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Trauma-Focused Interventions for Justice-Involved and At-Risk Youth: A Meta-Analysis

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1. Plain Language Summary

Trauma may result from a number of distressing experiences, including but not limited to physical, sexual and emotional abuse, neglect, maltreatment, and exposure to violence. The impact of trauma on children and youth has potentially serious and long-lasting negative consequences. It is therefore essential to treat and address the impact of trauma on youth. The objective of this study was to systematically review and statistically synthesize all available research on the effectiveness of trauma-informed treatment programs for justice-involved youth and youth at-risk of justice system involvement who experienced some form of trauma in their lives. Examples of the trauma-informed programs included are Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), Cognitive Processing Therapy (CPT), Trauma Affect Regulation: a Guide for Education and Therapy (TARGET), Trauma-Focused Functional Family Therapy (FFT), and Eye-Movement Desensitization and Reprocessing (EMDR). Our systematic search identified 29 publications that met our eligibility criteria and represent 30 treatment–comparison contrasts. Six of these evaluated the effectiveness of trauma-informed programs for justice-involved youth, and the remaining 24 evaluated programs for at-risk children and youth. From these studies, we extracted results related to delinquency, problem behaviors, aggression, antisocial behavior, substance use, and PTSD outcomes. Most of these studies (24) used random assignment to conditions designs (RCTs), with the remaining six using a quasi-experimental design with a comparison condition. For the justice-involved youth, the findings were either no difference (for delinquency) or slightly positive but sufficiently mixed to not allow for any strong conclusions regarding the effectiveness of these trauma-informed programs. For the at-risk youth studies, the pattern of evidence was positive, suggesting that these programs can reduce problem behaviors. The positive evidence is most convincing for CBT-type programs, particularly TF-CBT. However, these findings are at-risk of publication selection bias. As such, additional high quality randomized controlled trials of these treatment programs are clearly needed, particularly for youth already in the justice system before any firm conclusions can be drawn. In short, the evidence is promising but inconclusive.

2. Structured Abstract

2.1. Background

It is well established that trauma has serious and long-term negative effects on children and youth. Trauma may take many forms, including physical, sexual and emotional abuse, neglect and maltreatment, and exposure to violence in the home or community. Research has established a clear link between trauma and later delinquency. Furthermore, a large portion of youth involved in the juvenile justice system have a history of trauma.

Numerous treatments designed specifically to address trauma experiences and PTSD symptoms have been developed and there is a growing awareness of the potential for using such programs within the justice system. Prior reviews have established that these programs, particularly those based on cognitive-behavioral principles, can be effective at reducing negative emotional states such a depression, anxiety and the symptoms of PTSD.

The goal of this review was to focus specifically on the benefits of these programs for justice-involved youth and for reducing problem behaviors and delinquency more generally. Thus, we were interested in the effectiveness of trauma-informed programs delivered to youth involved in the juvenile-justice system as well as the effectiveness of these programs in reducing delinquency or predictors of delinquency, such as problem-behaviors, for children or youth with no formal justice-system involvement.

2.2. Search methods

Our search strategy attempted to systematically identify all eligible studies that have been conducted, whether formally published or not. The search strategy was conducted between April 24, 2017, and May 16, 2017, inclusively. A total of 24 electronic databases were searched. We also scanned the reference lists from numerous related prior reviews. A total of 9,102 titles were identified through this process and screened. After removing obviously irrelevant titles, 501 references remained and were screened against the eligibility criteria, producing 37 eligible references which were further distilled to 29 unique research studies.

2.3. Selection criteria

Two basic types of studies were eligible. The first included evaluations of trauma-informed treatments for youth already involved in the juvenile justice system. The second were evaluations of trauma-informed treatments for at-risk youth not already involved in the juvenile justice system (or not clearly identified as such), but that included delinquency as an outcome or an outcome highly predictive of later delinquency such as externalizing behaviors, aggression, antisocial behavior, substance use, etc. Both experimental (random assignment) and quasi-experimental studies that included a credible comparison group were eligible. No restrictions were placed on the nature of the publication, nor were any restrictions placed on the country in which the study was conducted, although we only searched for English language studies.

2.4. Data collection and analysis

Extensive data were extracted from each study, including information related to the general study characteristics, features of each treatment and comparison condition, characteristics of the participant sample, methodology, outcome measures, and results. All studies were double-coded by at least two members of the research team and all discrepancies were resolved through a consensus discussion. The effect sizes were analyzed using inverse variance weighted random effects meta-analysis methods.

2.5. Results

Our systematic search identified 29 publications that met our eligibility criteria and represent 30 treatment–comparison contrasts. Six of these evaluated the effectiveness of trauma-informed programs for justice-involved youth, and the remaining 24 evaluated programs for at-risk children and youth.

