examined in a subsequent multivariate model.

Covariates. The use of covariates to statistically adjusted for the effects of other risk factors was found to moderate the impact of the risk domains of antisocial associates, family/marital problems, education/employment, mental health, and victimization such that the use of covariates was associated with smaller and insignificant mean effects on recidivism. Likewise, for the risk domain of victimization, effect sizes in the original analysis that included variables that controlled for the effect of treatment participation ($r = .015$, 95% CI [-.026, .057]) were associated with smaller and non-significant effects compared to those that did not control for treatment participation ($r = .086$, 95% CI [.065, .108]), although the moderating effect of either covariate (risk factors or treatment participation) was no longer significant for this domain when examined together in a multivariate meta-regression. Collectively, these findings suggest that the relationship between antisocial associates, family/marital problems, education/employment, and mental health on recidivism may be reduced when models include covariates that adjust for the influence of other risk factors.

Validated Assessment Instruments. The use of validated assessment tools to measure risk factors was found to moderate the effects of the domain of antisocial behavior on recidivism. Whereas non-validated assessment instruments such as ad-hoc measures yielded an insignificant mean effect size ($r = .026$, 95% CI [-.013, .066]), the use of validated assessment tools was associated with significant effects that were noticeably larger than the mean effect size estimated for this risk domain in the meta-analysis from which the present analysis is based ($r = .143$ vs $r = .084$), suggesting that the observed impact of antisocial behavior on recidivism may have been diminished by the use of non-validated instruments or single-item indicators of antisocial behavior.

Outcome measure. Significant moderating effects were observed for different measures of recidivism in two risk domains: antisocial personality pattern and race. For antisocial personality pattern, primary studies that used arrests as the indicator of recidivism

(r = .042, 95% CI [-.069, .153]) produced a non-significant mean effect, whereas studies

evaluating other measures of recidivism (r = .176, 95% CI [.116, .235]) yielded a positive

and significant mean effect. Moreover, although the risk domain of race was non-significant

in the meta-analysis from which this analysis is based (r = .002, 95% CI [-.032, .033]), the

association between race and recidivism was moderated by the use of multiple indicators to

assess recidivism. This finding suggests that belonging to a racial or ethnic minority group

(as opposed to being White) had a significant and negative impact on recidivism for studies

only when recidivism was measured using mixed measures of recidivism (r = -.083, 95% CI

[-.164, -.001]) as opposed to unidimensional recidivism outcomes (r = .014, 95% CI [-.019,

.047]).

Sample-Level Characteristics

Although race was examined as a risk domain (Non-White versus White participants),

it was also evaluated as a study-level moderator (the percentage of White women in study

samples). Among the sample-level potential moderators that were evaluated, this was the

only variable that was found to impact the overall mean effect of any of risk domain. By

contrast, participant mean age or the percentage of participants whose current offense was

violent did not moderate the mean effects of any given risk domain.

Percentage of White Women. The percentage of White women in study samples was

found to significantly moderate the effect of antisocial associates (F[1, 28] = 4.745, p = .038),

substance misuse (F[1, 61] = 4.053, p = .049), and mental health (F[1, 59] = 6.538, p = .013)

on recidivism, which all slightly increased in proportion to the percentage of White women in

study samples. However, omnibus tests for multivariate meta-regressions for antisocial

associates and mental health were non-significant when this potential moderator was

examined simultaneously with other variables, suggesting that its effects on these domains

was not robust. Overall, findings suggest that the risk domain of substance misuse may have slightly stronger effects on the recidivism of White women compared to non-White women.

Risk Factor Characteristics

Moderating effects were not observed for any of the risk factor characteristics examined in the domains of mental health (depression, psychosis, PTSD) or victimization (childhood victimization, victimization as an adult, or sexual victimization), suggesting that the type of mental health diagnosis or victimization examined by primary studies did not significantly impact the overall effect of either domain on recidivism.

Multiple Moderators

Univariate meta-regression models yielded multiple significant moderators in four risk domains: antisocial associates, antisocial behavior, mental health, and victimization. Consequently, multivariate meta-regression was conducted to examine whether the statistical significance of these moderators was upheld when evaluated simultaneously in a multivariate meta-regression model. For the domain of antisocial associates, the omnibus test of this analysis was found to be non-significant ($F[2, 24] = 3.098$, $p = .064$) suggesting that neither (a) the proportion of White individuals in study samples or (b) the inclusion of covariates adjusting for other risk factors moderated this domain. Similarly, a non-significant omnibus test was obtained for mental health ($F[2, 58] = 2.995$, $p = .058$), suggesting that neither (a) adjusting for risk factors and (b) the percentage of White women in study samples significantly moderated the impact of mental health on recidivism after statistically adjusting for the effects of one another. For the domain of antisocial behavior, the omnibus test for a multivariate model was significant, ($F[2, 70] = 8.669$, $p = .004$), as was the use of a validated assessment instrument ($r = .115$, 95% CI [.050, .180]), suggesting that the instrument used to measure antisocial behavior moderated the strength of antisocial behavior on recidivism even after accounting for the length of the follow-up period examined. For the domain of

77

victimization, the moderating effects of using a validated assessment instrument (r = .048, 95% CI [-.005, .102]), controlling for whether or not women in primary studies participated in treatment programs (r = .074, 95% CI [-.255, .387], and whether other risk factors were controlled for (r = -.116, 95% CI [-.424, .215), were no longer found to moderate the strength of this risk domain when evaluated simultaneously in a multivariate model. However, the overall omnibus test was found to be significant (F[4, 76] = 4.608, p = .002), as was the estimate for publication status (r = -.051, 95% CI [-.096, -.006] implying the impact of publication status on the mean effect of victimization on recidivism was not confounded by any of the other variables in this model.

Discussion

Emerging evidence on justice-involved women has expanded the possibility of engaging the same meta-analytic tools on this body of literature that have been critical to the development of gender-neutral research. Although prior studies have examined how the relationships of various risk factors and criminal behavior are impacted by differences among the methods, samples, and risk factor characteristics of primary studies (e.g. Assink et al., 2015; Eisenberg et al., 2019; Gutierrez et al., 2013; Olver et al., 2014), few studies have extended these analyses to justice-involved women. The present study represents the first moderation analysis of meta-analytic findings of gender-neutral *and* gender-responsive risk factors on women's recidivism.

In total, 9 of the 14 moderators examined in this analysis were found to have a significant moderating effect on at least one risk domain. These included publication status, the year of publication, the use of a validated assessment tool, arrest outcomes, mixed recidivism outcomes, controlling for the effects of other risk factors, controlling for the effects of women's treatment participation, the percentage of White women in study samples, and the length of the follow-up period. Conversely, no moderating effects were found for the

use of incarcerations, convictions, or prison misconducts as indicators of recidivism, the proportion of women in study samples whose current offense was classified as violent, or the mean age of study samples. Further, no moderating effects were found with respect to the specific risk factor outcomes that were examined in the domains of mental health or victimization.

In total, results suggest that study and sample characteristics significantly impacted the effects of seven gender-neutral risk domains (antisocial personality pattern, antisocial associates, substance misuse, education/employment, antisocial behavior, antisocial attitudes, family/marital), two gender-responsive risk domain (mental health, victimization), and one "other" risk domain (race) on recidivism. By contrast, no moderating effects were observed that significantly impacted (a) the positive associations observed between housing safety, low self-efficacy, and recidivism, or (b) the non-significant associations between leisure/recreation and age on recidivism.

Examination of moderating effects resulted in several notable findings. First, the moderators that were found to impact risk domains most consistently and significantly were study-related characteristics, and most frequently whether effect sizes were derived from models that controlled for other risk factors. This suggests that for four risk domains (antisocial associates, education/employment, family/marital, mental health), the effect sizes reported in this analysis may in fact represent an underestimation of their true effects, as moderation analyses consistently found that effect sizes derived from studies controlling for risk factors were non-significant compared to effect sizes from bivariate models. This also suggests that the effects of these four risk domains on recidivism may have been confounded by other covariates, indicating the need for future research examining the relative, incremental, and interactive contributions of the risk factors examined in the present study.

Second, it is noteworthy that adjusting for treatment participation had no bearing any of the effect of any risk domains on recidivism that were examined in this analysis. Collectively, these findings provide some support for the robust nature of the risk domains examined in the present study, as participation in treatment programs may have mitigated the impact of risk domains on recidivism if women attended services that effectively targeted needs related to these domains. However, caution is warranted when interpreting this finding, as there was significant variation respect to the number and nature of treatment programs women in primary studies attended, the length of time in which they attended, and the proportion of women in study samples that received any kind of intervention services.

Third, the effect of risk domains on recidivism was found to be robust to the outcome measure used to assess repeated criminal offending across all domains with the exception of antisocial personality pattern and race. Although antisocial personality pattern is generally considered to be one of the strongest predictors of recidivism (Bonta & Andrews, 2017), it was not found to significantly impact recidivism when studies used arrests as indicators of repeated criminal behavior. Moreover, whereas the racial status of participants was found to be non-significant as a whole, it was significantly and negatively associated with recidivism when studies used multiple indicators of recidivism. In other words, being non-White was associated with lower levels of recidivism than being White only when studies examined composite indicators of recidivism as opposed to unidimensional indicators. This suggests that the indicator used to measure recidivism may have some bearing on the relationship between these two risk factors (antisocial personality pattern and race) and recidivism. With respect to the risk domain of race, the present findings also provide preliminary support that while racial and ethnic minority women may be more likely than their White counterparts to have contact with the police, this population may be *less* likely to recidivate than White

women when recidivism measures include other indicators of recidivism that are indicative of deeper or more sustained involvement with the criminal justice system.

Fourth, the relationships between four risk domains (antisocial associates, antisocial behavior, victimization, and mental health) and recidivism were found to have multiple significant moderators, resulting in estimations of multivariate meta-regression for each risk domain to simultaneously examine moderators that were found to be significant in univariate meta-regression. Within the domains of antisocial associates and mental health, none of the moderators found to be significant in univariate meta-regressions remained significant when examined simultaneously in multivariate meta-regressions, implying that the impact of their effect on both domains was confounded by other moderators. However, within the domain of antisocial behavior, the use of a validated assessment tool was associated with larger effects of this domain on recidivism even after controlling for the length of the follow-up period. For the domain of victimization, publication status remained significant even after adjusting for the effects of three other moderators that were found to be non-significant (using validated assessment tools, controlling for the effects of other risk factors, and controlling for the effects of treatment participation), suggesting that the effects of this risk domain on recidivism were significantly larger among unpublished than published studies.

Finally, results from moderator analysis suggested that as the percentage of White women in study samples increased, the overall effects of substance misuse on recidivism also increased. However, this increase was found to be very small. These findings are in line with a prior meta-analyses of gender-neutral risk factors, which did not find race or ethnicity to be substantive sources of effect size variability (Katsiyannis et al., 2018; Olver et al., 2014). They further provide early evidence for the broad applicability of the gender-responsive risk domains examined in the present analysis across women of different racial and ethnic identifies.

Practice, Research, and Policy Implications

  Findings from this study have several important implications for social work practice, research, and policy. First, results suggest that the majority of the variation in effect sizes among the risk factors examined in this analysis was related to study rather than sample-level characteristics. This finding has important applications for the RNR mode's *responsivity principle*, which asserts that correctional services should recognize and address the unique needs of different correctional subpopulations. Findings also indicate that most of the risk factors examined in this analysis are relevant for the reoffending of women regardless of age, racial identity, or whether they have committed violent offenses. Consequently, interventions targeting these risk factors are likely to have relevance for many women's treatment needs. However, it is critical to note that the present analysis was not an examination of intervention programs or different strategies for delivery. Thus, while the present findings suggest that correctional interventions targeting the risk domains examined in the present review may be generalizable to different correctional subpopulations, strategies for the implementation of services targeting these domains among may vary considerably.

  Second, the present findings provide support for growing calls to examine multi-dimensional indicators of recidivism rather than relying on only one indicator for analysis (King & Elderbroom, n.d.). Given that the metrics used to assess recidivism were found to impact not only the strength but the significance of both a gender-responsive and a gender-neutral risk domain, such research is urgently needed in order to provide increased clarity about how risk factors impact different types of involvement in the criminal justice system. They further support recommendations for researchers to be clear regarding the precise measure being used to examine recidivism outcomes in order to ensure that findings from correctional research are communicated in a common language (Gendreau & Andrews, 1990; Ostermann et al., 2015).

Third, the present analysis suggests that experiences of victimization and mental health impact recidivism irrespective of the type of mental illness or victimization involved. These findings suggest that services provided to justice-involved women may be most beneficial when they are capable of addressing a myriad of problems related to mental health and trauma rather than focusing exclusively on particular mental health disorders or type of victimization. These findings are in line with gender-responsive research, which has suggested that women will have better outcomes when they have the opportunity to participate in comprehensive, wraparound services that are trauma-informed and capable of addressing a broad range of treatment needs.

Finally, correctional researchers should strive to provide as much detail as possible regarding the unadjusted and adjusted effects of risk factors on recidivism in order to advance meta-analytic examinations of the true effects of different risk factors on recidivism. Given the significant moderating effects observed among adjusted effect sizes, such research is critical in order to promote the accurate estimation of the true effects of risk factors

Limitations

Findings from the present analysis should be interpreted in light of several limitations. Although meta-analyses represent a valuable tool for understanding how different characteristics may influence the observed relationships between risk factors and recidivism, no one study can examine every possible moderator. Moreover, moderators are not statistically independent and can confound one another in important ways (Lipsey, 2003). Therefore, it is possible that relevant moderators were not examined in the present study that may nevertheless have important impacts on the risk domains that were assessed. Additionally, it should be noted that studies were limited to those that examined U.S. samples. Therefore, the findings from this study may not generalize to justice-involved women living other countries. Further, although race was examined as both a risk factor and

moderating variable, the majority of women in the primary studies examined in this analysis were White. Although this is in line with national estimates of women on community supervision (Kaeble & Alper, 2020), future research should endeavor to examine more diverse samples of women in order to better understand how correctional services can be delivered in a manner that is responsive to their needs.

Conclusion

Meta-analyses provide a powerful tool for translating correctional theory into practice. As the number of women involved in the U.S. correctional system continues to grow, efforts to synthesize the growing body of literature on their risk factors can be augmented through explorations of key methodological and theoretical factors that may underpin variation in the impact of these risk factors on their recidivism. Such explorations are necessary in order to understand the correctional practices that are most effective for women in the criminal justice system.

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PAPER 3: UNDERSTANDING THE NATURE OF THE RELATIONSHIPS BETWEEN GENDER-RESPONSIVE RISK FACTORS AND RECIDIVISM: A MEDIATION ANALYSIS

Because women represent a minority of the overall criminal justice population, it is unsurprising that most evidence-based correctional services in the United States (U.S.) have been developed from studies evaluating samples of justice-involved men. However, the number of justice-involved women has risen sharply over the last 40 years, which has energized research efforts to develop interventions that reduce their risk of reoffending. These efforts have resulted in the rapid expansion of correctional services developed specifically for this population. Yet in order to maximize the benefits of these services, it is essential to understand the intervention components associated with positive outcomes among women in the criminal justice system.

Research has identified three principles critical to the success of correctional interventions: *risk, need,* and *responsivity*. These principles form the core of the Risk-Need-Responsivity (RNR) model, which currently guides the majority of criminal justice services delivered to people in the U.S. The RNR model is considered to be a *gender-neutral* perspective with principles that apply equally to justice-involved men and women. Interventions adhering to the RNR model match treatment intensity to individual risk levels (the *risk principle*), target malleable risk factors associated with reoffending (the *need principle*), and use a cognitive-behavioral approach that is tailored to the learning styles, motivations, abilities, and strengths of specific client populations (the *responsivity principle*; Bonta & Andrews, 2017).

A key feature of the RNR model is its identification of eight risk factors that have been found to have the strongest empirical connection to criminal recidivism (Andrews &

Dowden, 2006; Bonta & Andrews, 2017). These risk factors are called the *Central Eight* and include antisocial behaviors; antisocial personality patterns; antisocial cognitions; antisocial associates; family and marital circumstances; work and school-related problems; substance misuse; and lack of prosocial leisure and recreation activities (Bonta & Andrews, 2017). According to the RNR model's need principle, interventions aiming to reduce recidivism will be most effective when they explicitly target the malleable aspects, or *criminogenic needs*, associated with each of the Central Eight risk factors (Bonta & Andrews, 2017). Moreover, because the RNR model takes a gender-neutral perspective, these needs are considered to be the most important correctional treatment targets for justice-involved men *and* women.

The need principle is supported by an extensive body of research, which has found that interventions that focus on the Central Eight are associated with the strongest reductions in recidivism regardless of gender (Dowden & Andrews, 1999; Gobeil et al., 2016; Tripodi & Bender, 2007). Further, studies have consistently demonstrated that interventions that target the criminogenic need of substance misuse produce the largest reductions in recidivism among justice-involved women (Andrews & Dowden, 2006; Bonta & Andrews, 2017; Gobeil et al., 2016). In fact, meta-analyses have found that substance use interventions for justice-involved women are associated with reductions in the odds of recidivism ranging from 45% (Tripodi et al., 2011) to 52% (Gobeil et al., 2016). Consequently, interventions delivered to this population commonly have substance misuse as one of their central treatment targets (Gobeil et al., 2016).

Gender-Responsive Risk Factors

An established body of empirical evidence has made it clear that interventions adhering to the need principle are effective among women in the criminal justice system. However, what is less clear is whether women have additional criminogenic needs that extend beyond those identified by the Central Eight. This concern is frequently levied by

proponents of a *gender-responsive* perspective of correctional rehabilitation, who contend that women have distinct treatment needs that must be considered in the development and implementation of services delivered to this population (Covington & Bloom, 2007).

Many proponents of a gender-responsive perspective assert that in order to reduce the recidivism of justice-involved women, interventions should take into account the unique life circumstances and gender-responsive criminogenic needs most relevant to their criminal behavior (Belknap, 2007; Covington & Bloom, 2007; Salisbury et al., 2009; Voorhis, 2012). These criminogenic needs, which are commonly referred to as *gender-responsive risk factors,* reflect individual characteristics and circumstances that either (a) occur solely among justice-involved women, (b) occur more frequently among justice-involved women than justice-involved men, or (c) occur at similar rates among justice-involved women and men but impact women's recidivism in "uniquely personal and social ways" (Wright et al., 2012, p. 1615).

Although a wide range of gender-responsive risk factors has been identified, some of the most commonly cited include experiences of victimization occurring as a child and/or adult, mental health problems, financial needs, housing safety, relationship conflict, and substance misuse (Belknap, 2007; Covington & Bloom, 2007; Salisbury et al., 2009; Van Voorhis et al., 2008; Van Voorhis et al., 2013; Wright et al., 2012). Notably, several of these gender-responsive risk factors (e.g. relationship conflict and substance misuse) overlap with the Central Eight criminogenic needs. However, the remaining gender-responsive factors reflect potential treatment targets that are not represented within the RNR model's need principle.

A growing body of research has begun to examine how gender-responsive risk factors influence criminal recidivism. In general, studies have found evidence that many of these risk factors are associated with recidivism, and that instruments that assess them enhance the

predictive validity of risk assessment instruments associated with the RNR model (Van Voorhis et al., 2010). Further, a recent meta-analysis of gender-responsive risk factors found positive associations between mental health problems, housing safety, financial needs, experiences of victimization, low self-efficacy, parenting stress, and recidivism (Parisi, 2021). Among these risk factors, the strongest relationships were observed for experiences of financial needs, housing safety, mental health problems, and low self-efficacy, suggesting their potential as valuable targets within interventions delivered to justice-involved women.

Developing an Integrative Perspective

Growing evidence for the predictive validity of gender-responsive risk factors has prompted many researchers to advocate for the integration of research findings from gender-responsive and gender-neutral perspectives. A key feature of such an *integrative perspective* is the incorporation of gender-responsive risk factors into interventions that adhere to the evidence-based principles of the RNR model (Andrews et al., 2012; Blanchette & Brown, 2006; Brown, 2017). However, each perspective outlines a different pathway to explain how gender-responsive risk factors translate into criminal recidivism, which reflect differing rationale for how these risk factors should be incorporated into evidence-based services.

Pathways to recidivism

Research on risk factors for women's recidivism highlights two potential pathways by which gender-responsive risk factors may affect criminal behavior: (a) *risk factor pathways* and (b) *responsivity factor pathways*. Risk factor pathways are consistent with gender-responsive literature, which contends that gender-responsive risk factors are key drivers of criminal justice involvement among women and, as such, have direct relationships with their criminal behavior (Van Voorhis et al., 2010; Wright et al., 2007).

By contrast, the RNR model posits that gender-responsive risk factors are *responsivity factors*, which are defined as circumstances or experiences that negatively impact people's

optimum engagement with interventions that target Central Eight criminogenic needs (Andrews et al., 2012; Bonta & Andrews, 2017; Wilson & Givens, 2019). Consequently, responsivity factors are not considered to have a direct association with recidivism. Rather, they are theorized to impact recidivism by attenuating engagement in correctional services. As such, relationships between gender-responsive risk factors and recidivism in responsivity factor pathways are mediated by engagement in treatments that target the Central Eight.

A hypothesized model for risk and the responsivity factor pathways is illustrated in Figure 3.1. The blue lines represent direct pathways (risk factor pathways) between gender-responsive risk factors and criminal recidivism. Conversely, orange lines represent indirect pathways from gender-responsive risk factors to recidivism via their effects on treatment engagement (responsivity factor pathways).

Current Study

In order to strengthen and enhance services for justice-involved women, it is essential to understand the mechanisms underlying the relationship between gender-responsive risk factors and recidivism. If gender-responsive risk factors follow risk factor pathways then they should serve as the primary foci of services delivered to justice-involved women. Conversely, if gender-responsive risk factors follow responsivity factor pathways, as posited by the RNR model, then they should be addressed as secondary treatment targets to facilitate engagement in services that target the Central Eight or even targeted before engaging women in RNR-based services to enhance women's ability to benefit from these interventions. Distinguishing between risk and responsivity pathways is especially important for correctional interventions that target the Central Eight risk factor of substance misuse because substance misuse has consistently been identified as one of the strongest predictors of women's recidivism in both the RNR model and gender-responsive perspectives (Andrews et al., 2012; Wright et al., 2012) and is one of the most common services delivered to justice-involved women (Gobeil

et al., 2016). Yet although gender-responsive risk factors are commonly cited as being responsivity factors (Polaschek, 2012), few studies have directly evaluated whether they do in fact impact treatment engagement, or the role treatment engagement may play in their relationship with recidivism.

The goal of the present study was to address this gap in research by evaluating whether the gender-responsive risk factors that have been found to have the strongest association with recidivism (financial needs, housing safety, mental health problems, self-efficacy; Parisi, 2021) have a direct relationship with recidivism and exploring whether these relationships are mediated by engagement in substance use treatment. To achieve this goal, an exploratory path analysis was conducted that examined engagement in substance use treatment as a potential mediating mechanism in the relationships between these gender-responsive risk factors and criminal recidivism.

Methods

Data and Procedures

This study engaged a secondary analysis of data from the Probation/Parole Officer Interactions with Women Offenders Project (PPOIWOP), a prospective, longitudinal study of justice-involved women on probation and parole with documented histories of substance misuse (N = 402) conducted between 2011 and 2014 (Morash et al., 2018). The sample used in this study was obtained by recruiting 73 probation and parole officers (POs) with caseloads of women from 16 counties located within an hour and a half radius from the study's research office. These counties included a mix of rural, and suburban areas comprising 68.5% of Michigan's total population. The principal investigator of the study reviewed each PO's caseload and developed an initial sampling frame of 846 potential study participants. Eligibility for participation in the PPOIWOP included: (a) felony conviction, (b) history of substance misuse, and (b) supervision by the same PO for approximately three months prior to study initiation (Morash et al., 2018).

Following the development of an initial sampling frame, POs assisted with recruitment by providing women with a contact card or flyer, introducing them to on-site project interviewers, or gaining their permission to share their contact information with study interviewers (Morash et al., 2018). This process resulted in a final sample size of N = 402 women, or 47.5% of the initial sampling frame. Comparisons of individuals who did and did not agree to participate indicated that at 12 months, non-participants were significantly more likely to be in jail or prison. However, no other significant differences were observed between participants and non-participants (Morash et al., 2018).

Data for the present analysis were drawn from two sources collected over 24 months: (a) in-person interviews with participants and (b) Michigan state police records of arrests and convictions. Interviews with women were conducted at three time points following the start of supervision: 2- to 3- months (T1), 5 months (T2), and 8 months (T3). These interviews lasted approximately 90 minutes, 60 minutes, and 90 minutes at T1, T2, and T3, respectively, and were conducted by trained interviewers who recorded women's responses on a laptop computer. Data from official state records included information on arrests and convictions during the 24 months following the start of supervision (Morash et al., 2018). All data from the PPOIWOP are publicly available through the Inter-University Consortium for Political and Social Research (Morash et al., 2018).

Sample

Eligibility criteria for this analysis included all women in the PPOIWOP who indicated that they had received substance use treatment since the start of their supervision. Among the 402 women who participated in the PPOIWOP, 205 met this criterion and were used as the sample for the present analysis. As shown in Table 3.1, the average age of this sample of 205 women was 34.03 (SD = 10.23), and the majority were White (57.56%), followed by Black (23.41%) and Multiracial (18.05%). Fewer than one percent (0.98%) were

categorized as "Unclear or Other." The majority of women (70.24%) were high school graduates or had a GED. On average, women in the present sample had a history of 5.33 arrests ($SD = 3.89$) and 6.40 convictions ($SD = 5.46$), and the vast majority (74.02%) were on parole.

Measures

Outcome Variable

Recidivism is the main outcome of this analysis. Recidivism was operationalized in the PPOIWOP to include the number of times women were convicted for new offenses after the initiation of their supervision through the 24th month of the study. Although the PPOIWOP also includes a measure of arrests, convictions were chosen as the primary outcome as arrest data does not indicate whether or not an individual has been found guilty of committing a crime and is regarded as being less accurate than conviction data when assessing recidivism (Ruggero, Dougherty, & Klofas, 2015). However, because arrests nonetheless represent an additional form of criminal justice contact, a secondary analysis was conducted using arrest data as the primary outcome. Both measures of recidivism (convictions and arrests) were collected by researchers from official state police records (Morash et al., 2018). For the present analysis, separate dichotomous outcome variables were created to indicate whether women had been arrested (0 = *no,* 1 = *yes*) or convicted (0 = *no,* 1 = *yes*) by the 24th month of their supervision.

Independent Variables

Four independent variables are included in this analysis, each representing the gender responsive risk factors found to have the strongest relationship with recidivism in a recent meta-analysis (Parisi, 2021). These risk factors include: (1) financial needs, (2) housing safety, (3) mental health problems, and (4) low self-efficacy. All four variables were drawn from the Women's Risk/Need Assessment (WRNA), which was administered to women at

T1 (Van Voorhis et al., 2008). The WRNA was developed through a collaboration between the National Institute of Corrections and the University of Cincinnati and was designed to measure the overall criminogenic risk levels of justice-involved women (Van Voorhis et al., 2013). This risk level is assessed using subscales designed to measure the Central Eight and gender-responsive risk factors, including the gender-responsive risk factors used as independent variables in the present analysis. Prior research on the WRNA found that individual subscales and the instrument as a whole had strong correlations with conviction outcomes, with an area-under-the-curve value of .67 for the probation version of the assessment instrument (Van Voorhis et al., 2013). Details of the subscales used in this analysis are presented below.

Financial problems. Financial problems were assessed using 12 items drawn from the employment/financial subscale of the WRNA, which includes questions pertaining to women's employment and financial status. A prior analysis of the WRNA found that Cronbach's alpha for this subscale was relatively low (.55) but had high levels of predictive validity (Van Voorhis et al., 2013) for offense-related failures among women on probation. An inspection of initial measurement models in the present study revealed that seven items had negative and/or non-significant factor loadings. Therefore, these items were removed, and the final measure for analysis consisted of four items that used binary (0 = *no*, 1 = *yes*) and categorical response formats. These questions asked whether women were employed, had experienced homelessness, were worried about making ends meet, and had a member of their household with full-time employment. For all questions, higher scores indicated higher levels of financial needs. Factor loadings for the remaining items used in the final path analysis were all significant and ranged from .53 to .67.

Housing safety. Housing safety was measured using eight items from the housing safety subscale of the WRNA, which consists of questions assessing whether participants felt

stable and safe in their home environments. Prior research has found that this subscale is a strong predictor of recidivism, with a Cronbach's alpha of .70 (Van Voorhis et al., 2013). However, an initial measurement model found that two items had non-significant factor loadings. These items were subsequently removed, and the final scale was respecified with six items asking whether women felt secure in their homes, had stable housing, lived in violence and substance-free homes, and had safety concerns in their living environments. Response options were binary (0 = *yes*, 1 = *no*), with higher scores indicating greater levels of housing-related problems. Factor loadings for the six remaining items used in the path analysis were all significant and ranged from .47 to .91.

Mental health problems. Mental health was assessed using the 6-item mental health history subscale of the WRNA This subscale has been found to predict offense-related outcomes in prior research on the WRNA and has been found to have a Cronbach's alpha of .81 (Van Voorhis et al., 2013). Items assessed whether women had ever or in the recent past received mental health counseling, taken medications for mental health, been diagnosed with a mental illness, attempted suicide, or experienced hallucinations. Response options were binary (0 = *no*, 1 = *yes*) and coded such that higher scores reflected higher levels of mental health problems (α = .81).

Self-efficacy. Self-efficacy was assessed using the 17-item Sherer Self-Efficacy scale (Sherer et al., 1982), which was incorporated into women's assessments at T1 as part of the WRNA. The Sherer Self-Efficacy scale consists of 3-point Likert-type items (0 = *seldom/never*, 1 = *sometimes*, 2 = *often*) pertaining to women's feelings of self-efficacy. Sample items include "Do you feel capable of dealing with most problems that come up in life?" and "Can you depend on yourself?" Prior research has found that evidence of this scale's reliability when delivered to justice-involved women (α = .88; Salisbury et al., 2009),

and Cronbach's alpha in the present study was .88. Items were coded so that higher scores indicated higher levels of mental health problems.

Mediator Variable

Engagement in substance use treatment was measured using the treatment engagement scale of the Texas Christian University (TCU) Criminal Justice (CJ) Client Evaluation of Self and Treatment (CEST; TCU-CJ-CEST), which was administered at T3 to assess engagement in treatment between the start of supervision and T3. The treatment engagement scale of this measure includes four subscales that can be used to create an overall composite engagement score: participation (12 items), satisfaction (7 items), counselor rapport (12 items), and peer support (5 items). Prior studies have demonstrated evidence of the reliability and validity of the TCU-CJ-CEST, with alphas for subscales ranging from .77 to .93 among justice-involved populations (Simpson et al., 2012). Items were measured using a 5-item ordinal response format, with options ranging from 0 = *disagree strongly* to 4 = *agree strongly* (α = .95).

Covariates

Covariates were assessed at T1 and included age in years, which was coded as a continuous variable; race, coded as a binary variable (0 = *White*, 1 = *non-White*); and an 8-item measure assessing participants' criminal justice history. This measure was taken from the criminal history subscale of the WRNA, which is formed by summing responses from eight items pertaining to the severity of participants' criminal history.

Data Analysis

The present study used a path analysis design to examine how gender-responsive risk factors may be related to recidivism. Although structural equation modeling (SEM) was considered as an analytic strategy, the sample size for the present analysis was relatively small (N = 205). Kline's *N:q* rule suggests that a ratio of 20 observations (*N*) per each

estimated parameter (q) is ideal, although a 10:1 ratio can work well in many cases (Kline, 2011). However, incorporating measurement model indicators for independent and mediating variables would have yielded a parameter ratio far beyond this threshold. Consequently, the measurement and structural models that are estimated in SEM were separated such that measurement models were used to generate latent factor scores for all independent and mediating variables, which were then used as observed variables in a path analysis (Ganong et al., 2019). This process resulted in 18 estimated parameters, yielding an acceptable N:q ratio of over 10:1 (Kline, 2011).

Analyses took place in three steps. First, descriptive statistics and correlations were calculated for analytic sample data. Second, individual latent factor scores were estimated for all independent and mediating variables. The goal of this second step was to generate construct scores that accounted for variation attributable to measurement error. Because items for independent variables were binary and ordinal, means- and variance-adjusted weighted least squares estimation (WLSMV) and a polychoric correlation matrix were used to estimate latent factor scores. The following criteria were specified as indicators of acceptable model fit: Comparative Fit Index and Tucker-Lewis Index (TLI) values of .90 or higher, and a root mean square error of approximation (RMSEA) value of .08 or lower (West et al., 2012). Prior to estimating the path analysis, factor scores for all variables were standardized ($M = 0$, $SD = 1$) to aid in the interpretation of results (Brown & Moore, 2012). Third, latent factor scores were used as observed variables to conduct a path analysis to determine whether the effects of gender-responsive variables on recidivism were mediated by treatment engagement (Brown & Moore, 2012). The use of a path analysis permitted the simultaneous evaluation of the relative effects of each gender-responsive variable while holding constant others, as well as the indirect effects of gender-responsive variables on recidivism via treatment engagement. All latent factor scores were regressed on covariates (race, age, and criminal history; Hayes,

2018), and the distribution of the product of the coefficients method was used to test indirect effects and generate confidence intervals (MacKinnon et al., 2004, 2007; MacKinnon & Cox, 2012).

Model assumptions were evaluated by assessing factor scores for evidence of nonnormality and examining correlations between variables to determine the presence of multicollinearity (Hayes, 2018). Stata's "sktest" and "summarize" commands revealed evidence of skewness (range: -.61-1.36) and kurtosis (range: 1.86- 3.92) among factor scores, suggesting the need to reject the null hypothesis that data were normally distributed (Finney & DiStefano, 2006). Additionally, women in the present sample were clustered within 64 probation/parole officer (PO) caseloads. Therefore, the path analysis was conducted using the robust maximum likelihood (MLR) estimator in Mplus, which is robust to non-normality and non-independence of data (Schreiber, 2017). The "TYPE=COMPLEX" feature and cluster option in Mplus were also used to account for potential non-independence of observations in standard errors, and full-information-maximum-likelihood (FIML) procedures were used to handle missing data (Muthen, 2015). Rates of missing data were below 3% for all study variables, and information on missing values for specific scales can found in Table 3.1.

Study Software

Data were initially managed using Stata version 16 (StataCorp, 2019), and estimation of latent factor scores and subsequent path analyses were conducted using Mplus version 8.4 (n.d.). The distribution of the product of the coefficients method was conducted using online RMediation software provided by Tofighi and MacKinnon (2011).

<div align="center">

Results

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Descriptive and Bivariate Analyses

Table 3.1 presents correlations and descriptive statistics for all study variables. For these analyses, composite scores were estimated from the raw items associated with the TCU-

CJ-CEST and gender-responsive subscales. In total, 25.37% of the sample had been arrested and 20.49% had been convicted of a new offense by the 24th month of their supervision. Notably, the only variable that showed a significant zero-point association with arrests or convictions at 24-months was criminal history, although self-efficacy was found to be associated with arrest outcomes. These relationships were in the expected direction: criminal history was positively associated with arrests and convictions, and self-efficacy was negatively correlated with arrest outcomes. Moreover, self-efficacy was found to be positively associated with treatment engagement, and arrests and convictions were positively correlated with one another. However, no other variables were significantly correlated with either measure of recidivism or with treatment engagement, suggesting a lack of a significant association between most of the independent, mediating, and outcome variables.

Measurement Models

Individual measurement models were performed for all latent independent and mediating variables. As described above, the subscales associated with financial needs and housing safety were each found to contain negative or insignificant factor loadings. Following removal of these items, all measurement models demonstrated an acceptable fit to the data according to pre-specified model fit criteria. Fit statistics for all measures used in the final path analytic model can be found in Table 3.2.

Path Analysis

To evaluate whether financial needs, housing safety, mental health problems, and self-efficacy function as gender-responsive risk factors that impact recidivism directly or responsivity factors that impact recidivism indirectly via their effects on treatment engagement, a mediation analysis was conducted that examined the total effects, direct effects, and indirect effects of all independent variables on recidivism. For reference, direct effects refer to the relationships of gender-responsive risk factors (financial problems,

107

housing safety, mental health problems, self-efficacy) on convictions while not accounting for the effects of mediation. Indirect effects indicate changes in recidivism resulting from treatment engagement as a mediator, and the total effect represents the sum of the direct and indirect effects (Hayes, 2018).

Results of the mediation analysis are presented as odds ratios (*ORs*) in Table 3.3. Surprisingly, none of the four gender-responsive risk factors assessed in this analysis were found to have a direct effect on convictions at during the 24 months following the start of supervision. The upper and lower ends of all confidence intervals encompassed one, suggesting that these risk factors were non-significant at the .05 level. Likewise, significant indirect effects on convictions were not observed for any of the independent variables in this analysis, which indicates that treatment engagement was not a significant mediator in any of these relationships. However, an inspection of individual pathways revealed that self-efficacy was significantly and positively associated with treatment engagement (*B* = 0.37, 95% CI: [0.24, 0.50]).

Given that convictions represent a conservative measure of recidivism, all analyses were repeated using 24-month arrests as a secondary analysis. Procedures for this analysis were identical to those conducted for the conviction outcome. As shown in Table 3.3, this process yielded nearly identical results: self-efficacy remained positively associated with treatment engagement, yet no significant direct or indirect effects were observed in the relationships between gender-responsive risk factors and whether women had been arrested in the 24 months following the initiation of their supervision. However, criminal history (*OR* = 1.17, 95% CI: [1.01, 1.36]) was found to have a significant association with arrests, indicating that for every one-unit increase in criminal history, the odds of being arrested rose by 17%.

Discussion

To enhance rehabilitative efforts and support the implementation of evidence-based correctional services, it is critical to understand the program components associated with successful criminal justice outcomes. Research has demonstrated that correctional services are most effective when they adhere to the principles of risk, need, and responsivity (Bonta & Andrews, 2017). Although gender-responsive research has identified many factors associated with women's recidivism, few studies have examined the underlying processes by which these factors impact women's engagement in correctional services or how this engagement may, in turn, affect their recidivism. This research is important to conduct, as it has practical implications for determining whether gender-responsive risk factors represent criminogenic needs or responsivity factors and therefore, how they can be most effectively addressed within correctional interventions.