Only two of the justice-involved youth studies examined delinquency as an outcome and the overall finding was a no-difference effect. Across the six studies, a handful of positive findings were observed for the non-delinquency outcomes, but none of the overall mean effect sizes were statistically significant. Thus, the evidence base does not allow for any strong conclusions regarding the effectiveness of these trauma-informed programs for youth already involved with the justice system.

Promising results were observed for the studies with at-risk children and youth. We observed a moderately positive effect for problem behaviors (based on 18 studies), suggesting that these programs as a whole can produce meaningful reductions in problem behaviors. The finding for delinquency outcomes was roughly of the same size but based on only four studies, lending cautious support to the interpretation that these programs can reduce future delinquency among youth with histories of trauma. Other analogous outcomes, such as aggression, antisocial behavior, and substance abuse, also evidenced positive patterns of benefit. However, the number of studies reporting effects

for these outcomes were too few to draw any strong conclusions regarding these outcomes.

In terms of treatment types, the evidence supports the effectiveness of CBT type programs, particularly TF-CBT. We were unable to establish differential effectiveness between CBT and EMDR in terms of problem behavior and delinquency type outcomes. We also were unable to establish the additive benefit of specific treatment elements, although the pattern of evidence favored cognitive-restructuring and creating a trauma narrative. However, these effects were small and may reflect confounds with other study features.

Our analyses suggest that these findings may be affected by publication selection bias. As such, the positive results, while encouraging, should be interpreted cautiously.

2.6. Author's Conclusions

The meta-analysis suggests that trauma-informed programs for children and youth with histories of trauma can be effective at reducing problem behaviors predictive of delinquency. The effectiveness of these programs at reducing recidivism for justice-involved youth is less clear. Although the majority of studies identified for this review used random assignment designs, the small sample sizes and evidence of publication selection bias raise concerns that the findings may be upwardly biased. As such, additional high quality randomized controlled trials of these treatment programs are needed, particularly for youth already in the justice system, before any firm conclusions can be drawn. In short, the evidence is promising but inconclusive. However, given the broader evidence from other reviews on the effectiveness of these programs for mental-health outcomes, these programs should continue to be used for youth with a history of trauma.

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3. Background

It is well established that trauma has serious and long-term negative effects on children and youth (Schultz et al., 2017). Trauma may take many forms, including physical, sexual and emotional abuse, neglect and maltreatment, and exposure to violence in the home or community. Furthermore, abusive experiences can lead youth to develop flawed cognitive processing of social information, setting the stage for the occurrence of aggressive behavior toward others (Dodge, Bates, & Pettit, 1990, p. 1679). Stated succinctly, "the experience of physical harm leads a child to conceptualize the world in deviant ways that later perpetuate the cycle of violence" (Dodge et al., 1990, p. 1682).

Traumatic childhood experiences and exposure impacts youth of all backgrounds. However, we can distinguish between two categories of youth impacted by trauma: at-risk youth and justice-involved youth. At-risk youth have no history of formal contact with the justice system, but are exposed to and experience an accumulation of risk factors that increase the chance of justice system contact or placement in the child welfare system (Conradi & Wilson, 2010; Leve, Fisher, & Chamberlain, 2009; Thomlison, 2003; Ford, Kerig, Desai, & Feierman, 2016). Justice-involved youth are those youth with formal involvement with the juvenile justice system such as those with an adjudication for a delinquent act. Research has shown that compared to the general population, justice-involved youth have higher rates of exposure to trauma over their life-course (Abram et al., 2004; Coleman, 2005; Cruise & Ford, 2011; Ford & Hawke, 2012; Ford et al., 2016; Graziano & Wagner, 2011), suggesting a need for the juvenile-justice system to address trauma histories directly in the services provided to these youth.

Prior reviews have established a clear link between trauma and later delinquency. For example, Hubbard and Pratt (2002), focusing on the predictors of female delinquency, showed that girls with a history of physical or sexual abuse victimization were at much greater risk for delinquent behavior, reinforcing the link between trauma and juvenile justice involvement. The study noted, however, that this relationship may not hold for boys (Hubbard & Pratt, 2002, p. 7). The meta-analysis by Kitzmann, Gaylord, Holt, and Kenny (2003) focused on children exposed to domestic violence and found that child witnesses to parental conflict fared poorly across a range of outcomes, some of which are predictive of delinquency. These two meta-analyses establish a clear connection between trauma and risk for delinquency and create a basis for arguing that the juvenile justice system should be involved in treating trauma for those it serves. Below we review a broader range of prior work including systematic reviews and additional meta-analyses.

Overall, the evidence regarding the effectiveness of trauma-informed programs for youth is mostly positive. However, we were unable to identify any meta-analyses that specially examined the effectiveness of trauma-informed treatments for reducing official and unofficial delinquency. Furthermore, there is no apparent consensus or

comprehensive understanding around which trauma-informed treatments and techniques are more likely to best serve at-risk and justice-involved youth. Our goal was to focus specifically on programs delivered to youth involved in the juvenile-justice system as well as studies of children or youth with no formal justice-system involvement, but with delinquency outcomes or other problem-behaviors predictive of later delinquency. Thus, we were interested in assessing whether various trauma-informed treatment programs and features of these programs are effective in reducing acting-out and delinquent behavior.

3.1. Defining trauma

Exposure to trauma and violence can be both direct and indirect. It can also be a single event or occur over a prolonged period (Fratto, 2016). Some types of trauma and violence in which youth are exposed may include interpersonal, familial, or community violence; witnessing or experiencing maltreatment (e.g., intimate partner violence); psychological abuse, neglect, maltreatment; physical and/or sexual victimization; parental substance misuse; and experiencing the loss of a significant person (Baer & Maschi, 2003; Denigris, 2008; MacMillan et al., 2009). Additionally, some scholars also define trauma as including events such as natural disasters, car accidents, refugee status, war, political violence, or terrorist acts (Cohen, Mannarino, Berliner, & Deblinger, 2000; Cohen & Mannarino, 2008; Fratto, 2016; Graziano & Wagner, 2011).

3.2. The problem, condition, or issue

Trauma has been characterized as a pervasive and common occurrence (Becker & Rickel, 1998; Conradi & Wilson, 2010) and it has both short-term and long-term effects (Schultz et al., 2017). Experiencing traumatic events can challenge the emergence of healthy coping mechanisms of any individual, particularly children, youth, and young adults, who at various stages, are developing the very coping skills necessary for prosocial behavioral adjustment (Crosby, 2016). Traumatic experiences and exposure can lead to a variety of impairments related to attachment, affect regulation, dissociation, behavioral control, cognition, and self-concept (Cook et al., 2005, as cited in Crosby, 2016). For example, youth with a history of trauma may develop distorted perceptions and interpretations of social situations, experience impaired self-regulation, and develop serious mental health disorders or substance use disorders (Baer & Maschi, 2003; Becker & Rickel, 1998; Cruise & Ford, 2011; Ford et al., 2016).

Trauma may also thwart the positive and prosocial development of youth exposed to and indirectly impacted by trauma (Coates & Gaensbauer, 2009), the effects of which—if left untreated—may result in risky and poor decision-making and persist into into young adulthood and later social turning points (e.g., establishing intimate partner relationships, parenthood, etc.) (Cohen et al., 2000; Conradi & Wilson, 2010). Furthermore, untreated trauma can also result in maladaptive coping mechanisms such as substance use that evolves into chronic misuse and dependence (Cohen, Mannarino, Zhitova, & Capone, 2003; Cohen & Mannarino, 2008). Responses to trauma may also

manifest as diminished academic performance, sexual promiscuity, a variety of affective disorders (e.g., depression, anxiety, apathy), and antisocial behavior and conduct disorders (Denigris, 2008); the latter of which may increase a youth's chances of formal justice system contact (Ford & Hawke, 2012; Ford et al., 2016; Ford, Kerig, & Olafson, 2014).

3.3. Trauma treatment and how it might work

Trauma treatment or trauma-informed treatment or care involves specialized interventions that focus on treating symptoms of trauma (e.g., PTSD, depression, anxiety, and other affective disorders) (Conradi & Wilson, 2010). A diversity of trauma-informed treatments exist and include, but are not limited to Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), Cognitive Processing Therapy (CPT), Trauma Affect Regulation: a Guide for Education and Therapy (TARGET), Trauma-Focused Functional Family Therapy (FFT), structured group therapy, Structured Sensory Intervention for Traumatized Children, Adolescents, and Parents (SITCAP-ART), Eye-Movement Desensitization and Reprocessing (EMDR), and Trauma and Grief Components Therapy for Adolescents (TGCT-A).