Evaluation of direct and indirect effects indicated that neither the risk nor responsivity factor pathways examined in this analysis were significant. However, self-efficacy was found to have a positive association with treatment engagement. Further, when the model was re-estimated with a less conservative outcome measure for recidivism, criminal history emerged as a significant predictor of arrests. Collectively, these results do not support the significance of the gender-responsive risk factors evaluated in the present study as direct predictors of criminal recidivism, nor do they suggest that financial needs, housing safety, or mental health operate as responsivity factors that hinder treatment engagement. However, the present analysis does provide evidence that women's self-efficacy is significantly and positively associated with their ability to engage in substance use treatment. These findings are consistent with extant research that has shown self-efficacy to be an important component in the adoption and maintenance of adaptive coping behaviors (Saxena et al., 2016). They further support findings from a prior review of treatment completion among justice-involved

109

individuals, which found self-efficacy to be one the most influential factors fostering engagement in correctional interventions (Sturgess et al., 2016). Although the present study did not find that treatment engagement was associated with recidivism, the positive relationship between self-efficacy and engagement in substance use treatment suggests its potential value as a responsivity factor.

It is noteworthy that when a broader measure of justice system contact was used (arrests), criminal history emerged as a significant predictor of recidivism. In fact, no other variable examined in this analysis was found to have a statistically significant relationship with recidivism—a finding that lends support for the role of criminal history (past antisocial behavior) as one of the Central Eight risk factors within the RNR model (Bonta & Andrews, 2017). Yet it is important to note that although criminal history was associated with a higher likelihood of arrest, it did *not* significantly affect women's odds of being found guilty of committing a new offense (convictions). This finding suggests that different risk factors may exert different influences on recidivism according to how it is operationalized.

It is possible that among the women in this sample, a history of justice involvement had a greater impact on how they were perceived by correctional officers than it did their actual criminal behavior. Determining how to respond to individual behavior involves subjective decision-making on the part of POs and police officers, and the degree to which women were entrenched in the criminal justice system may have impacted how correctional authorities responded to their behavior. It may be that women's criminal history influenced officer discretion such that women in the present sample were more likely to be sanctioned when they entered supervision with an extensive criminal background, regardless of whether they had actually engaged in new criminal behavior. It may also be the case that women were rearrested in an effort to connect them to needed substance use services provided in jails and prisons—a phenomenon documented in prior studies of justice-involved individuals in need

of mental health treatment (Solomon & Draine, 1995). However, this possibility was unable to be explored in the present data, as reasons for arrest were not documented.

Findings from the present study were unexpected given the relative salience the four gender-responsive risk factors examined in this analysis are afforded within gender-responsive literature. However, they are not altogether unusual. The gender-responsive risk factors evaluated in the present study are frequently cited as highly prevalent challenges faced by women in the justice system, yet scholarly literature is often conflicting concerning their role in predicting recidivism (Andrews et al., 2012). Whereas some studies have found that financial needs, housing-related problems, mental health problems, and self-efficacy predict recidivism (e.g. DeHart, 2018; King, 2017; Van Voorhis et al., 2010), other studies have not supported these findings (Rettinger & Andrews, 2010; Smith et al., 2009). Although one meta-analysis (Parisi, 2021) has provided support for the predictive strength of the risk factors used in the present analysis among the justice-involved women generally, it is also possible that women with substance-related issues represent a specific correctional subpopulation that is affected by different risk factors than women without such problems.

Limitations

Findings from the present study are exploratory and should be considered within the context of the following limitations. First, the analysis had a modest sample size and was limited to women on probation and parole in Michigan who were involved in the criminal justice system as a result of substance use-related legal problems (Morash et al., 2018). Therefore, results from this research may not generalize to other geographical regions or populations of justice-involved women without substance misuse.

Second, no data were available regarding the quality or modality of programs that women attended. As a result, some women may have participated in services that simultaneously addressed their substance use and the risk factors evaluated in the present

study—for example, women may have attended wraparound substance use services that provided employment support or support for symptoms of mental health. This may have mitigated the negative impact of risk factors on treatment engagement and/or recidivism, which could have impacted the null findings observed in the present analysis.

Third, it is important to note that the WRNA subscales for the financial needs and housing safety subscales of the WRNA were adapted when constructing measurement models for the present analysis. Therefore, it is not appropriate to draw conclusions about the predictive validity of these scales based on findings from this research. Moreover, although research has found that this instrument effectively predicts recidivism among women on probation, parole, and drug court (Van Voorhis et al., 2013; Wright et al., n.d.), it is possible that substance-using women under community supervision who are not monitored in drug court programs may have different risk factors influencing their criminal offending. This signals the need for continued explorations of differences in risk factors within subpopulations of justice-involved women.

Despite these limitations, this research contributes to a broader understanding of how gender-responsive risk factors may be integrated into interventions delivered to justice-involved women. The results of this study call into question the function of financial needs, housing safety, and mental health in women's treatment engagement in correctional and their recidivism. However, regardless of whether targeting these factors in substance use interventions improves the ability of such interventions to better engage women or reduce their rates of recidivism, it does not detract from the importance of ensuring that support for issues related to financial needs, housing safety, mental health, and self-efficacy is provided to justice-involved women. Even if such services do not reduce the recidivism of this population, their provision is essential for moral and ethical purposes.

Implications for Future Research

The present findings highlight several important areas for future study. First, there is a clear need for additional and more rigorous research evaluating the predictive strength of the risk factors evaluated in the present study, particularly among samples of women with substance misuse. Prior studies have identified complex profiles of risk among justice-involved women who misuse substances (Brennan et al., 2012, 2019; DeHart, 2018; Salisbury & Van Voorhis, 2009), underscoring the potential for interrelationships that can occur between substance misuse and other gender-responsive risk factors. For example, research suggests that substance use may arise in response to past trauma (Covington & Bloom, 2007; Tripodi et al., 2019) and may even mediate the relationship between trauma, mental health problems, and criminal offending (Salisbury & Van Voorhis, 2009). Therefore, justice-involved women who misuse substances may have unique pathways to recidivism that attenuated the relevance of the gender-responsive risk factors explored in this analysis for their recidivism. Given the significant number of women with substance use-related issues in the criminal justice system, there is a pressing need for further research in this area.

Second, more needs to be learned regarding the responsivity principle and how it can be used in conjunction with findings from gender-responsive research to enhance services for justice-involved women. Proponents of the RNR model acknowledge that responsivity is the least researched and understood of the model's principles (Polaschek, 2012). However, low levels of treatment engagement and high rates of treatment non-completion are significant problems for correctional programs, particularly among individuals who are at a high risk for recidivism (Wormith & Olver, 2002). Treatment engagement has also been found to be a critical determinant of correctional program efficacy among justice-involved men and women (McMurran & Ward, 2010). Although gender-responsive risk factors are often labeled as

responsivity issues, few studies have empirically investigated the factors that hinder or facilitate engagement in treatment, gender-responsive or otherwise (O'Brien & Daffern, 2017). Therefore, future explorations of the factors that impact responsivity are urgently needed in order to support women's engagement in correctional services, particularly as they pertain to self-efficacy, which was found to be a significant predictor of engagement among the women in this analysis.

Third, the emergence of criminal history as a significant predictor of arrest but not recidivism outcomes suggests the need for a multi-pronged approach when examining recidivism. Although recidivism is often examined as a monolithic construct, different measures of recidivism capture different aspects of justice-involvement. For example, studies often use arrests as a measure of recidivism, yet arrest data alone does not indicate whether an individual has actually committed a criminal offense (Ruggero et al., 2015). Yet because correctional interventions often focus on reducing recidivism by changing individual behavior, ensuring that the measures used appropriately capture their behavior rather than other factors influencing justice-involvement (e.g. officer discretion) is essential. Consequently, future research should take care to examine multiple outcomes of recidivism to shine a light on the personal and situational factors that influence women's trajectories in and out of the criminal justice system.

Conclusions

The present study contributes to a broader understanding of the challenges associated with integrating gender-responsive risk factors into correctional services delivered to justice-involved women. This analysis outlines important areas for future research that must be addressed in order to lay the groundwork for a holistic and integrative approach for correctional treatment that incorporates findings from gender-responsive and gender-neutral literature.

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CONCLUSIONS

This three-paper dissertation focused on advancing research on justice-involved women by addressing empirical gaps that have inhibited the integration of gender-responsive and gender-neutral understandings of women's justice-involvement. Collectively, all three papers make important contributions to the knowledge base of effective services for women.

The first paper was a systematic review and meta-analysis of gender-responsive and gender-neutral risk factors. This paper used two- and three-level meta-analytic models in order to use as much of the available evidence base on justice-involved women as possible. Findings provided support for both gender-neutral and gender-responsive risk factors, suggesting that both are important to address in services for justice-involved women. The second paper delved more deeply into the variation that was discovered in the mean effects of many of these risk factors on recidivism in order to explore characteristics of study, sample, and risk factors that may have impacted the effect sizes reported by primary studies. This paper identified several important methodological considerations for future research on women's risk factors; most notably, taking care when reporting bivariate and multivariate effects, using comprehensive indicators of recidivism rather than relying on single indicators such as arrests or convictions, and using validated assessment tools. Finally, the third paper examined pathways by which the risk factors identified in the meta-analysis conducted as part of this dissertation impact recidivism. This paper found that although financial needs, housing safety, mental health problems, and self-efficacy may have a significant impact on recidivism generally, they did not significantly impact recidivism when examining women with substance use histories who were on probation and parole. Moreover, of the four risk factors examined, only self-efficacy was found to impact treatment engagement, suggesting

120

the value of further exploring how bolstering women's self-efficacy may help to strengthen their ability to engage in correctional services. However, this paper also found that treatment engagement did not significantly impact recidivism, highlighting important areas for future research on strategies that can be used to maximize women's ability to participate in and benefit from treatment services.

Limitations

Although each of the papers in this dissertation advances the evidence base of effective services for justice-involved women, there are several limitations that are important to consider when interpreting the findings. Related to Paper 1, studies were limited to U.S. samples and should not be assumed to be generalizable to justice-involved women in other countries. Future studies could explore the impact of risk factors on recidivism among women in other countries to expand on the findings reported in this dissertation. Moreover, the search, extraction, and analysis were conducted by a single reviewer rather than being reviewed by multiple researchers independently. Therefore, it is possible that relevant information was missed or erroneously excluded.

With respect to Paper 2, although moderators were selected on the basis of extant literature, many of the moderators in this study may have been confounded by characteristics that were not examined or simply not reported by studies. Future research would be advantaged by building off of the present findings to examine potential interactions of the moderators that were examined. Additionally, the meta-analysis and moderation analysis in this dissertation examined risk factors only among women. To determine whether these risk factors differentially impact women's recidivism specifically, more research is needed to illuminate the impact these risk factors may have on men.

Turning to Paper 3, analyses were limited in scope by the use of a path analysis rather than methods that may have been be more likely to take into account measurement error, such

as structural equation modeling (Kline, 2015). However, this method was not possible given the sample size available with the Probation/Parole Officer Interactions with Women Offenders Project (PPOIWOP) and number of risk factors examined. It is also possible that women's risk factors may interact with one another in complex ways that influenced their pathways to recidivism rather than impacting recidivism directly (DeHart, 2018; Salisbury & Van Voorhis, 2009). These complex relationships may have contributed to the non-significant findings observed between risk factors and recidivism in Paper 3. Future research could be advanced by considering the pathways that impact women's engagement in treatment in order to ensure they are able to benefit from services targeted to their needs.

Implications

The three papers in this dissertation provide important insights into the factors driving women's criminal justice involvement. They also highlight several broad implications for social work research and practice. First, this dissertation provides evidence for the importance of assessment tools that incorporate both gender-responsive and gender-neutral risk factors in order to reduce the likelihood that women will be misclassified and placed into higher or lower levels of custody than are warranted by their actual level of risk (Holtfreter & Cupp, 2007; Van Voorhis et al., 2010).

Second, although the era of mass incarceration is slowly declining, women remain one of the fastest-growing criminal justice populations (Kaeble & Glaze, 2016; The Sentencing Project, 2020). The field of social work has advanced efforts to reduce incarceration and ongoing justice-involvement through the twelve grand challenges, which include a focus on promoting smart decarceration in innovative and evidence-driven ways, including interventions designed to reduce their recidivism (Pettus-Davis & Epperson, 2015). This dissertation underscores the need to consider women's risk factors when identifying treatment targets for these interventions. It further suggests that efforts to foster women's

sense of self-efficacy may be important in order to ensure that once these services are provided, women are able to effectively engage in them.

Third, gender-responsive research has made significant strides in highlighting the challenges facing justice-involved women and demonstrating that these challenges often operate as risk factors for future criminal justice involvement (Covington, 2007). Findings from this dissertation provide early support for the applicability of these risk factors to women of different ages, races, and offence histories. However, the nuanced differences in needs *between* women have remain underexplored. In particular, the voices of lesbian, gay, bisexual, questioning, transgender, and gender-nonconforming individuals have been absent in research regarding women's criminal justice involvement, despite the overrepresentation of these populations in the U.S. criminal justice system (Irvine-Baker et al., 2019). Binary systems of gender classification within correctional systems often render this population invisible in research on justice-involved women, as correctional systems often classify transgender or gender-nonconforming individuals as women or men without taking into account their true gender identities (Sevelius & Jenness, 2017). In order to promote services that are responsive to the needs of these individuals, further research must be conducted in order to build on and advance the foundation that has been provided by gender-responsive literature and explore how the risk factors examined in this paper may intersect with sexual orientation and gender identity to impact women's progression through the criminal justice system

Overall, this dissertation draws attention to the importance of incorporating gender-responsive risk factors into the evidence-based principles of the Risk Need Responsivity model. Findings provide evidence that trauma, mental health problems, financial needs, self-efficacy, housing safety, and parental stress are linked to women's trajectories through the criminal justice system, albeit in complex ways. Many of these risk factors occur alongside

those that are used to inform existing correctional services, suggesting that gender-neutral programs may be addressing some, but not all of the risk factors that are relevant to justice-involved women. Yet in order to provide comprehensive care to this population, it is critical that services delivered to women address their full spectrum of needs.

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Table 1.1

Subscales for Stand-Alone Versions of the WRNA

Pre-release	Probation	Prison
Criminal history	Criminal history	Criminal history
Employment/financial	Employment/financial	Anger
Housing safety	Housing safety	Antisocial friends
Antisocial friends	Antisocial friends	Recent substance abuse
Anger	Anger	Depression symptoms
Depression	Depression	Psychotic symptoms
Psychosis	Child abuse	Child abuse
Child abuse	Adult abuse	Relationship dysfunction
Adult abuse	Substance abuse history	Family support (strength)
Sexual abuse	Current substance abuse	
Current substance abuse	Parental stress	
Relationship dysfunction	Educational assets	
Parental stress	Family support (strength)	
Family support (strength)	Self-efficacy (strength)	
Self-efficacy (strength)		

Table 1.2

Coding Criteria for Risk Domains

Gender-neutral risk domain

Antisocial behavior	Adult crime, early antisocial behavior, offense history, previous failure on probation or parole, length of time in correctional settings, history of violent crimes, early age of arrest
Antisocial personality pattern	Antisocial personality disorder or conduct disorder, anger, aggression, violent behavior, impulse control, low problem-solving skills.
Antisocial attitudes	Thoughts, feelings, beliefs, and/or attitudes supportive of antisocial or criminal behavior.
Antisocial associates	Exposure to associates who are supportive of crime, low exposure to prosocial associates.
Family/Marital	Generalized family dysfunction, marital status (single), marital problems, lack of family support, marital dissatisfaction, conflict with intimate partner, family problems, intimate partner relational instability, relationship dysfunction, having a non-supportive partner.
Education/employment	Quality of interpersonal relationships with other people in school or work settings, level of involvement and satisfaction in work and/or school, low performance in work and/or school, employment status
Substance abuse	Past or present use or misuse of psychoactive substances.
Leisure/recreation	Any predictor concerning how leisure or recreation time is spent.

Gender-responsive risk domain

Victimization	Physical, emotional, or sexual abuse or neglect occurring in childhood, adulthood or during an unspecified time period.
Financial needs	Financial concerns, financial needs, need for public assistance, low income
Unsafe Housing	Feeling insecure in the home, housing stability, violence in the environment, safety concerns in one's living situation.
Mental health problems	Past or present mental health disorder; time spent in psychiatric settings (e.g. hospitals); self-harm; personal/emotional distress.
Parenting stress	Parental status, custody of minor children, financial responsibility for children, reported stress due to parenting.
Low self-efficacy	Low levels of self-esteem or self-efficacy.

Other risk domains

Age	Age at the time of the study.
Race	Racial and/or ethnic identity (non-White versus White)
Service needs	Reported need or lack of access to services, including healthcare services, mental health services, and/or legal services.

Lack of social support

Lack of support or contact with people outside of one's intimate partner or family.

Cohabitation

Living with at least one other person.