Several of these treatment programs are phase-based or completed in sessions whereby youth work on and develop different engagement and coping skills, as seen in TF-CBT (e.g., coping skills building phase, trauma narrative and processing phase, and treatment consolidation and closure phase) (Cohen, Mannarino, Kliethermes, & Murray, 2012). Furthermore, trauma treatment programs are often implemented as individual, family or group interventions. The TARGET program for example, emphasizes individual self-regulation skills using an acronym framework called FREEDOM, whereas a FFT-trauma focused model relies more on family participation to complete its five-phase process (Ford & Hawke, 2012; Kerig & Alexander, 2012; Mahoney, Ford, Ko, & Siegfried, 2004; Marrow, Knudsen, Olafson, & Bucher, 2012b). A common emphasis of trauma-informed treatment programs is cognitive processing of grief and traumatic experiences with the aim of developing enhanced information-processing skills that challenge maladaptive thoughts, as well as improving post-traumatic emotional, cognitive, self-regulatory, and interpersonal skills. Treatments that incorporate such an approach include CPT, TGCT-A, cognitive behavioral therapy (CBT), and structured group therapy (Ahrens & Rexford, 2002b; Arnold et al., 2002; Mahoney et al., 2004; Ovaert, Cashel, & Sewell, 2003).

3.4. Prior reviews

Numerous systematic reviews and meta-analyses have examined the effectiveness for treatments for children, adolescents, and adults who have trauma histories, such as maltreatment, or have been diagnosed with PTSD. Most of these reviews focus on PTSD symptomatology, depression, and anxiety. Few have focused on justice-involved youth and those that have were neither systematic nor meta-analyses, such as the reviews of psychosocial and behavioral interventions for traumatized youth by Ford et al. (2016)

and Cohen et al. (2000) as well as a review of the management of traumatized youth by Conradi and Wilson (2010) and of gender-specific approaches by Chesney-Lind, Morash, and Stevens (2008). While Ford et al. (2016) focused on justice-involved youth, they did not arrive at any conclusion regarding the effectiveness of these programs but noted the importance of assessing the various components of trauma interventions and of reaching youth prior to their involvement with the justice system. Similarly, Chesney-Lind et al. (2008) reviewed a modest sample of evaluations for at-risk and justice-involved female populations, and argued that the evidence-base remains limited in identifying effective treatments that address the variety of needs for young girls at risk of contact with and who are currently involved with the juvenile justice system. Finally, Heckman, Cropsey, and Olds-Davis (2007) provided a review of eight studies of trauma treatments for PTSD in correctional settings, three of which involved male juvenile youth. As with Ford et al. (2016) and Chesney-Lind et al. (2008), the authors did not draw any hard conclusions about the benefits of these treatments.

Most reviews of treatments relevant to this review are of non-justice-involved populations and generally focus on trauma-related symptomatology outcomes, such as PTSD symptoms, depression, anxiety, etc. Generally, these reviews find that CBT and TF-CBT are effective at reducing various outcomes of interest. For example, Dorsey et al. (2017) updated Silverman et al. (2008) and concluded that it was well established that cognitive behavioral therapy in various treatment modalities (individual and group) is effective. A Cochrane review by Roberts, Kitchiner, Kenardy, and Bisson (2010) examined the effect of a variety of psychological interventions on reducing traumatic stress symptoms and concluded that TF-CBT was effective in reducing traumatic stress symptoms, although the authors also noted evidence of heterogeneity, cautioning for careful interpretations.

A systematic review by Leenarts, Diehle, Doreleijers, Jansma, and Lindauer (2013) examined evidence-based psychotherapeutic treatments for youth traumatized by maltreatment. This review found TF-CBT was well-supported as a treatment for these children (Leenarts et al., 2013, p. 269). Arriving at a similar conclusion, a Cochrane review by Macdonald, Higgins, Ramchandani, and Macdonald (2006) focused on the effectiveness of CBT interventions for youth traumatized by sexual abuse. The authors concluded that CBT reduced PTSD symptoms and anxiety, but that the effects were modest. Closer to the focus of our study, Cary and McMillen's 2012 review included behavioral problems as an outcome. The results indicated small to moderate and significant effects of TF-CBT and components of TF-CBT on behavior problems. A review by Fraser et al. (2013) also concluded that CBT type programs were effective.

Another popular treatment for PTSD is eye movement desensitization and reprocessing (EMDR). Several meta-analyses examined the effectiveness of this program. For example, Rodenburg, Benjamin, de Roos, Meijer, and Stams (2009) examined EMDR's effectiveness on symptoms related to post-traumatic stress among children. The results of the meta-analysis were equivocal in that EDMR was associated with improved post-treatment trauma scores, but the results were heterogeneous and there were significant moderating effects such as year of publication, the percentage of study completers, and the number of treatment sessions, among others. Dorsey et al. (2017, p. 12) concluded that EMDR is "probably effective," and (Kar, 2011, p. 173) concluded that "CBT had better remission rates than EMDR."

The various reviews summarized above suggest that therapeutic approaches to treating trauma can produce positive results on important outcomes, with fairly consistent positive conclusions drawn for cognitive-behavioral type programs. None of the meta-analyses were specifically focused on justice-involved youth. Additionally, none were focused primarily on delinquency or childhood behaviors predictive of delinquency with the exception of Cary and McMillen (2012) who examined problem behaviors. However, this was not a primary focus of that review.