Table 1.3

Characteristics and IDs of Included Studies

ID	Author	Year	N	Sample Age	Sample Demographics	Measurement tools	Follow-up	Recidivism Type	Extracted Risk Factors
1	Adam Evans	2016	200	36.9 (*SD* = 8.1)	52% White, 48% Black	Administrative data	36 months	Arrest or incarceration	Age, race, number of prior convictions, non-violent crime
2	Alper	2014	1,235	36.4 (*SD* = 9.9)	Not reported by gender	Level of Service Inventory- Revised, administrative data	40.5- 74 months	Absconding violations, drug-related violations, employment-related violations, monetary violations, residence violations, treatment violations, violent violations, drug-related police arrests, property-related police arrests, violent-related police arrests, or public order police arrests	Disadvantage, unemployment, offender concentration in neighborhood, low social ties
3	Bakken & Visher; Visher & Bakken[a]	2018; 2014	142	36.1 (*SD* = 8.8)	73% Black	Self-report measures, Center for Epidemiologic Studies Depression Scale, Posttraumatic Stress Disorder Symptom Scale, ad hoc multi-item scales	12 months	Dichotomous indicator of any reports of 10 different crimes committed by the respondent since release	Prior convictions, deviant peers, family support, tangible support, education, employment, neighborhood safety, mental health condition, minor children, lived with children, age, race
4	Barrick	2008	31,742	Not reported	Not reported by gender	Ad hoc	36 months	Felony conviction	Adjudicated as a felon, prior supervision

				by gender					violation, crime seriousness, prior record points, supervision length, employment, age, race
5	Barrick et al.	2014	255	32.6 (*SD* = 7.23)	Majority was non-white	Ad hoc scales	60 months	Incarceration	Prior convictions, juvenile detention, prior risk, prior violence charges, number of prior charges, prior infractions, prior incarceration segregation, age at first arrest, non-family visits in prison, non-family phone contact in prison, non-family mail contact in prison, postrelease family emotional support, in-prison family emotional support, in-prison family phone contact, in-prison family mail contact, in-prison family visit, postrelease family instrumental support, partner, education level, employment, abuse history, abuse during incarceration, global severity index, minor children, age, race
6	Britt et al.	2019	2006	32.6 (*SD* = 7.23)	78.7% European American, 14% African American, 4.1% Hispanic, 2% Native	Iowa Violence and Victimization Instrument	30 months	Conviction or parole revocation for any new violence or victimization offenses	Violence score

				American, 1% Asian American				
7	Caudy et al.	2018	3,562	32.9	Jail sample: 9.1% White, 38.2% Black, 11.6% Hispanic, 1.1% Other; Probation sample: 58.5% White, 30.9% Black, 9.2% Hispanic, 1.4% Other	Wisconsin Risk Need Assessment	399.7 days	Arrest	Alcohol abuse, drug abuse, negative friend associations, family stress, unemployment, financial problems, emotional instability, mental deficiency
8	Caviness	2011	245	34.1 (*SD* = 8.9)	71.4% Caucasian, 19.2% African American, 6.9% Hispanic, 2% American Indian, .4% Other	Ad hoc measures, Alcohol Use Disorders Identification Test, Medical Outcomes Study Social Support Survey, Beck Depression Inventory II, Psychiatric Diagnostic Screening Questionnaire, Self-Control Scale,	6 months	Arrest	Self-control, substance misuse, Alcohol Use Disorders Identification Test score, drug offense, violent offender status, violent charges, first incarceration, social support, high school graduate, homelessness, generalized anxiety disorder, PTSD, depression, children, custody status, age, race
9	Cimino et al.	2015	57	36.5 (*SD* = 8.6)	90.7% White, 9% African American, 5.3% Other	Trauma Symptom Inventory, Substance Abuse Subtle Screening Inventory	15 months	Arrest or incarceration	Anger/irritability, defensive avoidance, alcohol misuse, substance misuse, anxiety, depression, intrusive experiences, dissociation
10	Dalbir	2017	379	30.7 (*SD* = 10.1)	46% Caucasian, 44% African American, 7% Hispanic, 4% Other,	Ad hoc measures	12 months	Arrest	Substance misuse, time served, prior jail admissions, gang member, homelessness, mental health conditions,

								co-occurring disorder, age, race
11	Deschan es et al.	2007	2,122	Not reported	48.2% White, 50.3% Black, 1.1% other, 15.2% Hispanic, 63.2% Non-Hispanic	Administrative records	36 months	Arrest	Race, violent offense, drug offense, prior arrest, violent first offense, drug first offense, age
12	Evans	2009	26	32.5	88.5% Caucasian, 11.5% African American	Childhood Experience of Care and Abuse Questionnaire, Women's Experience with Battering, Abuse Assessment Screen, Follow-up Abuse Questionnaire	6 months	Arrest	Childhood abuse, antipathy mother, neglect from mother, physical abuse from mother, antipathy father, neglect from father, physical abuse from father, sexual abuse, domestic violence, Abuse Assessment Screen, Women's Experience with Battering scale
13	Gehring & Van Voorhis	2014	103	27.1	43.7% White	Hamilton County Inventory of Need Pretrial Screening Tool	6 months	Failure to appear for court and new arrests	Substance misuse, criminal history, family/marital, employment/financial, child physical abuse, trauma history, mental health problems
14	Grella and Rodrigue z	2011	1,158	36.6 (SD = 8.7)	44.9% White	Ad hoc measures	12 months	Incarceration	Drug offense, violent charge, felon, race
15	Hamilton et al.	2004	8,815	Not reported by gender	66.7% White, 18.5% Black, 14.8% Other	Static Risk Offender Needs Guide-Revised	24 months	Arrest or violation of parole or probation	Substance misuse, antisocial attitude, antisocial associates, family/marital, educational needs, employment needs,

								housing needs, mental health
16	Holtfrett er et al.	2004	134	32.5	66.7% White, 18.5% Black, 14.8% Other	Modified Level of Service Inventory-Revised	6 months	Arrest	Substance misuse, criminal history, antisocial attitudes, family/marital, leisure/recreation, education, education/employment, financial needs, poverty, emotional/personal, age, race
17	Huebner et al.	2010	506	33.8 (SD = 8)	64% White	Administrative records	96 months	Conviction	Drug offence, drug use at release, prior convictions, time served, prior misconduct, marital status, education, employment, community disadvantage, lived alone, mental health, cohabitating, minor children, age, race
18	Ivey	2018	71	37	Not reported by gender	Revised Conflict Tactics Scale	18 months	Arrest	Race, intimate partner violence, depression
19	Johnson et al.	2011	261	36.4 (SD = 9.6)	23% White, 73% Black, 4% Mixed/Other	Diagnostic Interview Schedule Screener	4 months	Arrest	Major depressive disorder, baseline number of prior arrests, age, African American, employment
20	Jones et al.	2018	317	28% 18-29 years	70% Black	Washington University Risk Behavior Assessment	8 months	Felony charge, misdemeanor, or municipal violation	Crack/cocaine use, prior arrests, social support, education, unstable housing, childhood sexual abuse, childhood separation from parents, victimization exposure, race
21	Kim[b]	2010	670	35.63 (SD = 9.1)	Not reported by gender	Level of Service Inventory- Revised	24-36 months	Incarceration	Substance misuse, criminal history, antisocial attitudes,

								antisocial associates, family/marital, leisure/recreation, education/employment, financial needs, housing needs, emotional/personal
22	Kim[b]	2010	267	36.9 (*SD* = 8.8)	Not reported by gender	Level of Service Inventory- Revised	24-36 months	Incarceration	Substance misuse, criminal history, antisocial attitudes, antisocial associates, family/marital, leisure/recreation, education/employment, financial needs, housing needs, emotional/personal
23	Kopak et al.	2015	381	21% under 25	83% Non-Hispanic White	Ad hoc, DSM-IV criteria	12 months	Arrest	Substance relapse, adolescent conduct problems, unemployment
24	Kubiak	2004	60	38.1 (*SD* = 7.5)	50% White	National Comorbidity Survey, Composite International Diagnostic Interview	Not reported	Arrest, parole revocation	PTSD
25	Lapham et al.	2000	628	30.4	38.2% Non-Hispanic White, 50.2% Hispanic, 11.6% American Indian	Michigan Alcohol Screening Test, Minnesota Multiphasic Personality Inventory, MacAndrew Alcoholism Scale. structured clinical interview according to DSM-III-R criteria, breathalyzer test	60 months	Arrest	Violence towards spouse, Michigan Alcohol Screening Test score, MacAndrew Alcoholism Scale score, blood alcohol content at arrest, substance misuse, prior charge for driving while intoxicated, marital status, alcoholic spouse, high school diploma/GED/12 years of education, childhood physical or sexual abuse,

								parent with an alcohol problem, race
26	Lovins et al.	2007	1340	34	Treatment group: 47.8% White; control group: 36.2% White	Administrative data	24 months	Incarceration	Race
27	Lowenka mp et al.	2001	125	31.9 (SD = 7.8)	57.1% Non-White	LSI-R, ad-hoc scales	39 months	Incarceration	Race, age, child abuse
28	McCoy and Miller	2013	164	37.6 (SD = 9.1)	30.5% Caucasian, 48.2% African American, 18.9% Hispanic, 2.4% Other	Inventory of Offender Risk, Needs, and Strength	24 months	Arrest	Anger regulation Hit/throw things at spouse or partner, alcohol/drug problem, number of arrests, antisocial associates, educational training, educational strengths, age
29	Messina et al.	2006	1933	36 (SD = 7.6)	37% White, 31% Black, 21% Hispanic, 11% Other	Adapted from the Initial Assessment	12 months	Incarceration	Years incarcerated, marital status, divorce status, employment needs, abused as a child, comorbid disorder, age
30	Morash et al.	2016	226	33.8 (SD = 10.4)	48.7% White and not Hispanic, 27.9% Black and not Hispanic 22.6% Hispanic or multiracial	Dual-Role Relationship Inventory–Revised, Women's Risk/Needs Assessment, Adapted Brief Symptom Inventory, adapted Hong Psychological Reactance Scale, agency case notes	24 months	Convictions	Supervision intensity, anxiety/reluctance
31	Olson et al.	2015	3,014	35.7 (SD = 9.2)	40.7% White, 53.6% Black, 5.7% Hispanic	Ad hoc	40.8 months	Arrest	Felony class, time in prison, prior disciplinary incidents, prior violent disciplinary incidents, prior prison sentences,

								number of prior domestic violence arrests, number of prior violent arrests, number of prior arrests for drug possession, number of prior arrests for drug sales, single, educational level, childhood physical abuse, self-harm history, mental health medication, age, race
32	Robbins et al.	2009	276	30.7	68% Black, 4% Latina	Ad hoc	18 months	Arrest	Substance misuse, prior arrests, education level, expects to live with children, age, race
33	Robertson et al.	2019	2,415	Not reported by gender	Not reported by gender	Ad hoc, Driving behavior survey, blood alcohol concentration, Inventory of Drug Use Consequences, Research Institute on Addictions Self-Inventory	12-months	Arrest	Reckless driving, alcohol-related weight loss, unable to limit alcohol use, loss of interests other than alcohol, alcohol-related blackouts, prior alcohol-related driving arrests
34	Salekin et al.	1998	78	30.6 (SD = 7.7)	62.8% White, 28.2% Black, 7.7% Hispanic, 1.3% Native American	Personality Assessment Inventory, Psychopathy Checklist-Revised. Personality Disorder Examination	12 months	Arrest, detention, incarceration	Psychopathy, antisocial scale, aggression
35	Salgado	2007	200	16% less than 24 years of age, 54.5% ages 25-35, 59% greater	55% White Non-Hispanic, 20% Black, Non-Hispanic 12.5% Hispanic, 6% Native American/Alask	Adapted Cohen's Perceived Stress Scale, Ways of Coping Questionnaire, ad hoc measures	6 months	Incarceration	Drug use, alcohol use, prior sentence, under 18 at first arrest, length of sentence over one year, antisocial attitudes, lack of family support, marital status, partner stress, relationship stress,

			than 35 years	an, 5% Asian/Pacific Islander, 6% Other				family drug exposure, family involved in corrections, education level, education/employment, employment status, basic needs, structural support in and out of prison, threat of harm as a child, childhood sexual abuse, adult sexual or physical abuse, hopelessness, minor children, child stress, age, race, health and safety problems
36	Salisbury et al.	2009	134	34.2	50.7% White, 32.8% Black, 14.9% Hispanic, 1.5% Native American	Level of Service Inventory- Revised, Institutional Risk Assessment (Custody Classification Scale), Millon Clinical Multiaxial Inventory, Rosenberg Self-Esteem scale, Sherer Self-Efficacy scale, ad hoc measures	44.2 months	New crimes and technical violations	Substance misuse, antisocial associates, education/employment, financial needs, adult harassment, self-efficacy,
37	Salisbury; Salisbury & Van Voorhis; Van Voorhis et al[c]	2007; 2009; 2008, 2010, n.d.	313	31.9	67.8% White, 29.9% African American, 1% Asian, 1 Hispanic/Latino, .3% Biracial	Women's Risk/Need Assessment	21.6 months	Prison admission	Anger, past substance misuse, current substance misuse, criminal history, antisocial associates, antisocial family, antisocial home environment, family support, family conflict, relationship dysfunction, education challenges, educational strengths, employment/financial, unsafe housing, adult

								victimization, adult physical abuse, adult emotional abuse, adult harassment, general childhood abuse, history of childhood abuse, history of adult abuse, self-esteem, self-efficacy, depression/anxiety, psychosis, history of mental illness, parental stress, parental involvement
38	Schonbrun et al.	2017	165	34.9 (SD = 8.6)	67.9% Non-Latino Caucasian, 23.6% African American, 7.3% Latino, 1.2% Other	Timeline Followbac, Medical Outcomes Study Social Support Survey, ad hoc measures	5 months	Incarceration	Need for SUD treatment, employment needs, need for benefits, need for transportation assistance, housing needs, need for abuse services, mental health needs, need for child care assistance, medical service needs, prescription needs, HIV/STD service needs, legal aid needs
39	Scott & Dennis, Scott et al.[a]	2012; 2014	624	7% 18-20, 22% 21-29, 26% 30-39, 35% 40-49, 11% 50+ years	83% African American, 9% Caucasian, 5% Hispanic, 4% Mixed/other	A modified version of the Global Appraisal of Individual Needs, Family Effectiveness Measure, Lifestyle Criminality Screening Form, Psychological Inventory of Criminal Thinking Styles	36 months	New charge	Antisocial personality, conduct disorder, lifestyle criminality, alcohol misuse, marijuana misuse, cocaine misuse, opiate misuse, abstinence, age at first arrest, antisocial attitudes, marital status, less than 6th grade literacy, unemployment, co-occurring disorder, mood disorder, generalized anxiety

									disorder, attention deficit disorder, borderline personality disorder, traumatic stress
40	Skeem et al.	2016	7,155	38.2 (*SD* = 10.9)	41.2% African American	Federal Post-Conviction Risk Assessment	1030.13 days (*SD* = 299.5)	Arrest	Substance misuse, criminal history, antisocial attitudes, antisocial associates, employment needs
41	Skopp et al.	2007	113	34.6 (*SD* = 8.3)	64% White, 14% African American, 12% Native American, 10% Other	Personality Assessment Inventory	12 months	General infractions	Aggression, dominance, violence potential index, antisocial features, history of violence, traumatic stress, borderline features, age
42	Staton et al.; Surrat et al.[a]	2019, 2018	284	32.2 (*SD* = .8.1)	98.6% White	Texas Christian University Family and Friends Assessment, Strength Self-Efficacy Index, ad hoc measures	12 months	Incarceration	Drug use, alcohol/drug use in home, injection drug use, illicit drug use, using drugs with friends, prior arrests, substance exposure in home, marital status, nonconforming partner, employment status, financial needs, substance use in home, unstable living environment, self-efficacy, living with intimate partner, living with spouse/significant other, living with parents/family, living with other adults, age, health problems, insurance
43	Tiller	2003	167	40.2% under 29, 36.4% between	59.8% White/Hispanic, 27.1% White/non-	Risk Prediction Index	48 months	Arrest, incarceration, revocations of parole or probation	Substance misuse, prior arrest with weapon, absconding history, employment needs

			30-39, 59.8% over 40	Hispanic, 13.1% Black/non-Hispanic				
44	Vigesaa	2013	290	31. 7 (SD = 9.2)	76.9% White, 23.1& Native American	Level of Service Inventory- Revised	18-40 months	Technical violation or new offense	Criminal history, antisocial associates, leisure/recreation, education, employment, financial needs, childhood abuse, abuse as an adult, age, race
45	Vitacco et al.	2011	76	42.76 (SD = 11.8)	76.3% European American, 14.5% African American, 9.2% Other Ethnic Minority	Ad hoc measures	4.6 months	Revocation of conditional release	Antisocial personality disorder, supervision level, substance misuse, prior charges, violent offense, supervision level, mood disorder, psychotic disorder, hospitalization
46	Van Voorhis et al.[ac]	2008, 2010, n.d.	161	35.3	70.3% White, 29% African American, .6% Pacific Islander	Women's Risk Needs Assessment	24 months	Incarceration	Anger, substance misuse, history, current substance misuse, criminal history, antisocial attitudes, antisocial associates, family conflict, relationship dysfunction, educational needs, educational strengths, employment/financial, living alone, abuse as an adult, adult physical abuse, adult emotional abuse, adult harassment, child abuse history, child abuse, self-efficacy, self-esteem, psychosis, depression/anxiety, mental health history,

Note: Column headers are not shown on this page. The columns appear to be: No., Author, Year, N, Age, Race/Ethnicity, Measure, Follow-up time, Outcome, and Predictors.

								parental involvement, parental stress
47	Van Voorhis et al., Wright et al.[ac]	2008, 2010; n.d.	198	33.7	70.2% White, 12.1% African American, 13.1% American Indian, 2% Latino	Level of Service Inventory- Revised, Women's Risk Needs Assessment	12 months	Any misconduct	Criminal history, antisocial attitudes, antisocial associates, family/marital, relationship dysfunction, leisure/recreation, education/employment, financial needs, accommodation, adult harassment, emotional/physical victimization, childhood abuse, self-esteem, self-efficacy, emotional/personal
48	Van Voorhis et al., Wright et al.[ac]	2008, 2010, n.d.; 2007	272	33.7 (*SD* = 8.3)	79.6% White, 19.5% African American, .4% Asian, .4% Indian	Women's Risk Needs Assessment	12 months	Misconducts	Anger, past substance misuse, present substance misuse, criminal history, antisocial attitudes, antisocial associates, family conflict, family support, relationship dysfunction, educational needs, educational challenges, employment/financial, unsafe housing, adult abuse history, adult physical abuse, adult emotional abuse, adult harassment, child abuse, self-esteem, self-efficacy, mental health history, depression/anxiety, lack of parental involvement, parental stress,

49	Van Voorhis et al., Wright et al.[ac]	2008, 2010, n.d.; 2007	233	34	72.5% White, 18.9% African American, 2.6% American Indian, 3.4% Latino	Level of Service Inventory- Revised, Women's Risk Needs Assessment Trailer	12 months	Any revocation	Substance misuse, antisocial attitudes, antisocial associates, family/marital, education/employment, income, public assistance, child abuse, parental stress
50	Van Voorhis et al.[ac]	2008, 2010	134	34.6	50.7% White	Level of Service Inventory- Revised, Women's Risk Needs Assessment	17 months	Arrest	Substance misuse, criminal history, antisocial attitudes, antisocial associates, family/marital, relationship dysfunction, leisure/recreation, education/employment, financial needs, accommodation needs, adult physical abuse, child abuse, self-esteem, self-efficacy, parental stress
51	Van Voorhis et al.[ac]	2008, 2010	156	34.6	53.2% White	Level of Service Inventory- Revised, Women's Risk Needs Assessment	6 months	Prison misconduct	Substance misuse, criminal history, antisocial attitudes, antisocial associates, family/marital, relationship dysfunction, leisure/recreation, education/employment, financial needs, accommodation needs, adult physical abuse, child abuse, self-esteem, self-efficacy, mental health,
52	Van Voorhis et al.[ac]	2008, 2010, n.d.	158	34.3	29.9% White, 1.3% African American, 38,9%	Level of Service Inventory- Revised, Women's Risk Needs Assessment Trailer	24 months	Arrest	Substance misuse, crystal meth use, criminal history, antisocial attitudes,

				Hawaiian or part Hawaiian, 6.4% Filipina, 3.2% Pacific Islander, 6.4% Asian, 3.8% Hispanic/Latina, 10.2% Other				antisocial associates, family/marital, relationship dysfunction, family supportive of prosocial behavior, leisure/recreation, education/employment, financial needs, income, homelessness, unsafe housing, adult physical abuse, adult emotional abuse, adult harassment, abuse history, intimate partner violence, child abuse, self-esteem, self-efficacy, depression, mental health, parental stress
53	Van Voorhis et al.[b]	2012	187	36	1.5% Asian, 20.6% African American, 1% Other, 76.3% White	Women's Risk Needs Assessment	12 months	Arrests, convictions, return to prison, any offense failure	Substance misuse, antisocial associates, family support, relationship dysfunction, educational assets, employment/financial, child abuse, depression, parental stress
54	Van Voorhis et al.[b]	2012	35	33	2.8% African American, 97.2% White	Women's Risk Needs Assessment	12 months	Arrests, convictions, return to prison, any offense failure	Past substance misuse, present substance misuse, antisocial associates, family support, family conflict, relationship dysfunction, unsafe housing
55	Van Voorhis et al.[b]	2012	169	33	7% African American, .6% Hispanic/Latina, .6% Native American, 1.7% Other, 90.1% White	Women's Risk Needs Assessment	12 months	Arrests, convictions, return to prison, any offense failure	Substance misuse, criminal history, employment/financial, adult abuse, lifetime sexual abuse, depression, parental stress

56	Van Voorhis et al.[b]	2012	210	35.3	17.5% African American, 11% Hispanic/Latina, 2% Native American, 1.5% Other, 68% White	Women's Risk Needs Assessment Trailer, Level of Service Inventory- Revised	12 months	Arrests, convictions, return to prison, any offense failure	Anger, substance misuse, antisocial attitudes, antisocial associates, family conflict, family/marital, relationship satisfaction, leisure/recreation, education/employment, employment/financial, accommodation, child abuse, sexual abuse, self-efficacy, mental health
57	Van Voorhis et al.[b]	2013a	53	35.8	3.1% Asian, 19.4% African American, 1% Hispanic/Latina, 1% Native American, 75.5% White	Women's Risk Needs Assessment	12 months	Any misconduct	Antisocial associates, relationship satisfaction, PTSD, parental involvement
58	Van Voorhis et al.[b]	2013a	347	34.7	25.5% African American, 2.6% Hispanic/Latina, 1.3% Native American, 67% White, 3.7% Other	Women's Risk Needs Assessment	12 months	Any misconduct	Anger, past substance misuse, current substance misuse, antisocial associates, education/employment, employment/financial, child abuse, PTSD, depression, mental health
59	Van Voorhis et al.[b]	2013a	69	34.9	18.3% African American, 9.9% Hispanic/Latina, 1.5% Native American, 69.5% White, .8% Other	Level of Service Inventory- Revised , Women's Risk Needs Assessment	12 months	Any misconduct	Anger, financial needs, child abuse, adult abuse, self-efficacy, depression, psychosis, parental stress
60	Van Voorhis et al.[b]	2013b	85	34.2	33.3% African American, 1% Native American, 63.7% White	Level of Service Inventory- Revised , Women's Risk Needs Assessment Trailer,	12 months	Arrests, convictions, incarcerations, technical	Substance misuse, antisocial associates, relationship dysfunction, relationship satisfaction, educational needs,

								violations, offense failures	educational assets, employment/financial, adult abuse, self-efficacy, depression, psychosis, emotional/personal, parental stress,
61	Van Voorhis et al.[b]	2013b	102	32.6	50.9% African American, 47.3% White	Level of Service Inventory- Revised , Women's Risk Needs Assessment Trailer,	12 months	Arrests, convictions, incarcerations, technical violations, offense failures	Past substance misuse, current substance misuse, employment/financial, childhood abuse, physical abuse, parental involvement, anger
62	Van Voorhis et al.[b]	2013b	51	33.3	60.4% African American, 5.7% Hispanic/Latina , 34% Native American	Level of Service Inventory- Revised , Women's Risk Needs Assessment Trailer,	12 months	Arrests, convictions, incarcerations, technical violations, offense failures	Anger, criminal history, education/employment, accommodation, child abuse, physical abuse, emotional/personal, mental health history, parental stress, parental difficulties, parental involvement
63	Van Voorhis et al.[b]	2013b	315	34	.3% Asian, 19.5% African American, .9% Native American, 79.3% White	Level of Service Inventory- Revised , Women's Risk Needs Assessment Trailer,	12 months	Arrests, convictions, incarcerations, technical violations, offense failures	Anger, past substance misuse, criminal history, antisocial associates, family conflict, relationship dysfunction, relationship satisfaction, education/employment, employment/financial, adult abuse, self-efficacy, parental involvement
64	Wright et al.[c]	n.d.	150	31.8	55.3% White, 29.3% African American, 8% American Indian, 2% Latino	Level of Service Inventory- Revised , Women's Risk Needs Assessment Trailer	12 months	Revocations	Antisocial attitudes, antisocial associates, leisure/recreation, education/employment, income, homelessness, adult harassment

Table 1.4

Mean Effect Sizes of Risk Factor Domains

Risk Factor Domain	# St.	# ES	Mean r	95% CI	p	% Var. Level 1	Level 2 Var.	% Var. Level 2	Level 3 Var.	% Var. Level 3	I^2	τ	Egger's
Gender-Neutral													
APP	19	30	.147	[.088, .204]	<.001	28.08	.000	.000	.011**	71.920			.147***
Antisocial associates	28	30	.112	[.070, .154]	<.001	3.274	.008***	96.726	.000	0.000			.104***
Substance misuse	42	70	.111	[.080, .142]	<.001	5.165	.012***	94.835	.000	0.000			.094***
Education/employment	41	56	.088	[.058, .117]	<.001	14.517	.004***	51.410	.003	34.073			.054*
Antisocial behavior	41	74	.084	[.047, .120]	<.001	0.406	.004***	30.127	.008	69.467			.072**
Antisocial attitudes[a]	16	16	.080	[.022, .137]	.011						88.640	.089	-.990
Family/marital	29	66	.075	[.053, .098]	<.001	34.384	.004***	65.616	.000	0.000			.080***
Leisure/recreation[a]	10	10	.032	[-.034, .098]	.298						36.990	.051	-.805
Gender-responsive													
Financial needs	31	38	.114	[.073, .154]	<.001	29.413	.008	58.789	.002	11.798			.089*
Housing safety	18	20	.095	[.038, .151]	.002	21.283	.001*	78.717	.000	0.000			.078
Mental health	37	66	.080	[.053, .106]	<.001	29.251	.000	0.000	.003***	70.749			.066***
Psychosis only[a]	5	5	.146	[.067, .223]	.007						0.010	.001	-1.617
Depression only	15	17	.082	[.033, .132]	.003	31.909	.000	0.000	.003	68.091			.086*
PTSD only	7	8	.044	[-.026, .113]	.178	75.378	.000	0.000	.000	24.622			.065
Low self-efficacy	13	22	.079	[.029, .128]	.004	48.920	.000	0.000	.004*	51.080			.025
Victimization	31	81	.075	[.052, .097]	<.001	79.632	.000	0.000	.001*	20.368			.050***
Child	22	41	.078	[.045, .110]	<.001	69.954	.000	0.000	.002	30.046			.052**
Adult	15	31	.081	[.047, .114]	<.001	83.262	.000	0.000	.001	16.738			-.002
Sexual[a]	5	5	.074	[-.003, .151]	.056						0.000	.000	.947
Parental stress	22	32	.071	[.024, .117]	.005	46.019	.003	21.311	.004	32.669			.090*
Other													
Lack of social support	4	6	.032	[-.065, .128]	.438	45.061	.001	18.92	.002	36.020			.028
Cohabitation	3	5	-.090	[-.355, .189]	.424	27.679	.000	0.000	.020	72.321			-.027
Service needs	3	7	-.008	[-.129, .113]	.871	31.021	.012**	68.979	.000	0.000			-.079
Age[a]	18	18	-.005	[-.013, .004]	.260						88.010	.010	.114
Race	21	30	.002	[-.032, .033]	.990	17.926	.004***	82.074	.000	0.000			-.006

Note. # St. = number of studies; # ES = number of effect sizes; r = Pearson's r; CI = confidence interval; % Var. = percentage of variance explained; Level 2 Var. = variance between effect sizes from the same study; Level 3 Var. = variance between studies; APP = antisocial personality pattern

* $p < .05$, ** $p < .01$, *** $p < .001$.

[a] Risk domain was evaluated using a two-level random effects model, as studies reported only one effect size

Table 1.5

Subgroup Analyses

Subgroup	# Studies	# ES	r	95% CI	p	% Var. Level 1	Level 2 Var.	% Var. Level 2	Level 3 Var.	% Var. Level 3	I^2	τ
(1) Antisocial personality pattern												
Published	12	23	.119	[.070, .168]	<.001	54.619	.000	0.000	.004*	45.381		
Not published[a]	7	7	.209	[.033, .372]	.027	12.631					84.420	.175
Converted	7	12	.080	[.017, .143]	.018	59.716	.000	0.000	.003	40.284		
Not converted	12	18	.190	[.107, .271]	<.001	24.145	.000	0.000	.014	75.855		
Bivariate	17	27	.153	[.088, .217]	<.001	26.275	.000	0.000	.012**	73.725		
Multivariate	2	3	.093	[-.203, .374]	.311	40.490	.001	6.700	.006	52.809		
Primarily non-White	5	8	.108	[-.026, .239]	.099	28.012	.000	0.000	.011	71.988		
Primarily White	13	21	.159	[.085, .231]	<.001	27.107	.000	0.000	.012	72.893		
(2) Substance misuse												
Published	25	45	.108	[.064, .151]	<.001	4.002	.016***	95.998	.000	0.000		
Not published	17	25	.109	[.067, .151]	<.001	9.467	.006***	90.533	.000	0.000		
Converted	21	39	.091	[.044, .137]	<.001	3.911	.017***	96.089	.000	0.000		
Not converted	21	31	.134	[.096, .171]	<.001	12.155	.005	85.512	.000	2.333		
Bivariate	32	52	.121	[.083, .158]	<.001	4.980	.013***	95.020	.000	0.000		
Multivariate	13	18	.085	[.026, .143]	.007	5.991	.011***	94.009	.000	0.000		
Primarily non-White	9	18	.080	[.020, .139]	.012	5.679	.011***	94.321	.000	0.000		
Primarily White	30	45	.126	[.085, .166]	<.001	5.025	.013***	94.975	.000	0.000		
(3) Education/employment												
Published	27	39	.097	[.061, .132]	<.001	15.961	.004***	53.309	.002	30.73		
Not published	14	17	.072	[.014, .130]	.018	12.333	.002	21.789	.006	65.878		
Converted	23	29	.049	[.014, .084]	.008	17.672	.005	82.328	.000	0.000		
Not converted	20	27	.139	[.097, .180]	<.001	19.329	.001	25.624	.003	55.047		
Bivariate	27	38	.123	[.089, .156]	<.001	17.820	.003***	53.058	.002	29.122		
Multivariate	14	18	.015	[-.020, .050]	.390	32.331	.002	67.669	.000	0.000		
Primarily non-White	9	13	.053	[.012, .094]	.016	42.890	.001	52.526	.000	4.584		
Primarily White	28	38	.103	[.069, .136]	<.001	20.812	.002	31.954	.003	47.234		
(4) Antisocial behavior												
Published	26	46	.086	[.039, .133]	.001	0.425	.000**	1.216	.011***	98.359		
Not published	15	28	.074	[.011, .136]	.024	0.329	.009***	61.810	.006	37.860		
Converted	24	54	.050	[.014, .087]	.007	0.594	.005***	54.860	.004	44.546		
Not converted	17	20	.152	[.079, .224]	<.001	0.316	.000	0.000	.016**	99.684		
Bivariate	26	36	.123	[.065, .180]	<.001	0.298	.000	1.500	.016**	98.202		
Multivariate	17	38	.032	[.009, .054]	.007	1.202	.004***	98.798	.000	0.000		
Primarily non-White	11	27	.035	[-.001, .070]	.057	2.096	.000**	6.060	.002	91.843		

148

Primarily White	26	39	.096	[.043, .148]	.001	0.296	.001***	60.339	.007	39.365		
(5) Antisocial associates												
Published	16	18	.111	[.055, .167]	.001	2.872	.009***	97.128	.000	0.000		
Not published	12	12	.109	[.035, .182]	.008	3.999	.003	48.001	.003	48.001		
Converted	11	13	.093	[.008, .176]	.035	1.754	.015***	98.246	.000	0.000		
Not converted[a]	17	17	.162	[.122, .202]	<.001						71.900	.063
Bivariate	20	21	.160	[.118, .201]	<.001	6.567	.002	47.486	.002	45.947		
Multivariate[a]	9	9	.004	[-.001, .009]	.094						10.690	.004
Primarily non-White[a]	4	4	.075	[-.059, .207]	.172						68.840	.072
Primarily White	21	23	.125	[.078, .172]	<.001	4.158	.006***	95.842	0.000	0.000		
(6) Antisocial attitudes[a]												
Published	3	3	.094	[-.319, .477]	.441						71.940	.257
Not published	13	13	.069	[.012, .126]	.023						91.190	.397
Converted	5	5	.097	[-.015, .206]	.074						62.860	.100
Not converrted	11	11	.067	[-.016, .149]	.103						95.980	.089
Bivariate	14	14	.088	[.021, .155]	.014						88.560	.100
Multivariate	2	2	.023	[-.359, .398]	.140						52.620	.182
Primarily non-White	2	2	.137	[-.257, .493]	.143						0.000	.000
Primarily White	11	11	.059	[-.018, .135]	.118						70.530	.293
(7) Family/marital												
Published	20	43	.082	[.055, .110]	<.001	34.543	.004***	65.457	.000	.000		
Not published	10	23	.058	[.008, .107]	0.024	34.849	.002	34.076	.002	31.075		
Converted	13	24	.062	[.02, 0.104]	.006	24.169	.007***	75.831	.000	.000		
Not converted	17	42	.087	[.058, .116]	.000	68.043	.000	0.000	0.001	31.957		
Bivariate	22	54	.096	[.073, .120]	.000	42.756	.003*	57.244	.000	.000		
Multivariate	8	12	.012	[-.022, .045]	.468	68.654	.001*	31.346	.000	.000		
Primarily non-White	6	17	.077	[.032, .121]	.002	35.964	.004***	64.036	.000	.000		
Primarily White	20	46	.076	[.044, .108]	.000	39.221	.002	34.784	0.001	25.995		
(8) Leisure/recreation[a]												
Published	6	6	.004	[-.118, .125]	.940						50.996	.084
Not published	4	4	.057	[-.027, .141]	.118						0.000	.018
Converted	3	3	.025	[-.113, .161]	.526						32.222	.032
Not converted	7	7	.038	[-.070, .145]	.425						51.604	.084
Bivariate	7	7	.038	[-.070, .145]	.425						51.604	.084
Multivariate	3	3	.025	[-.113, .161]	.526						32.222	.032
Primarily non-White	1	1	.080	[-.077, .233]	.318						0.000	.000
Primarily White	7	7	.025	[-.083, .132]	.593						52.051	.084
(9) Housing safety												
Published	13	15	.101	[.030, .172]	.009	18.023	.012*	81.977	.000	0.000		
Not published[a]	5	5	.032	[-.034, .097]	.251						0.000	.000

Converted	8	10	.101	[.005, .195]	.041	15.525	.014*	84.475	.000	0.000		
Not converted[a]	10	10	.089	[.013, .161]	.025						44.860	.071
Bivariate	13	14	.097	[.024, .169]	.013	20.115	.010*	79.885	.000	0.000		
Multivariatee[a]	6	6	.091	[-.042, .220]	.134						74.570	.101
Primarily Non-white[a]	4	4	.095	[-.037, .224]	.106						12.690	.033
Primarily White[a]	11	13	.090	[.011, .167]	.028	19.151	.011*	80.849	.000	0.000		
(10) Victimization												
Published	18	49	.054	[.030, .077]	<.001	87.500	.000	0.000	.001	12.500		
Not published	13	32	.117	[.080, .154]	<.001	89.085	.000	0.000	.001	10.915		
Converted	9	14	.028	[-.001, .057]	.055	100.000	.000	0.000	.000	0.000		
Not converted	22	67	.095	[.068, .122]	<.001	79.400	.000	0.000	.001*	20.600		
Bivariate	25	73	.089	[.066, .113]	<.001	83.238	.000	0.000	.001	16.762		
Multivariate	6	8	.016	[-.022, .052]	.355	100.000	.000	0.000	.000	0.000		
Primarily non-White	8	19	.053	[.016, .089]	.007	87.379	.000	0.000	.001	12.621		
Primarily White	22	61	.084	[.057, .111]	<.001	80.487	.000	0.000	.001	19.513		
(11) Mental health												
Published	24	44	.068	[.035, .100]	<.001	27.371	.000	0.000	.003**	72.629		
Not published	13	22	.103	[.066, .140]	<.001	100	.000	0.000	.000	0.000		
Converted	17	30	.049	[.011, .086]	.013	30.692	.000	0.000	.003*	69.308		
Not converted	20	36	.107	[.078, .137]	<.001	62.646	.000	0.000	.001	37.354		
Bivariate	27	53	.094	[.063, .125]	<.001	32.816	.000	0.000	.003***	67.184		
Multivariate	10	13	.029	[-.001, .058]	.056	67.84	.000	0.000	.001	32.160		
Primarily non-White	7	14	.032	[-.013, .076]	.150	49.325	.000	0.000	.001	50.675		
Primarily White	26	47	.100	[.070, .130]	<.001	41.586	.000	0.000	.002	58.414		
(12) Low self-efficacy												
Published	9	18	.062	[.001, .122]	.047	44.544	.000	0.000	.005*	55.456		
Not published[a]	4	4	.136	[.065, .205]	.009						0.000	.000
Not converted	12	21	.090	[.040, .140]	.001	53.802	.000	0.000	.004*	46.198		
Bivariate	12	21	.090	[.040, .140]	.001	53.802	.000	0.000	.004*	46.198		
Primarily non-White	1	4	.198	[.072, .317]	.015	100.000	.000	0.000	.000	0.000		
Primarily White	12	18	.063	[.016, .109]	.011	60.323	.000	0.000	.003	39.677		
(13) Age[a]												
Published	12	12	-.002	[-.008, .005]	.535						75.875	.000
Not published	6	6	-.007	[-.104, .091]	.870						98.595	.004
Converted	14	14	-.005	[-.014, .004]	.240						91.226	.000
Not converted	4	4	.048	[-.072, .167]	.292						57.446	.004
Bivariate	4	4	.022	[-.206, .249]	.778						74.698	.016
Multivariate	14	14	-.005	[-.012, .003]	.177						90.206	.000
Primarily non-White	6	6	.000	[-.014, .015]	.937						79.691	.000
Primarily White	11	11	-.008	[-.020, .005]	.189						68.924	.000

	# studies	# ES	r	CI	p	Q	p	% Var	Level 2 Var	Level 3 Var	Level 2 Var	p
(14) Race												
Published	14	18	-.004	[-.042, .034]	.832	29.058	.002	70.942	.000	0.000		
Not published	7	12	.009	[-.058, .076]	.774	10.137	.007***	89.863	.000	0.000		
Converted	17	26	.004	[-.031, .039]	.810	16.830	.004***	83.170	.000	0.000		
Not converted[a]	4	4	-.037	[-.152, .079]	.387						.000	.000
Bivariate	9	12	.001	[-.089, .091]	.983	6.651	.004	31.444	.008	61.904		
Multivariate	12	18	.003	[-.038, .045]	.867	20.163	.003***	79.837	.000	0.000		
(15) Service needs[a]												
Published	2	6	-.017	[-.164, .132]	.787	26.560	.015**	73.440	.000	0.000		
Bivariate	2	2	-.060	[-.875, .842]	.642						77.870	.127
Multivariate	2	5	.016	[-.150, .181]	.807	30.100	.012	69.900	.000	0.000		
Primarily non-White	3	7	-.008	[-.129, .113]	.871	31.021	.012**	68.979	.000	0.000		
Primarily White	3	7	-.008	[-.129, .113]	.871	31.021	.012**	68.979	.000	0.000		

Note. # studies = number of studies; # ES = number of effect sizes; r = Pearson's r; CI = confidence interval; % Var. = percentage of variance explained; Level 2 Var. = variance between effect sizes from the same study; Level 3 Var. = variance between studies

* $p < .05$, ** $p < .01$, *** $p < .001$.