Across the variety of prior reviews identified none examined at risk and justice-involved youth along a spectrum of probable justice system related or risky behavior outcomes for each population given trauma exposure, with the exception of Ford et al. (2016), Chesney-Lind et al. (2008). Yet, the Ford et al. (2016) and Chesney-Lind et al. (2008) reviews were narrative and did not involve a pooled analysis of treatment effect sizes. The current meta-analysis focuses squarely on justice system outcomes such as delinquency and problem behaviors for at-risk youth and all possible outcomes for justice-involved youth, including within-system punishment such as the number of days in locked settings.

4. Objectives

The research literature has established that trauma increases the likelihood of not only psychosocial impairment but also delinquency and delinquency-related outcomes. Justice-involved youth with unmet mental health needs stemming from a history of trauma may be at high-risk of recidivism. Additionally, at-risk youth may be at high risk for eventual justice system involvement. The purpose of this review was to help identify effective trauma-informed treatments and treatment features that are useful both within the juvenile justice context and to prevent involvement in the justice system for youth at-risk given prolonged exposure to trauma.

Toward this aim, our research questions were:

1. How effective are trauma-informed treatment programs for youth within the juvenile justice system across relevant outcomes? The primary outcome of interest was future delinquent behavior. Secondary outcomes included substance use, mental health functioning, aggression, violent behavior, and school behaviors.
2. How effective are trauma-informed treatment programs at preventing delinquency for children and youth not involved in the juvenile justice system (referred to as at-risk youth hereafter)? The primary outcome of these studies is delinquent behavior independent of whether it represents official delinquency, such as an arrest, or self/other reported types of delinquent behaviors. Secondary outcomes included acting-out (externalizing behaviors), substance use, aggression, and violent behavior.
3. What is the relative effectiveness of the different trauma-informed treatment programs?
4. What is the relative effectiveness of different trauma-informed treatment program components, both individually and collectively?

5. Methods

5.1. Study design and implementation

The purpose of this research study was to synthesize the evidence from all comparison group evaluations of trauma-informed programs to estimate their absolute and relative effectiveness using meta-analysis and systematic review methods. We were interested in both the effectiveness of such programs for youth already involved in the juvenile justice system as well as preventing at-risk youth from such involvement. Thus, we examined the effectiveness of these programs at both reducing and preventing involvement in the juvenile justice system, as well as more immediate outcomes, such as PSTD symptoms, impulsivity, and aggressiveness.

Black, Woodworth, Tremblay, and Carpenter (2012) provides a useful summary of extant trauma-informed therapies currently used for treating adolescents with trauma-related symptoms. Their extensive literature search identified the following treatments: MMTT (Multimodality Trauma Treatment), SCCT (Stanford cue-centered therpay), Seeking Safety, TARGET, and TF-CBT. Our *a priori* review of literature also identified seven different therapeutic practices that are commonly used across these different treatment models: psychoeducation, relaxation techniques, identifying triggers, affect regulation and expression, developing a trauma narrative, cognitive restructuring, and planning for the future. The goal of the meta-analysis was to compare both the different treatment models as well as the various trauma treatment techniques across different outcome types.

5.1.1. Search strategy

We designed the search strategy with the purpose of identifying all eligible studies published or authored after 1959, independent of publication status and format (e.g. technical report, conference paper, book chapter, etc.) (White, 2009; Rothstein & Hopewell, 2009). Toward this aim, we searched numerous databases and websites. The search strategy was systematic which allows other researchers to replicate our process (see Appendix A).

The keywords used to search computerized bibliographic databases represented three distinct categories of terms. Within each category, terms were connected with the Boolean "OR". The categories themselves were connected with the Boolean "AND". Thus, a hit must have had at least one term from each category. This helps maximize the efficiency of the search processes. The three categories and terms included:

1. Population: youth, adolescent, juvenile*, delinquen*, student

2. Treatment: (trauma OR trauma-focused OR trauma-informed OR traumatic) with (treatment OR intervention OR therapy OR program)
3. Methodology: outcome, evaluate, evaluation, effect, effectiveness, recidivism, experiment, quasi, assessment, RCT, randomized

These keywords were further developed and refined based on our initial search results. A detailed log of the search process and the results of the search was maintained and archived (see Appendix A).