[a] Evaluated using a two-level random effects model, as studies reported only one effect size

Table 2.1

Mean Effect Sizes of Risk Factor Domains

Risk Factor Domain	# St.	# ES	Mean r	95% CI	p	% Var. Level 1	Level 2 Var.	% Var. Level 2	Level 3 Var.	% Var. Level 3	I^2	τ	Egger's
Gender-Neutral													
APP	19	30	.147	[.088, .204]	<.001	28.08	.000	.000	.011**	71.920			.147***
Antisocial associates	28	30	.112	[.070, .154]	<.001	3.274	.008***	96.726	.000	0.000			.104***
Substance misuse	42	70	.111	[.080, .142]	<.001	5.165	.012***	94.835	.000	0.000			.094***
Education/employment	41	56	.088	[.058, .117]	<.001	14.517	.004***	51.410	.003	34.073			.054*
Antisocial behavior	41	74	.084	[.047, .120]	<.001	0.406	.004***	30.127	.008	69.467			.072**
Antisocial attitudes[a]	16	16	.080	[.022, .137]	.011						88.640	.089	-.990
Family/marital	29	66	.075	[.053, .098]	<.001	34.384	.004***	65.616	.000	0.000			.080***
Leisure/recreation[a]	10	10	.032	[-.034, .098]	.298						36.990	.051	-.805
Gender-responsive													
Financial needs	31	38	.114	[.073, .154]	<.001	29.413	.008	58.789	.002	11.798			.089*
Housing safety	18	20	.095	[.038, .151]	.002	21.283	.001*	78.717	.000	0.000			.078
Mental health	37	66	.080	[.053, .106]	<.001	29.251	.000	0.000	.003***	70.749			.066***
Psychosis only [a]	5	5	.146	[.067, .223]	.007						0.010	.001	-1.617
Depression only	15	17	.082	[.033, .132]	.003	31.909	.000	0.000	.003	68.091			.086*
PTSD only	7	8	.044	[-.026, .113]	.178	75.378	.000	0.000	.000	24.622			.065
Low self-efficacy	13	22	.079	[.029, .128]	.004	48.920	.000	0.000	.004*	51.080			.025
Victimization	31	81	.075	[.052, .097]	<.001	79.632	.000	0.000	.001*	20.368			.050***
Child	22	41	.078	[.045, .110]	<.001	69.954	.000	0.000	.002	30.046			.052**
Adult	15	31	.081	[.047, .114]	<.001	83.262	.000	0.000	.001	16.738			-.002
Sexual[a]	5	5	.074	[-.003, .151]	.056						0.000	.000	.947
Parental stress	22	32	.071	[.024, .117]	.005	46.019	.003	21.311	.004	32.669			.090*
Other													
Lack of social support	4	6	.032	[-.065, .128]	.438	45.061	.001	18.92	.002	36.020			.028
Cohabitation	3	5	-.090	[-.355, .189]	.424	27.679	.000	0.000	.020	72.321			-.027
Service needs	3	7	-.008	[-.129, .113]	.871	31.021	.012**	68.979	.000	0.000			-.079
Age[a]	18	18	-.005	[-.013, .004]	.260						88.010	.010	.114
Race	21	30	.002	[-.032, .033]	.990	17.926	.004***	82.074	.000	0.000			-.006

Note. # St. = number of studies; # ES = number of effect sizes; *r* = Pearson's *r*; CI = confidence interval; % Var. = percentage of variance explained; Level 2 Var. = variance between effect sizes from the same study; Level 3 Var. = variance between studies; APP = antisocial personality pattern
* *p* < .05, ** *p* < .01, *** *p* < .001.
[a] Risk domain was evaluated using a two-level random effects model, as studies reported only one effect size

Table 2.2

Characteristics of Studies Included in Primary Meta-Analysis (k = 64)

Study Characteristic	k (%)	N	Range	M
Total sample size		77,519	26-31,742	1,211.23
Age	55 (85.94%)		26.9-42.76	35.17
Follow-up Period			3-96	21.40
Race	58 (90.63%)			
Predominantly White	42 (72.41%)			
Predominantly African American	10 (17.24%)			
Predominantly Hispanic/Latinx	1 (1.72%)			
Predominantly Native Hawaiian	1 (1.72%)			
Settings				
Community	57 (89.06%)			
Institutional	7 (10.94%)			
Recidivism Indicators				
Mixed	22 (34.38%)			
Arrests	17 (26.56%)			
Incarcerations	14 (21.88%)			
Prison misconducts	7 (10.94%)			
Convictions	3 (4.69%)			
New charges	1 (1.56%)			

Table 2.3

Moderator Analyses

	# St.	# ES	Mean r	95% CI	β	95% CI	F(df1, df2)	p	Level 2 Var.	Level 3 Var.	I²	τ
(1) Antisocial Personality Pattern												
Study												
Published	19	30	.119**	[.048, .191]	.083	[-.043, .207]	F(1, 28) = 1.823	.188	.000***	.011**		
Not published	19	30	.201***	[.100, .299]	-.083							
Publication year	16	27	.151***	[.074, .227]	-.002	[-.015, .011]	F(1, 25) = 0.077	.783	.000***	.016*		
Follow-up period	19	30	.147***	[.089, .205]	-.002	[-.006, .002]	F(1, 28) = 0.975	.332	.000***	.011*		
Risk factors	19	30	.099	[-.081, .272]	.055	[-.136, .241]	F(1, 28) = 0.344	.563	.000***	.012**		
Did not adjust	19	30	.153***	[.089, .216]	.000							
Validated	19	30	.151***	[.087, .214]	-.042	[-.238, .157]	F(1, 28) = 0.188	.668	.000***	.012**		
Non-validated	19	30	.110	[-.080, .291]	.000							
Arrests	19	30	.042	[-.069, .153]	.135*	[.008, .258]	F(1, 28) = 4.768	.038	.000***	.009**		
Other	19	30	.176***	[.116, .235]	.000							
Incarceration	19	30	.150	[-.105, .386]	-.003	[-.261, .254]	F(1, 28) = 0.001	.979	.000***	.012**		
Other	19	30	.147***	[.084, .208]	.000							
Infractions	19	30	.237***	[.121, .347]	-.119	[-.251, .015]	F(1, 28) = 3.322	.079	.000***	.009*		
Other	19	30	.120***	[.059, .182]	.119							
Mixed	19	30	.182**	[.087, .274]	-.059	[-.179, .064]	F(1, 28) = 0.966	.334	.000***	.011*		
Other	19	30	.124**	[.050, .198]	.000							
Sample												
Mean age	16	25	.159***	[.090, .226]	-.013	[-.04, .015]	F(1, 23) = 0.900	.353	.000***	.013		
Percent White	18	29	.143	[-.037, .314]	.000	[-.003, .003]	F(1, 27) = 0.001	.976	.000***	.013*		
Percent violent	16	24	.145***	[.074, .215]	.002	[-.001, .004]	F(1, 22) = 1.328	.262	.000***	.014*		
(2) Antisocial associates												
Study												
Published	28	30	.112***	[.059, .164]	.002	[-.09, .094]	F(1, 28) = 0.002	.964	.009***	.000		
Not published	28	30	.114**	[.039, .187]	-.002							
Publication year	21	23	.107***	[.055, .158]	.011	[-.005, .027]	F(1, 21) = 2.192	.154	.009***	.000		
Follow-up period	25	27	.123***	[.079, .167]	-.002	[-.007, .002]	F(1, 25) = 1.175	.289	.008***	.000		
Validated	28	30	.106***	[.058, .152]	.039	[-.075, .152]	F(1, 28) = 0.494	.488	.008***	.000		
Non-validated	28	30	.144**	[.041, .244]	-.039							
Risk factors	28	30	.053	[-.015, .119]	.089*	[.005, .170]	F(1, 28) = 4.745	.038	.006***	.001		

Did not adjust	28	30	.14***	[.092, .189]	-.089*					
Arrests	28	30	.075	[-.022, .17]	.047	[-.061, .155]	F(1, 28) = 0.790	.382	.008***	.000
Other	28	30	.121***	[.074, .168]	-.047					
Convictions	28	30	.246**	[.077, .401]	-.146	[-.315, .032]	F(1, 28) = 2.825	.104	.007***	.000
Other	28	30	.104***	[.062, .145]	.146					
Incarcerations	28	30	.114**	[.043, .184]	-.003	[-.093, .087]	F(1, 28) = 0.004	.950	.009***	.000
Other	28	30	.112***	[.057, .164]	.003					
Infractions	28	30	.089	[-.021, .196]	.028	[-.092, .146]	F(1, 28) = 0.23	.636	.008***	.000
Other	28	30	.117***	[.070, .164]	-.028					
Sample										
Mean age of sample	27	29	.105***	[.063, .147]	-.007	[-.028, .013]	F(1, 27) = 0.579	.453	.007***	.000
Percent White	25	27	-.002	[-.120, .116]	.002*	[.000, .004]	F(1, 25) = 4.828	.037	.006***	.000
Percent violent	19	19	.097***	[.052, .14]	-.001	[-.002, .000]	F(1, 17) = 2.178	.158	.002***	.002
Multiple mods.	25	27	.000		.000		F(2, 24) = 3.098	.064	.005***	.000
Intercept	25	27	.012	[-.106, .130]	.000					
Risk factors	25	27	.000		-.047	[-.134, .040]				
Percent White	25	27	.000		.002*	[.000, .004]				
(3) Substance misuse										
Study										
Published	42	70	.108***	[.069, .147]	.009	[-.057, .075]	F(1, 68) = 0.075	.784	.010*	.000
Not published	42	70	.116***	[.064, .168]	-.009					
Publication year	36	60	.11***	[.075, .144]	.002	[-.005, .008]	F(1, 58) = 0.242	.624	.010*	.000
Follow-up period	41	68	.114***	[.083, .147]	.000	[-.002, .002]	F(1, 66) = 0.013	.911	.010*	.000
Risk factors	42	70	.102**	[.044, .158]	.014	[-.055, .083]	F(1, 68) = 0.166	.685	.010*	.000
Did not adjust	42	70	.115***	[.078, .152]	-.014					
Treatment	42	70	.090*	[.003, .175]	.025	[-.069, .117]	F((1, 68) = .274	.602	.013***	.000
Did not adjust	42	70	.114	[.081, .147]	-.025					
Validated	42	70	.107***	[.070, .144]	.015	[-.055, .085]	F(1, 68) = 0.175	.677	.010*	.000
Non-validated	42	70	.121***	[.063, .179]	-.015					
Arrests	42	70	.084**	[.032, .135]	.042	[-.023, .108]	F(1, 68) = 1.695	.197	.010*	.000
Other	42	70	.125***	[.088, .164]	-.042					
Incarcerations	42	70	.115***	[.053, .176]	-.006	[-.078, .067]	F(1, 68) = 0.024	.878	.010*	.000
Other	42	70	.11***	[.073, .146]	.006					
Infractions	42	70	.070	[-.035, .173]	.046	[-.064, .155]	F(1, 68) = 0.691	.409	.010*	.000
Other	42	70	.115***	[.083, .148]	-.046					
Mixed	42	70	.171***	[.104, .238]	-.077	[-.154, .000]	F(1, 68) = 3.974	.050	.010*	.000
Other	42	70	.096***	[.062, .129]	.077					
Sample										

Mean age	34	53	.111***	[.074, .147]	-.013	[-.029, .003]	$F(1, 51) = 2.729$	.105	.010*	.000
Percent White	38	63	.037	[-.044, .116]	.001*	[.000, .003]	$F(1, 61) = 4.053$	.049	.010*	.000
Percent violent	29	48	.091***	[.059, .122]	.000	[-.001, .001]	$F(1, 46) = 0.145$	.705	.008***	.000

(4) Education/ employment

Study

Published	41	56	.08***	[.044, .115]	-.016	[-.077, .046]	$F(1, 54) = 0.259$	.613	.003***	.003
Not published	41	56	.064*	[.014, .114]	.016					
Publication year	34	45	.06***	[.030, .091]	.006	[-.001, .013]	$F(1, 43) = 2.599$	.114	.003***	.002
Follow-up period	38	52	.083***	[.053, .113]	-.001	[-.003, .000]	$F(1, 50) = 3.945$	.053	.003***	.003
Validated	41	56	.09***	[.058, .122]	-.053	[-.110, .004]	$F(1, 54) = 3.503$	.067	.003***	.002
Non-validated	41	56	.037	[-.011, .085]	.053					
Treatment	41	56	.041	[-.020, .101]	.043	[-.026, .112]	$F(1, 54) = 1.582$	.214	.003***	.003
Did not adjust	41	56	.084***	[.051, .115]	-.043					
Risk factors	41	56	.013	[-.023, .049]	.104***	[.056, .151]	$F(1, 54)= 19.175$	.000	.003***	.001
Did not adjust	41	56	.116***	[.086, .148]	-.104***					
Arrests	40	55	.083**	[.024, .140]	-.007	[-.076, .061]	$F(1, 53) = 0.047$	.829	.003***	.003
Other	40	55	.075***	[.040, .110]	.007					
Convictions	40	55	.063	[-.031, .156]	.016	[-.082, .114]	$F(1, 53) = 0.109$	.743	.003***	.003
Other	40	55	.079***	[.047, .111]	-.016					
Incarcerations	40	55	.08**	[.024, .135]	-.004	[-.070, .063]	$F(1, 53) = 0.014$	.906	.003***	.003
Other	40	55	.076***	[.040, .112]	.004					
Infractions	40	55	.062	[-.028, .151]	.017	[-.078, .112]	$F(1, 53) = 0.133$	.717	.003***	.003
Other	40	55	.079***	[.047, .111]	-.017					

Sample

Mean age	34	45	.076***	[.048, .103]	-.008	[-.021, .005]	$F(1, 43) = 1.504$	.227	.000***	.003*
Percent White	36	49	.023	[-.05, .095]	.001	[.000, .002]	$F(1, 47) = 2.973$	.091	.000***	.002
Percent violent	23	32	.094***	[.059, .129]	-.001	[-.002, .000]	$F(1, 30) = 1.606$	.215	.000***	.003

(5) Antisocial behavior

Study

Published	41	74	.085**	[.037, .131]	-.002	[-.079, .076]	$F(1, 72) = 0.002$	.967	.004***	.009**
Not published	41	74	.083**	[.022, .144]	.002					
Publication year	36	69	.073***	[.034, .111]	.003	[-.006, .013]	$F(1, 67) = 0.591$	.445	.004***	.008*
Follow-up period	40	73	.074***	[.036, .113]	-.002*	[-.004, .000]	$F(1, 71) = 4.072$	.047	.004***	.008**
Treatment	41	74	.034	[-.033, .101]	.069	[-.010, .148]	$F(1, 72) = 3.005$	.087	.004***	.008**
Did not adjust	41	74	.103***	[.060, .145]	-.069					
Validated	41	74	.143***	[.098, .188]	-.117***	[-.177, -.057]	$F(1, 72) =14.879$	.000	.004***	.004
Non-validated	41	74	.026	[-.013, .066]	.117***					

Risk factors	41	74	.051	[-.004, .107]	.056	[-.018, .129]	$F(1, 72) = 2.275$	.136	.004***	.008**		
Did not adjust	41	74	.107***	[.059, .154]	-.056							
Arrests	41	74	.102**	[.035, .167]	-.026	[-.107, .055]	$F(1, 72) = 0.408$	.525	.004***	.009**		
Other	41	74	.076**	[.031, .120]	.026							
Convictions	41	74	.025	[-.130, .180]	.062	[-.099, .219]	$F(1, 72) = 0.591$	.445	.004***	.009**		
Other	41	74	.088***	[.049, .125]	-.062							
Incarcerations	41	74	.054	[-.021, .128]	.040	[-.046, .126]	$F(1, 72) = 0.857$	.358	.004***	.009**		
Other	41	74	.094***	[.051, .136]	-.040							
Sample												
Mean age	33	57	.086***	[.044, .127]	-.014	[-.029, .001]	$F(1, 55) = 3.34$	.073	.004***	.008**		
Percent White	36	58	.049	[-.057, .153]	.001	[-.001, .002]	$F(1, 56) = 0.499$	.483	.006***	.007		
Percent violent	25	35	.117***	[.062, .172]	.001	[-.001, .003]	$F(1, 33) = 0.85$	.363	.002***	.012**		
Multiple mods.	40	73					$F(2, 70) = 8.669$	<.001	.000***	.004		
Intercept			.027	[-.013, .067]								
Follow-up					-.001	[-.002, .001]						
Validated					.115***	[.050, .180]						
(6) Antisocial attitudes[a]												
Study												
Publication year	10	10	.037	[-.014, .088]	.022**	[.009, .036]	$F(1, 8) = 13.888$	.006			82.768	.004
Follow-up period	16	16	.074*	[.012, .135]	-.001	[-.006, .005]	$F(1, 14) = 0.067$	.800			88.162	.009
Arrests	16	16	.038	[-.086, .160]	.047	[-.094, .187]	$F(1, 14) = 0.514$	.485			83.227	.009
Other	16	16	.085*	[.015, .154]	-.047							
Incarcerations	16	16	.035	[-.059, .128]	.065	[-.055, .184]	$F(1, 14) = 1.347$	.265			86.566	.008
Other	16	16	.100*	[.025, .174]	-.065						82.768	.004
Sample												
Mean age	13	13	.071*	[.010, .130]	-.010	[-.041, .020]	$F(1, 11) = 0.573$	.465			59.166	.005
Percent White	13	13	.024	[-.232, .277]	.001	[-.004, .005]	$F(1, 11) = 0.129$	.726			7.120	.007
Percent violent	14	14	.058	[-.008, .123]	.000	[-.003, .002]	$F(1, 12) = 0.235$	.637			59.487	.007
(7) Family/ marital												
Study												
Published	29	66	.083***	[.055, .110]	-.023	[-.072, .026]	$F(1, 64) = 0.878$	.352	.004***	.000		
Not published	29	66	.059**	[.019, .100]	.023							
Publication year	23	49	.066***	[.036, .095]	.001	[-.005, .007]	$F(1, 47) = 0.156$	.695	.006***	.000		
Follow-up period	28	65	.079***	[.056, .102]	.000	[-.002, .001]	$F(1, 63) = 0.482$	.490	.004***	.000		
Validated	29	65	.087***	[.060, .114]	-.035	[-.084, .014]	$F(1, 63) = 2.049$	.157	.004***	.000		
Non-validated	29	65	.052*	[.011, .093]	.035							
Treatment	29	66	.047	[-.003, .096]	.036	[-.02, .091]	$F(1, 64) = 1.668$	.201	.004***	.000		
Did not adjust	29	66	.083***	[.058, .108]	-.036							