The following electronic databases were searched: Australian Institute of Criminology; ASSIA—Applied Social Science Index and Abstracts; CINCH (the Australian Criminology Database) via Informit; Criminal Justice Abstracts; EconLit; First Search—Dissertation Abstracts; Google Scholar; HeinOnline; Jill Dando Institute of Crime Science (JDI) via OVID; NCJRS (National Criminal Justice Reference Service); Policy Archive; PolicyFile; Criminal Justice Periodicals (now ProQuest Criminal Justice); Dissertations & Theses: Full Text; Evidence-Based Resources from the Joanna Briggs Institute; PubMed; PsycINFO; Public Affairs Information Service; RAND Documents; Social Sciences Citation Index; Social Services Abstracts; Sociological Abstracts; SSRN—Social Science Research Network; and Worldwide Political Science Abstracts.

We also scanned the reference lists for additional references and any meta-analyses, systematic reviews, or other reviews of trauma-focused interventions for youth and children. Scanning reference lists provided an additional source for potentially eligible references. We were able to include an additional 73 references from hand searching (see Appendix B).

5.1.2. Eligibility

The eligibility criteria define the population of interest for the study; that is, they define which studies should be included and which should be excluded. To be eligible for inclusion in this meta-analysis, a study must have met all of the eligibility criteria detailed below. Again, no restrictions were placed on the nature of the publication, nor were any restrictions placed on the country in which the study was conducted, although we only searched for English language studies.

Two basic types of studies were eligible. The first included evaluations of trauma-informed treatments for youth already involved in the juvenile justice system. The second were evaluations of trauma-informed treatments for at-risk youth not already involved in the juvenile justice system (or not clearly identified as such), and included an outcome that was some measure of delinquent behavior (official or unofficial), or an outcome that is highly predictive of later delinquency such as externalizing behaviors, aggression, antisocial behavior, substance use, etc. The specifics are detailed below.

Intervention and control conditions

Eligible treatments included any trauma-informed or trauma-focused intervention or program designed or appropriate for youth. Any intervention that specifically stated that it was intended for treating youth with trauma histories qualified. Also, any intervention specifically focused on treating PTSD or other trauma-related symptoms was eligible even if the intervention was not labeled specifically as trauma-focused.

The control condition could include a no-treatment type control condition, a non-trauma-informed treatment, or a contrasting trauma-informed treatment. Thus, the control could be either a non-treatment or treatment-type condition.

Participants

Study participants included youth under 18 years of age with a documented history of trauma. Eligible participants included both youth directly involved in the juvenile justice system and children and youth at-risk of such involvement. For studies including at-risk youth participants, they must have included an outcome measure of delinquent behavior or an analogous outcome that is highly predictive of delinquency behavior, such as externalizing behaviors, aggression, antisocial behavior, or substance misuse. Due to the broad range of age eligibility for trauma-informed programs targeting youth, with some programs including children as young as one year old, the mean age of participants must have been between 12 and 18 at the point of outcome measurement. This decision was made as we were interested in evaluating delinquency or analogous outcomes. Since the lower age limit for juvenile delinquency adjudication is not specified in the majority of states (Office of Juvenile Justice and Delinquency Prevention, 2017), we made the decision to require program participants to have a minimum mean age of at least 12 years, thus ensuring that enough of the youth in the sample will have reached an age where delinquent behaviors tend to emerge.

Research design

The population of studies eligible for this review included experimental and quasi-experimental evaluations of a trauma-informed treatment compared to either a no-treatment control group or an alternative treatment condition.

To be eligible as an experimental or quasi-experimental design, a study must have met at least one of the following criteria:

1. Participants were randomly assigned to treatment and control (or alternative treatment) conditions or assigned by a procedure plausibly equivalent to randomization (i.e., a quasi-random method such as alternating case).
2. Quasi-experiments for which the participants in the treatment and control conditions were generally similar with regard to their demographic characteristics and could be compared for initial equivalence on baseline data, such as symptom severity. For example, a cohort design with no evidence that the characteristics of the youth meaningfully changed between cohorts would be eligible.

3. Studies qualified as quasi-experiments if the treatment and control groups were matched on important baseline characteristics or designs that used statistical controls for important baseline variables.

One-group, pre-post designs that did not have a comparison condition were not eligible. Similarly, quasi-experimental designs that compared treatment completers to treatment drop-outs were not eligible. This also included designs that compared individuals who agreed to treatment versus those who refused.

Outcome measures

Several outcomes were of interest in this review. Studies involving justice-involved youth were included independent of outcome type and could include the outcomes noted below. Studies of non-justice involved youth, or at-risk youth, must have included delinquency or substance abuse as an outcome or an outcome predictive of delinquency (i.e., outcomes 1-4 below).