Risk factors	29	66	.038	[-.002, .078]	.053*	[.005, .102]	F(1, 64) = 4.898	.030	.003***	.000		
Did not adjust	29	66	.092***	[.065, .117]	-.053*							
Arrests	29	66	.062*	[.006, .117]	.016	[-.045, .077]	F(1, 64) = 0.281	.598	.004***	.000		
Other	29	66	.078***	[.053, .103]	-.016							
Incarceration	29	66	.063**	[.028, .097]	.022	[-.023, .068]	F(1, 64) = 0.968	.329	.004***	.000		
Other	29	66	.085***	[.055, .114]	-.022							
Infractions	29	66	.124***	[.061, .186]	-.056	[-.123, .012]	F(1, 64) = 2.681	.106	.004***	.000		
Other	29	66	.069***	[.045, .092]	.056							
Mixed	29	66	.070**	[.022, .116]	.008	[-.047, .062]	F(1, 64) = 0.079	.780	.004***	.000		
Other	29	66	.077***	[.051, .103]	-.008							
Sample												
Mean age	26	58	.076***	[.051, .100]	-.003	[-.009, .002]	F(1, 56) = 1.388	.244	.004***	.000		
Percent White	25	57	.017	[-.054, .089]	.001	[.000, .002]	F(1, 55) = 3.378	.071	.000***	.001		
Percent violent	21	47	.080***	[.045, .114]	-.001	[-.002, .001]	F(1, 45) = 0.801	.376	.001***	.003		
(8) Leisure/ recreation[a]												
Study												
Published	10	10	.006	[-.092, .103]	.051	[-.087, .188]	F(1, 8) = 0.734	.416			4.545	.003
Not published	10	10	.057	[-.041, .154]	-.051							
Publication year	7	7	.001	[-.096, .098]	.014	[-.027, .055]	F(1, 5) = 0.795	.414			53.306	.004
Follow-up period	9	9	.036	[-.049, .120]	-.001	[-.008, .006]	F(1, 7) = 0.126	.734			51.741	.005
Sample												
Mean age	10	10	.029	[-.045, .103]	.005	[-.035, .044]	F(1, 8) = 0.073	.794			43.890	.004
Percent White	8	8	-.015	[-.275, .247]	.001	[-.004, .006]	F(1, 6) = 0.218	.657			5.687	.007
Percent violent	9	9	.030	[-.053, .114]	.001	[-.002, .003]	F(1, 7) = 0.315	.592			47.582	.005
(9) Housing safety												
Study												
Published	18	20	.103**	[.037, .166]	-.033	[-.169, .106]	F(1, 18) = 0.249	.624	.010*	.000		
Not published	18	20	.070	[-.052, .190]	.033							
Publication year	13	15	.095*	[.025, .164]	.012	[-.007, .03]	F(1, 13) = 1.819	.200	.009*	.001		
Follow-up period	18	20	.097**	[.038, .155]	-.002	[-.008, .004]	F(1, 18) = 0.31	.585	.010*	.000		
Validated	18	20	.087*	[.017, .156]	.027	[-.102, .155]	F(1, 18) = 0.195	.664	.010*	.000		
Non-validated	18	20	.114*	[.006, .218]	-.027							
Incarceration	18	20	.113*	[.017, .205]	-.028	[-.148, .094]	F(1, 18) = 0.229	.638	.000***	.000		
Other	18	20	.085*	[.010, .159]	.028							
Mixed outcomes	18	20	.125	[-.007, .253]	-.038	[-.184, .111]	F(1, 18) = 0.285	.600	.010*	.000		
Other	18	20	.088*	[.022, .153]	.038							
Sample												
Mean age	16	18	.087**	[.028, .144]	-.015	[-.054, .024]	F(1, 16) = 0.65	.432	.008**	.000		

Percent White	15	17	.113	[-.062, .28]	.000	[-.003, .002]	F(1, 15) = 0.065	.802	.009*	.000
Percent violent	13	13	.068*	[.008, .127]	.000	[-.002, .001]	F(1, 11) = 0.351	.565	.002*	.002

(10) Mental Health

Study

Published	37	66	.067***	[.036, .097]	.046	[-.013, .105]	F(1, 64) = 2.443	.123	.000***	.003**
Not published	37	66	.113***	[.062, .163]	-.046					
Publication year	32	54	.073***	[.043, .104]	.005	[-.004, .014]	F(1, 52) = 1.137	.291	.000***	.003**
Follow-up period	35	63	.083***	[.055, .110]	.000	[-.002, .001]	F(1, 61) = 0.427	.516	.000***	.003**
Validated	37	66	.076***	[.045, .108]	.020	[-.047, .087]	F(1, 64) = 0.360	.550	.000***	.004***
Non-validated	37	66	.096**	[.037, .154]	-0.02					
Treatment	37	66	.044	[-.016, .105]	.042	[-.025, .109]	F(1, 64) = 1.568	.215	.000***	.003**
Did not adjust	37	66	.086***	[.058, .114]	-.042					
Risk factors	37	66	.032	[-.007, .071]	.066**	[.018, .414]	F(1, 64) = 7.545	.008	.000***	.002***
Did not adjust	37	66	.098***	[.07, .126]	-.066**					
Arrest	37	66	.050	[-.012, .112]	.037	[-.032, .107]	F(1, 64) = 1.144	.289	.000***	.003***
Other	37	66	.087***	[.057, .116]	.037					
Incarceration	37	66	.044	[-.004, .092]	.049	[-.008, .105]	F(1, 64) = 2.917	.092	.000***	.003***
Other	37	66	.092***	[.062, .122]	-.049					
Infraction	37	66	.131***	[.072, .191]	-.066	[-.131, .001]	F(1, 64) = 3.907	.052	.000***	.003**
Other	37	66	.067***	[.039, .094]	.066					
Mixed outcomes	37	66	.108***	[.051, .163]	-.036	[-.100, .029]	F(1, 64) = 1.235	.271	.000***	.003**
Other	37	66	.072***	[.041, .102]	.036					

Sample

Mean age	34	58	.084***	[.055, .114]	.000	[-.013, .013]	F(1, 56) = 0.002	.968	.000***	.003*
Percent White	32	61	.012	[-.049, .074]	.001*	[.000, .002]	F(1, 59) = 6.538	.013	.000***	.001
Percent violent	24	46	.09***	[.054, .124]	.000	[-.001, .001]	F(1, 44) = 0.046	.831	.000***	.004**

Risk factor

Depression	37	66	.08**	[.036, .124]	-.001	[-.045, .044]	F(1, 64) = 0.001	.979	.000***	.003**
Other	37	66	.08***	[.051, .108]	.001					
PTSD	37	66	.069*	[.005, .132]	.012	[-.051, .075]	F(1, 64) = 0.135	.715	.000***	.003**
Other	37	66	.081***	[.053, .108]	-.012					
Psychosis	37	66	.121**	[.043, .197]	-.045	[-.122, .033]	F(1, 64) = 1.338	.252	.000***	.003**
Other	37	66	.077***	[.05, .103]	.045					
Multiple mods.	32	61					F(2, 58) = 2.995	.058	.000***	.001
Intercept			.026	[-.046, .099]						
Risk factors					-.021	[-.083, .042]				
Percent White					.001*	[.000, .002]				

(11) Low Self-Efficacy

Study characteristics									
Published	13	22	.062*	[.006, .117]	.081	[-.042, .202]	F(1, 22) = 1.881	.184	.000***	.004*
Not published	13	22	.142*	[.034, .248]						
Publication year	8	10	.063	[-.029, .155]	-.003	[-.029, .024]	F(1, 8) = 0.050	.829	.000***	.007
Follow-up period	13	22	.08**	[.033, .127]	.003	[-.002, .009]	F(1, 22) = 1.573	.223	.000***	.004*
Arrests	13	22	.121*	[.002, .238]	-.053	[-.183, .079]	F(1, 22) = 0.688	.416	.000***	.004*
Other	13	22	.07*	[.015, .123]	.053					
Infractions	13	22	.061	[-.034, .154]	.026	[-.087, .139]	F(1, 22) = 0.234	.633	.000***	.005*
Other	13	22	.087**	[.025, .149]	-.026					
Mixed	13	22	.125*	[.021, .228]	-.062	[-.179, .058]	F(1, 22) = 1.133	.299	.000***	.004*
Other	13	22	.065*	[.008, .121]	.062					
Sample										
Mean age	13	22	.08**	[.027, .132]	.007	[-.042, .056]	F(1, 22) = 0.090	.767	.000**	.005*
Percent White	13	22	.188*	[.016, .350]	-.002	[-.004, .001]	F(1, 22) = 1.922	.179	.000***	.003
Percent violent	12	21	.08**	[.026, .133]	.005	[-.006, .015]	F(1, 21) = 0.884	.358	.000**	.005*

(12)
Victimization

Study										
Published	31	81	.054***	[.031, .077]	.064**	[.021, .108]	F(1, 79) = 8.517	.005	.000***	.001
Not published	31	81	.117***	[.081, .155]	-.064**					
Publication year	25	53	.077***	[.049, .105]	-0.001	[-.007, .006]	F(1, 51) = 0.056	.814	.000***	.002
Follow-up period	30	79	.078***	[.055, .102]	-0.001	[-.002, .001]	F(1, 77) = 0.414	.522	.000***	.001*
Validated	31	81	.086***	[.062, .110]	-.072*	[-.131, -.012]	F(1, 79) = 5.619	.020	.000***	.001*
Non-validated	31	81	.014	[-.042, .07]	.072*					
Treatment	31	81	.015	[-.026, .057]	.071**	[.024, .117]	F(1, 79) = 9.124	.003	.000***	.001
Did not adjust	31	81	.086***	[.065, .108]	-.071**					
Risk factors	31	81	.013	[-.028, .055]	.074**	[.027, .119]	F(1, 79) = 9.816	.002	.000***	.001
Did not adjust	31	81	.087***	[.065, .109]	-.074**					
Arrests	31	81	.078**	[.028, .127]	-.003	[-.059, .054]	F(1, 79) = 0.01	.922	.000***	.001*
Other	31	81	.075***	[.049, .101]	.003					
Incarceration	31	81	.034	[-.003, .070]	.055*	[.011, .099]	F(1, 79) = 6.262	.014	.000***	.001
Other	31	81	.089***	[.065, .113]	-.055*					
Infractions	31	81	.105***	[.057, .152]	-.039	[-.093, .015]	F(1, 79) = 2.094	.152	.000***	.001
Other	31	81	.066***	[.042, .090]	.039					
Mixed	31	81	.091***	[.051, .130]	-.024	[-.072, .025]	F(1, 79) = 0.956	.331	.000***	.001*
Other	31	81	.068***	[.041, .094]	.024					
Sample										
Mean age	29	75	.081***	[.055, .106]	-.001	[-.015, .013]	F(1, 73) = 0.016	.899	.000***	.002*

	k	N	b	95% CI	b	95% CI	F	p			Q	p
Percent White	29	78	.047	[-.02, .114]	.001	[-.001, .002]	$F(1, 76) = 1.02$	.316	.000***	.001		
Percent violent	21	66	.093***	[.065, .120]	.001	[-.002, .003]	$F(1, 64) = 0.322$	.573	.000***	.001		
Adult	31	81	.076***	[.043, .110]	-.002	[-.040, .036]	$F(1, 79) = 0.013$	.910	.000***	.001*		
Other	31	81	.074***	[.048, .100]	.002							
Child	31	81	.078***	[.048, .107]	-.005	[-.043, .032]	$F(1, 79) = 0.076$	.784	.000***	.001*		
Other	31	81	.073***	[.043, .102]	.005							
Sexual	31	81	.075*	[.000, .148]	.000	[-.075, .076]	$F(1, 79) = 0.000$	.994	.000***	.001*		
Other	31	81	.075***	[.052, .098]	.000							
Multiple mods.	31	81					$F(4, 76) = 4.608$	.002	.000***	.000		
Intercept			.076*	[.018, .133]			.					
Validated					.048	[-.005, .102]						
Treatment					.074	[-.255, .387]						
Risk factors					-0.116	[-.424, .215]						
Published					-.051*	[-.096, -.006]						
(13) Age[a]												
Study												
Published	18	18	-.002	[-.011, .007]	-.013	[-.033, .007]	$F(1, 16) = 1.866$	.191			76.699	.000
Not published	18	18	-.015	[-.032, .003]								
Published	18	18	-.002	[-.011, .007]	-.013	[-.033, .007]	$F(1, 16) = 1.866$	.191			76.699	.000
Not published	18	18	-.015	[-.032, .003]								
Publication year	18	18	-.005	[-.014, .004]	.000	[-.002, .001]	$F(1, 16) = 0.285$	.601			88.319	.000
Follow-up period	17	17	-.004	[-.015, .006]	.000	[.000, .000]	$F(1, 15) = 0.003$	.958			9.469	.000
Risk factors	18	18	-.004	[-.014, .006]	-.007	[-.031, .017]	$F(1, 16) = 0.355$	.560			88.995	.000
Did not adjust	18	18	-.010	[-.032, .012]	.007							
Arrests	18	18	-.011	[-.026, .005]	.008	[-.011, .027]	$F(1, 16) = 0.890$	.360			87.312	.000
Other	18	18	-.002	[-.013, .009]	-.008							
Mixed	18	18	.000	[-.015, .014]	-.007	[-.025, .011]	$F(1, 16) = 0.667$	.426			83.764	.000
Other	18	18	-.007	[-.019, .004]	.007							
Sample												
Percent White	16	16	-.007	[-.039, .024]	.000	[-.001, .001]	$F(1, 14) = 0.034$	.856			85.077	.000
Percent violent	7	7	-.009	[-.105, .086]	-0.002	[-.01, .007]	$F(1, 5) = 0.305$	.604			93.852	.005
(14) Race												
Study												
Published	21	30	-.005	[-.049, .040]	.011	[-.056, .078]	$F(1, 28) = 0.111$	.742	.004***	.000		
Not published	21	30	.006	[-.044, .056]	-.011							
Publication year	21	30	.000	[-.033, .033]	-.002	[-.010, .005]	$F(1, 28) = 0.349$	.560	.004***	.000		
Follow-up	20	29	.002	[-.033, .033]	.000	[-.002, .002]	$F(1, 27) = 0.000$	.922	.004***	.000		
Treatment	21	30	.006	[-.048, .060]	-.009	[-.077, .059]	$F(1, 28) = 0.012$	.795	.004***	.000		
Did not adjust	21	30	-.003	[-.045, .039]	.009							

	# St.	# ES	r	CI		CI	F	p	% Var.	Level
Risk factors	21	30	-.013	[-.063, .038]	.023	[-.044, .089]	F(1, 28) = 0.773	.491	.004***	.000
Did not adjust	21	30	.010	[-.033, .053]	-.023					
Arrests	21	30	.036	[-.015, .087]	-.058	[-.122, .007]	F(1, 28) = 2.647	.078	.003***	.000
Other	21	30	-.022	[-.062, .018]	.058					
Incarceration	21	30	-.001	[-.065, .062]	.002	[-.072, .077]	F(1, 28) = 0.001	.952	.004***	.000
Other	21	30	.001	[-.038, .040]	-.002					
Mixed	21	30	-.083*	[-.164, -.001]	.097*	[.009, .183]	F(1, 28) = 4.782	.033	.003***	.000
Other	21	30	.014	[-.019, .047]	-.097*					
Sample										
Mean age	16	22	.008	[-.031, .046]	-.002	[-.018, .014]	F(1, 20) = 0.000	.792	.002	.000
Percent violent	8	13	.005	[-.049, .059]	.002	[-.004, .008]	F(1, 11) = 0.673	.466	.004	.000
Risk factor										
Black	21	30	.024	[-.027, .075]	-.039	[-.103, .026]	F(1, 28) = 1.818	.234	.003***	.000
Other	21	30	-.014	[-.054, .026]	.039					
Hispanic/Latinx	21	30	-.014	[-.084, .055]	.018	[-.060, .097]	F(1, 28) = 0.156	.635	.004***	.000
Other	21	30	.004	[-.033, .042]	-.018					

Note. # St. = number of studies; # ES = number of effect sizes; *r* = Pearson's *r*; CI = confidence interval; % Var. = percentage of variance explained; Level 2 Var. = variance between effect sizes from the same study; Level 3 Var. = variance between studies; Follow-up period= follow-up period in months; Validated = use of validated assessment tools; Risk factors = statistical adjustment for risk factors; Treatment = statistical adjustment for treatment; Arrests = arrest outcomes; Conviction = conviction outcomes; Infractions = infraction outcomes; Incarceration = incarceration outcomes; Mixed = mixed recidivism outcomes, Multiple mods. = Multiple moderator model
* *p* < .05, ** *p* < .01, *** *p* < .001.
[a] Risk domain was evaluated using a two-level random effects model, as studies reported only one effect size

Table 3.1

Correlations and Descriptive Statistics for Study Variables (N = 205)

	1	2	3	4	5	6	7	8	9	10
Independent/mediating variables										
1. Financial needs	1.00									
2. Housing safety	0.18*	1.00								
3. Mental health	0.25*	0.23*	1.00							
4. Self-efficacy	-0.29*	-0.15*	-0.37*	1.00						
5. Treatment engagement	-0.03	-0.04	0.02	0.23*	1.00					
Dependent variables										
6. Arrests	0.06	0.12	0.00	-0.15*	-0.10	1.00				
7. Convictions	0.04	0.08	-0.03	-0.11	0.00	0.76*	1.00			
Demographic variables										
8. Race[a]	0.24*	0.06	-0.01	0.08	0.01	0.07	0.03	1.00		
9. Criminal history	0.20*	0.09	0.07	-0.20*	-0.08	0.20*	0.14*	.06	1.00	
10. Age	0.25*	-0.01	0.17*	-0.13	-0.03	0.03	0.05	0.25*	0.06*	1.00
Descriptive statistics										
M	3.31	0.64	2.77	24.19	17.70	25.37	20.49	42.44	5.40	34.02
%										
SD	1.69	1.01	1.98	6.37	2.37	0.44	0.40	0.50	2.64	10.23
Minimum	0	0	0	0	4.08	0	0	0	0	18
Maximum	6	5	6	34	20	1	1	1	13	60
% missing	2.93	4.39	0.98	2.44	0.49	0	0	0	0	0

Note. Composite scores were estimated using raw items.
[a] 0 = White, 1 = Non-White
[b] 0 = Probation 1 = Parole
*$p < .05$

Table 3.2

Goodness-of-Fit Indices for Independent and Mediating Variables Used in Path Analysis

Models	$\chi^2(df)$	p	RMSEA [95% CI]	CFI	TLI
Financial problems	2.010(2)	.366	.005 [.000, .138]	1.000	0.999
Housing safety	13.435(9)	.456	.049 [.000, .100]	0.965	0.942
Mental health	12.357(9)	.194	.043 [.000, .095]	0.998	0.997
Self-efficacy	240.630(119)	<.001	.071(.058, .083)	0.948	0.941
Engagement	845.000(590)	<.001	.046 [.039, .053]	0.979	0.977

Note. df = degrees of freedom. RMSEA = root mean square error of approximation, CFI = comparative fit index, TLI= Tucker-Lewis index.

Table 3.3

Total, Direct, and Indirect Effects of Gender-Responsive Risk factors on Recidivism

	Convictions									Arrests								
	Total			Direct			Indirect			Total			Direct			Indirect		
	OR	95% CI		*OR*	95% CI		*OR*	95% CI		*OR*	95% CI		*OR*	95% CI		*OR*	95% CI	
Financial needs	1.04	0.75	1.44	1.05	0.76	1.45	1.00	0.94	1.03	0.95	0.68	1.45	0.96	0.69	1.33	0.99	0.94	1.03
Housing safety	1.08	0.85	1.38	1.08	0.85	1.39	1.00	0.97	1.03	1.06	0.82	1.37	1.06	0.76	1.37	1.00	0.96	1.04
Mental health	0.88	0.63	1.23	0.89	0.64	1.25	0.99	0.92	1.04	0.95	0.68	1.32	0.98	0.69	1.39	0.97	0.91	1.01
Self-efficacy	0.78	0.48	1.24	0.81	0.50	1.33	0.96	0.80	1.10	0.70	0.47	1.04	0.77	0.51	1.17	0.91	0.80	1.01

Note. OR = odds ratio, CI = Confidence interval, confidence intervals were estimated using the distribution of the products of the coefficients method

Figure 1.1

Prisma table of search and selection process

19024 manuscripts imported for screening	→	11773 duplicates removed
7251 manuscripts screened	←	6879 manuscripts irrelevant

372 full-text manuscripts assessed for eligibility →

326 studies excluded

58 Did not evaluate a risk factor
50 Did not evaluate recidivism
15 Did not evaluate women
81 Did not evaluate women separately
13 Participants were under 18
11 Non-justice involved participants
9 not in English
41 Not enough information to calculate effect size
16 Duplicates
10 No follow-up period
1 Could not be located
2 Wrong study type
19 Country outside U.S.