1. *Delinquency*: Any measure of delinquency following the treatment program (often called recidivism). Possible measures included official measures such as arrest or adjudication, or self-reported or other reported measures of delinquency. Measures could be reported dichotomously or on a multi-item scale.
2. *Acting-out/Problem-behaviors*: Any measure of acting-out or problem-behaviors, such as externalizing behaviors.
3. *Substance Abuse*: Self-reported or official measures of substance abuse.
4. *Aggression/Violence*: Any measure of aggressiveness or violence, including self-report or other-report (e.g. parent, teacher).
5. *PTSD Symptoms*: Any measure of PTSD symptomatology or other trauma-related symptoms.
6. *Impulsiveness*: Any measure of impulsiveness measured at the end of treatment (post-treatment).
7. *Executive functioning*: Any measure of executive functioning.

Effect size data

Most of the outcomes of interest included scaled measures that are well suited to Hedges' g standardized mean difference effect size (Cohen's d with Hedges' small sample-size bias correction applied). Our coding protocol and associated FileMaker database included fields for entering data needed for calculating effect sizes, such as means, standard deviations, sample sizes, frequencies or proportions of failures (in the case of dichotomous outcome data), etc. This allowed for the computation of effect sizes to be automated via scripts.

We coded effect size data at all time points, including at baseline prior to treatment, at post-test immediately following treatment, and at any follow-up point. Although a

majority of the studies included in this meta-analysis used random assignment designs, the small sample sizes in most of these studies often resulted in non-trivial baseline differences (i.e., random but non-trivial differences). As such, we adjusted all post-test and follow-up effect sizes for baseline differences whenever possible, which was the case for 87 (76%) of the 114 post-test or follow-up effect sizes.

The majority of the 114 post-test or follow-up effect sizes (82 or 72%) were based on means, standard deviations, and sample sizes. In the case of available baseline data, the effect size was computed as:

$$d = \frac{\left(\overline{X}_{T2} - \overline{X}_{T1}\right) - \left(\overline{X}_{C2} - \overline{X}_{C1}\right)}{\sqrt{\frac{s_{T1}^2(n_T-1)+s_{C1}^2(n_C-1)}{n_T+n_C-2}}}$$

$$g = d\left(1 - \frac{3}{4(n_T+n_C)-9)}\right)$$

where d is Cohen's standardized mean difference effect size, g is Hedges' small sample-size bias corrected standardized mean difference effect size, $\overline{X}$ is a mean with subscript T and C for treatment and control and 1 and 2 for baseline and post-test or follow-up, respectively, s is a standard deviation, and n the treatment or control sample size. Note that baseline standard deviations were used as these would not have been affected by treatment.

The above computation was used for 75 of 82 effect sizes based on means. For the remaining seven where no baseline data were available, the effect size was computed using the standard equation:

$$d = \frac{\overline{X}_T - \overline{X}_C}{\sqrt{\frac{s_T^2(n_T-1)+s_C^2(n_C-1)}{n_T+n_C-2}}}$$

$$g = d\left(1 - \frac{3}{4(n_T+n_C)-9)}\right)$$

with the terms defined as above.

Nineteen (17%) of the effect sizes were based on dichotomous outcomes. The Cox logit method was used for converting the logged odds ratio into a Hedges' g. For 2 by 2 frequency data, the following equation was used:

$$g = \frac{ln\left(\frac{ad}{bc}\right)}{1.65}$$

where a, b, c, and d are the cell frequencies for the 2 by 2 table. When proportions were available, rather than frequencies, the following equation was used:

$$g = \frac{ln\left(\frac{p_C(1-p_T)}{p_T(1-p_C)}\right)}{1.65}$$

where p_T and p_C are the proportion of failures (e.g., recidivists) in the treatment and control conditions.

For one of the 19 effect sizes based on a dichotomous variable, it was possible to adjust for a baseline difference. This was done simply by subtracting the post-test g from the baseline g, both computed using the formula above for proportions.

A single effect size was based on the dichotomous treatment indicator regression coefficient from a regression-based model. The effect size was computed using the regression coefficient (which reflects the adjusted mean between the treatment and control condition) and the standard deviation for the outcome variable.

The above methods could not be used for 11 effect sizes. Ten of these came from Ford, Steinberg, Hawke, Levine, and Zhang (2012) that reported baseline adjusted Cohen's d effect sizes. The eleventh effect size came from Najavits, Gallop, and Weiss (2006) and was reported as an unadjusted Cohen's d. These were coded as is and then converted to Hedges' g.

5.1.3. Coding

A detailed coding protocol was developed for extracting information from eligible studies. In developing this coding protocol, we drew from our own prior meta-analyses and the coding protocol for Lipsey's large juvenile delinquency meta-analysis (Lipsey, 1995; Lipsey, 2009; Lipsey & Wilson, 1998). A FileMaker database was developed for coding directly from the studies into the database. This database had coding forms that looked similar to a paper survey with detailed information regarding how to code each item. This helped ensure consistency in coding and reduce coding errors.