11 manuscripts identified through reference harvesting

57 manuscripts eligible for inclusion

Figure 1.2

Note. RCT Criteria: (1) Is randomization performed appropriately? (2) Are the groups comparable at baseline? (3) Are there complete outcome data? (4) Are outcome assessors blinded to the intervention provided? (5) Did the participants adhere to the assigned intervention?

Quantitative non-randomized criteria: (1) Are the participants representative of the target population? (2) Are measures appropriate regarding both the outcome and intervention (or exposure)? (3) Are there complete outcome data? (4) Are the confounders accounted for in the design and analysis? (5) During the study period, is the intervention administered (or did exposure occur) as intended?

Quantitative descriptive criteria: (1) Is the sampling strategy relevant to address the research question? (2) Is the sample representative of the target population? (3) Are the measurements appropriate? (4) Is the risk of nonresponse bias low? (5) Is the statistical analysis appropriate to answer the research question?

Figure 3.1

Conceptual model of the relationships between gender-responsive risk factors and recidivism.
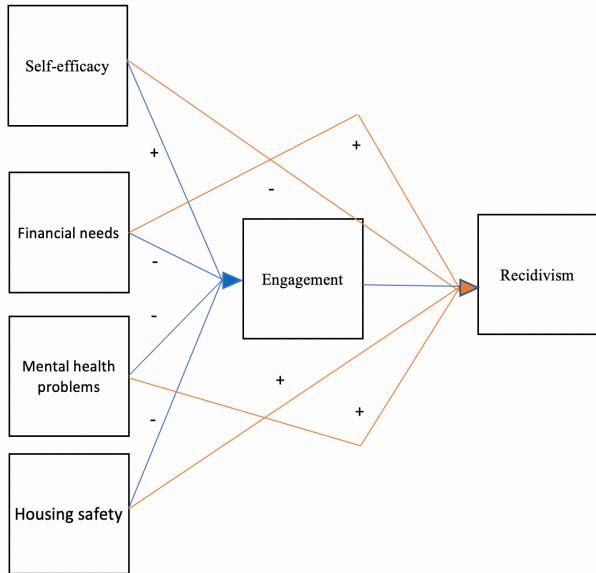
Note. Orange paths indicate the direct relationships between risk factors and recidivism, which are all positive with the exception of self-efficacy. Blue lines indicate the indirect relationships between risk factors and recidivism via treatment engagement, which are all negative with the exception of self-efficacy.

APPENDIX A: SEARCH TERMS

Web of Science
 ("woman" or "women" OR "female" OR "gender") AND ("risk" OR "predictor" OR "criminogenic risk" or "criminogenic need") AND ("recidivism" OR rearrest* OR reconvict* OR reincarcerat* OR reoffend* OR arrest* OR convict* OR incarcerat* OR re-arrest* OR re-convict* OR re-incarcerat* OR re-offend*)

Sociological Abstracts
(MAINSUBJECT.EXACT("Sex Differences") OR MAINSUBJECT.EXACT("Females") and "woman" or "women" or "female" or "gender") AND (MAINSUBJECT.EXACT("risk factors") OR MAINSUBJECT.EXACT("predictor variables") OR "risk" OR "predictor" OR "criminogenic risk" or "criminogenic need") AND (MAINSUBJECT.EXACT("Recidivism") OR rearrest* OR reconvict* OR reincarcerat* OR reoffend* OR arrest* OR convict* OR incarcerat* OR re-arrest* OR re-convict* OR re-incarcerat* OR re-offend*)

PubMed
("women"[mesh] OR "sex characteristics" [mesh] OR "woman" OR "women" OR "gender") AND ("risk factors" [mesh] OR "risk factor" OR "risk factors" OR "predictor" OR "criminogenic risk" or "criminogenic need") AND ("recidivism" [mesh] OR "recidivism" OR "recidivate" OR "rearrests" OR "rearrested" OR "reconvict" OR "reconvicted" OR "reconviction" OR "reconvictions" OR "reincarcerate" OR "reincarceration" OR "reincarcerated" OR "reoffend" OR "reoffending" OR "reoffender" OR "reoffenses" OR "arrest" OR "arrests" OR "arrested" OR "conviction" OR "convictions" OR "convicted" OR "incarcerate" OR "incarcerated" OR "incarceration" OR "incarcerations" OR "re-arrests" OR "re-arrested" OR "re-arrest" OR "reconviction" OR "reconvictions" OR "reconvicted" OR "re-incarcerate" OR "re-incarcerated" OR "re-incarceration" OR "re-offend" or "re-offending" or "re-offender" OR "re-offenses")

Psychinfo
 (DE "Human Females" OR DE "Human Sex Differences" OR "woman" OR "women" OR "gender") AND (DE "risk factors" OR "risk" OR "predictor" OR "criminogenic risk" or "criminogenic need") AND (DE "recidivism" OR "recidivism" OR "recidivate" OR rearrest* OR reconvict* OR reincarcerat* OR reoffend* OR arrest* OR convict* OR incarcerat* OR re-arrest* OR re-convict* OR re-incarcerat* OR re-offend*)

ProQuest Criminal Justice Database
("woman" or "women" OR "female" OR "gender") AND ("risk" OR "predictor" OR "criminogenic risk" or "criminogenic need") AND ("recidivism" OR rearrest* OR reconvict* OR reincarcerat* OR reoffend* OR arrest* OR convict* OR incarcerat* OR reoffend)

APPENDIX B: STUDY EXTRACTION FORM

Title and author	Aim	Setting	Design	N	Sample Characteristics	Inclusion/ Exclusion	Response Rate	Follow-up
Measure of recidivism	Assessment Tools	Theoretical Orientation	Effect Size Metric	Adjusted/ Unadjusted	Control Variables	Total Recidivism	Measure of recidivism	Assessment Tools

Antisocial Personality Pattern

6		0.14 [0.10, 0.18]
8		−0.14 [−0.26, −0.01]
9.1		−0.12 [−0.57, 0.39]
9.2		−0.09 [−0.37, 0.20]
25		0.10 [0.00, 0.20]
28.1		0.08 [−0.04, 0.20]
28.2		−0.02 [−0.15, 0.11]
33		0.18 [0.03, 0.31]
34.1		0.20 [−0.02, 0.40]
34.2		0.26 [0.04, 0.46]
34.3		0.29 [0.07, 0.48]
34.4		0.18 [−0.04, 0.39]
37		0.15 [0.04, 0.26]
39.1		−0.01 [−0.10, 0.09]
39.2		−0.02 [−0.11, 0.08]
39.3		0.05 [−0.04, 0.15]
41.1		0.10 [−0.09, 0.28]
41.2		0.25 [0.07, 0.42]
41.3		0.19 [0.01, 0.36]
41.4		0.29 [0.11, 0.45]
45.1		0.01 [−0.25, 0.27]
45.2		0.22 [−0.03, 0.45]
46		0.15 [−0.00, 0.30]
48		0.13 [0.01, 0.25]
56		0.21 [0.08, 0.34]
58		0.35 [0.25, 0.44]
59		0.26 [0.02, 0.47]
61		0.16 [−0.04, 0.34]
62		0.45 [0.20, 0.65]
63		0.22 [0.11, 0.32]
RE Model		0.14 [0.09, 0.19]

Correlation Coefficient

Substance Misuse

RE Model 0.11 [0.08, 0.14]

Correlation Coefficient

Education/ Employment

Antisocial Behavior

Antisocial Associates

Study	Correlation [95% CI]
2	0.00 [−0.60, 0.60]
3	0.05 [−0.10, 0.19]
7	−0.02 [−0.16, 0.11]
10	0.11 [−0.25, 0.45]
15	0.25 [0.23, 0.27]
21	−0.03 [−0.10, 0.05]
22	−0.01 [−0.04, 0.03]
28	0.00 [−0.00, 0.00]
36	0.12 [−0.05, 0.28]
37	0.16 [0.05, 0.27]
40	0.18 [0.15, 0.20]
42.1	0.20 [0.08, 0.32]
42.2	0.01 [0.00, 0.02]
42.3	0.35 [0.25, 0.45]
44	0.01 [−0.15, 0.17]
46	0.13 [−0.03, 0.28]
47	0.10 [−0.04, 0.24]
48	0.02 [−0.10, 0.14]
49	0.12 [−0.01, 0.24]
50	0.01 [−0.16, 0.18]
51	0.04 [−0.12, 0.20]
52	0.19 [0.03, 0.34]
53	0.16 [0.02, 0.30]
54	0.43 [0.11, 0.67]
56	0.15 [0.01, 0.28]
57	0.26 [−0.01, 0.50]
58	0.11 [0.00, 0.21]
60	0.16 [−0.05, 0.36]
63	0.13 [0.02, 0.24]
64	0.19 [0.03, 0.34]
RE Model	0.11 [0.07, 0.15]

Family/Marital

Study	Correlation [95% CI]
RE Model	0.08 [0.05, 0.10]

173

Antisocial Attitudes

15		0.23 [0.21, 0.25]
16		-0.11 [-0.27, 0.06]
21		0.06 [-0.01, 0.14]
22		-0.00 [-0.04, 0.04]
35		-0.09 [-0.23, 0.05]
39		0.00 [-0.21, 0.21]
40		0.07 [0.05, 0.09]
46		-0.11 [-0.26, 0.05]
47		0.17 [0.03, 0.30]
48		0.15 [0.03, 0.26]
49		0.17 [0.04, 0.29]
50		-0.03 [-0.20, 0.14]
51		0.04 [-0.12, 0.20]
52		0.18 [0.02, 0.33]
56		0.13 [-0.01, 0.26]
64		0.18 [0.02, 0.33]
RE Model		0.07 [0.01, 0.13]

-0.4   -0.2   0   0.2   0.4

Correlation Coefficient

Leisure/Recreation

16		-0.08 [-0.25, 0.09]
21		-0.04 [-0.15, 0.08]
22		0.06 [0.00, 0.13]
44		-0.01 [-0.16, 0.14]
47		0.12 [-0.02, 0.26]
50		-0.19 [-0.35, -0.02]
51		0.07 [-0.09, 0.22]
52		0.08 [-0.08, 0.23]
56		0.11 [-0.03, 0.24]
64		0.11 [-0.05, 0.27]
RE Model		0.03 [-0.03, 0.10]

-0.4   -0.2   0   0.2   0.4

Correlation Coefficient

174

Financial Needs

3		−0.12 [−0.41, 0.19]
5		0.05 [0.01, 0.10]
7		0.04 [−0.06, 0.15]
8		0.13 [0.00, 0.25]
10		0.10 [−0.14, 0.32]
13		0.14 [−0.06, 0.32]
16.1		0.19 [0.02, 0.35]
16.2		0.20 [0.03, 0.36]
17		−0.02 [−0.09, 0.04]
21		0.05 [−0.08, 0.18]
22		0.00 [−0.06, 0.07]
35.1		0.21 [0.07, 0.34]
35.2		−0.02 [−0.16, 0.12]
36		0.11 [−0.06, 0.27]
38.1		0.23 [0.06, 0.38]
38.2		0.10 [−0.08, 0.28]
42		0.40 [0.31, 0.48]
44		0.01 [−0.09, 0.12]
46		0.10 [−0.06, 0.25]
47		0.14 [0.00, 0.27]
48		0.05 [−0.07, 0.17]
49.1		0.15 [0.02, 0.27]
49.2		−0.09 [−0.22, 0.04]
50		−0.06 [−0.23, 0.11]
51		−0.11 [−0.26, 0.05]
52.1		0.25 [0.10, 0.39]
52.2		0.18 [0.02, 0.33]
52.3		0.21 [0.06, 0.35]
53		0.24 [0.10, 0.37]
55		0.13 [−0.02, 0.28]
56		0.16 [0.03, 0.29]
58		0.08 [−0.03, 0.18]
59		0.16 [−0.08, 0.38]
60		0.40 [0.20, 0.56]
61		0.25 [0.06, 0.42]
63		0.14 [0.03, 0.25]
64.1		0.11 [−0.05, 0.27]
64.2		0.18 [0.02, 0.33]
RE Model		0.12 [0.08, 0.15]

−0.6 −0.4 −0.2 0 0.2 0.4 0.6

Correlation Coefficient

Unsafe Housing

3		0.19 [0.03, 0.35]
15		0.25 [0.23, 0.27]
17		0.04 [−0.08, 0.15]
20		0.03 [−0.09, 0.15]
21		0.01 [−0.09, 0.12]
22		0.01 [−0.05, 0.07]
37		0.23 [0.12, 0.33]
38		0.32 [0.17, 0.46]
42.1		0.03 [−0.13, 0.20]
42.2		0.21 [0.09, 0.32]
42.3		−0.10 [−0.24, 0.04]
46		−0.02 [−0.17, 0.14]
47		0.18 [0.04, 0.31]
48		0.02 [−0.10, 0.14]
50		−0.06 [−0.23, 0.11]
51		0.03 [−0.13, 0.19]
52		0.07 [−0.09, 0.22]
54		0.24 [−0.10, 0.53]
56		0.09 [−0.05, 0.22]
62		0.19 [−0.09, 0.44]
RE Model		0.10 [0.04, 0.15]

−0.4 −0.2 0 0.2 0.4 0.6

Correlation Coefficient

175

Low Self-Efficacy

36		0.12 [-0.05, 0.28]
37.1		0.08 [-0.03, 0.19]
37.2		0.12 [0.01, 0.23]
42		-0.01 [-0.05, 0.03]
46.1		0.12 [-0.04, 0.27]
46.2		-0.07 [-0.22, 0.09]
47.1		0.10 [-0.04, 0.24]
47.2		0.13 [-0.01, 0.26]
47.3		0.11 [-0.03, 0.25]
47.4		0.15 [0.01, 0.28]
48.1		0.05 [-0.07, 0.17]
48.2		0.06 [-0.06, 0.18]
50.1		0.00 [-0.17, 0.17]
50.2		0.03 [-0.14, 0.20]
51.1		-0.05 [-0.21, 0.11]
51.2		-0.12 [-0.27, 0.04]
52.1		0.22 [0.07, 0.36]
52.2		0.16 [0.00, 0.31]
52.3		0.24 [0.09, 0.38]
52.4		0.17 [0.01, 0.32]
56		0.10 [-0.04, 0.23]
59		0.23 [-0.01, 0.44]
60		0.17 [-0.04, 0.37]
63		0.13 [0.02, 0.24]
RE Model		0.09 [0.05, 0.12]

-0.4   -0.2   0   0.2   0.4   0.6

Correlation Coefficient

Parental Stress

3		-0.21 [-0.50, 0.11]
5		-0.04 [-0.18, 0.09]
8.1		0.05 [-0.08, 0.17]
8.2		-0.19 [-0.31, -0.07]
17		0.17 [-0.02, 0.36]
32		-0.05 [-0.20, 0.11]
35.1		0.13 [-0.01, 0.26]
35.2		0.01 [-0.13, 0.15]
37.1		0.17 [0.06, 0.28]
37.2		0.07 [-0.04, 0.18]
38		-0.30 [-0.69, 0.21]
39.1		0.08 [-0.01, 0.18]
39.2		0.04 [-0.05, 0.13]
46.1		-0.06 [-0.21, 0.10]
46.2		0.05 [-0.11, 0.20]
48.1		0.01 [-0.11, 0.13]
48.2		0.12 [0.00, 0.24]
48.3		-0.01 [-0.13, 0.11]
49		0.10 [-0.06, 0.26]
50		0.02 [-0.15, 0.19]
52.1		0.20 [0.02, 0.37]
52.2		0.18 [-0.00, 0.35]
53		0.14 [-0.00, 0.28]
55		0.13 [-0.02, 0.28]
57		-0.31 [-0.54, -0.04]
59		0.25 [0.01, 0.46]
60		0.19 [-0.02, 0.39]
61		0.19 [-0.00, 0.37]
62.1		0.21 [-0.07, 0.46]
62.2		0.33 [0.06, 0.56]
62.3		0.28 [0.00, 0.52]
63		0.13 [0.02, 0.24]
RE Model		0.07 [0.02, 0.11]

-1   -0.5   0   0.5   1

Correlation Coefficient

Victimization

RE Model   0.07 [0.05, 0.08]

Correlation Coefficient

Mental Health

RE Model   0.07 [0.05, 0.09]

Correlation Coefficient

177

Age

Correlation Coefficient

Lack of Social Support

Correlation Coefficient

Cohabitating

3		−0.23 [−0.54, 0.14]
17		−0.20 [−0.39, −0.00]
42.1		0.02 [−0.11, 0.15]
42.2		0.03 [−0.10, 0.15]
42.3		0.12 [−0.05, 0.28]
RE Model		−0.01 [−0.18, 0.15]

Correlation Coefficient

Race

1		−0.14 [−0.29, 0.02]
3		0.05 [−0.25, 0.34]
4.1		−0.04 [−0.07, −0.01]
4.2		−0.02 [−0.03, 0.00]
5		−0.02 [−0.15, 0.12]
8		−0.04 [−0.16, 0.09]
10.1		0.10 [−0.17, 0.36]
10.2		−0.08 [−0.23, 0.08]
10.3		0.06 [−0.27, 0.38]
11.1		0.13 [0.12, 0.15]
11.2		−0.04 [−0.06, −0.01]
11.3		−0.02 [−0.10, 0.05]
14.1		−0.07 [−0.14, −0.01]
14.2		0.06 [−0.01, 0.13]
14.3		0.04 [−0.04, 0.11]
14.4		−0.03 [−0.22, 0.15]
16		0.06 [−0.17, 0.29]
17		−0.05 [−0.19, 0.08]
18		0.44 [0.21, 0.62]
20		−0.17 [−0.29, −0.06]
25		0.09 [−0.02, 0.20]
26		0.08 [−0.03, 0.19]
27		−0.09 [−0.32, 0.15]
28		0.09 [−0.53, 0.66]
31.1		−0.03 [−0.13, 0.07]
31.2		0.01 [−0.05, 0.06]
32		0.04 [−0.12, 0.21]
35		0.01 [−0.13, 0.15]
39		−0.00 [−0.10, 0.09]
44		−0.05 [−0.22, 0.12]
RE Model		0.00 [−0.03, 0.03]

Correlation Coefficient

Service Needs

35		0.04 [-0.10, 0.18]
38.1		-0.02 [-0.18, 0.13]
38.2		-0.01 [-0.17, 0.14]
38.3		0.18 [0.02, 0.32]
38.4		-0.18 [-0.32, -0.02]
42.1		-0.16 [-0.28, -0.04]
42.2		0.11 [-0.02, 0.23]
RE Model		-0.01 [-0.13, 0.11]

Correlation Coefficient

APPENDIX D: FUNNEL PLOTS

Antisocial Personality Pattern

Substance Misuse

Education/Employment

Antisocial Behavior

Antisocial Associates

Antisocial Attitudes

Family Marital

Leisure/Recreation

182

Financial Needs

Unsafe Housing

Abuse

Mental Health

183

Low Self−Efficacy

Lack of Social Support

Parental Stress

Age

Race

Cohabitation

Service Needs