Several distinct categories of information were coded for each study. These included information related to the general study characteristics, features of the treatment and comparison conditions, characteristics of the participant sample, the methodology, outcome measures, and results.

5.1.4. Statistical analysis

Modern meta-analytic methods were used to analyze the effect sizes extracted from the collection of eligible studies (Cooper, Hedges, & Valentine, 2009; Lipsey & Wilson, 2001). The general method involved using inverse variance weights to give greater weight to effect sizes from larger studies and a random effects model that assumes variability in treatment effects across studies.

The computation of the inverse variance weights was based on the method of computing the effect size. For all effect sizes based on means, including effect sizes based on Cohen's d reported by study authors, the variance was estimated as:

$$v_d = \frac{n_1 + n_2}{n_1 n_2} + \frac{g^2}{2\left(n_1 + n_2\right)} \, .$$

For effect sizes based on the Cox logit method, the variance was estimated as:

$$v_d = \frac{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}{1.65^2} \, .$$

In the case of the effect size based on a regression coefficient, the variance was estimated directly from the reported standard error for the coefficient, re-scaling it to maintain consistent confidence intervals. The equation used was:

$$v_d = \frac{d(se^2)}{b}$$

An important issue in analyzing meta-analytic data is handling multiple effect sizes from the same study. These effects are statistically dependent and must be handled appropriately (Gleser & Olkin, 2009). We dealt with this complication by first running separate analyses for each outcome construct of interest, that is, delinquent behavior, substance abuse, PTSD symptoms, etc. If there were multiple effect sizes per outcome per study, these were average prior to performing any meta-analysis, thus maintaining statistical independence.

An objective of this project was to examine the differential effectiveness of the various trauma-informed treatments. We explored this in two ways. First, we used moderator analysis to compare clearly defined treatment types, such as the various named programs. Second, we compared the treatment techniques (program elements or components), such a relaxation training or cognitive-restructuring. The treatment techniques that we coded were informed by the list of such components identified by Black et al. (2012) in their review of contemporary treatments in this area.

Sensitivity analyses were run to examine the influence of methodological variability and potential sources of bias, such as comparing random assignment and quasi-experimental designs. Additionally, publication selection bias was explored through funnel plot analysis and the trim-and-fill method (Duval & Tweedie, 2000; Sterne & Egger, 2001).

5.1.5. Human subjects

This study did not raise any human subjects concerns. This meta-analysis made use of data in the public domain that is in aggregate form and cannot be traced back to specific individuals. Meta-analyses are generally considered exempt from human subjects review.

6. Results

6.1. Results of the systematic search

The systematic search yielded a total of 9,102 references across 15 databases and eight websites, including duplicate references. This was reduced to 8,602 references after the removal of duplicates and the elimination of clearly irrelevant references based on a screening of the title and abstract. A total of 501 references were eligible for full-text review after title and abstract screening. Another 73 references were added during hand searching of reference lists, yielding a set of 574 references. The full-text of these 574 references were screened for eligibility against our eligibility criteria (see section 5.1.2), leaving 37 eligible for full-text coding. This yield was further reduced after excluding an additional eight studies during full-text coding, producing a final set of 29 eligible references for meta-analysis. See Appendix B for a flow diagram on the reference distillation process and Section 9 for study references.

6.2. Description of included studies

Table 9.1 displays study characteristics for the 29 unique studies included in this meta-analysis. The majority of these studies were conducted in the United States (72%), followed by Canada (10%), the European Union (7%), and a variety of other countries (10%). Approximately half of the studies were published in the 2000s (52%), followed by the 2010s (28%) and the 1990s (21%). All but one study included in this meta-analysis was a journal article or book chapter, the exception being a doctoral dissertation. An author was a developer of the treatment or intervention being evaluated in 48 percent of the included studies. In addition, the vast majority of research conducted in the included studies was funded by an external agency (93%).

All of the studies included in this meta-analysis reported on the results of a single evaluation. Among these evaluations, the majority (66%) used random assignment to conditions either with (14%) or without (52%) matching (e.g., matched pairs). Random assignment studies in principle provide the strongest basis for assessing the effectiveness of trauma treatment programs and interventions. We also identified numerous quasi-random assignment designs (14%). This design type, while not technically randomized, used a method of assigning youth to conditions that is likely to function in a random fashion, such as alternating assignment based on arrival or identification of suitability for the program. Thus, these designs are also likely to have very strong internal validity and as such we consider them to be a credible approach for assessing treatment effectiveness. Lastly, quasi-experimental designs using matching or statistical controls (10%) and basic quasi-experimental designs with no statistical controls (10%)

made up the remaining research designs of evaluated studies. While at higher risk for selection bias, for a quasi-experimental design to be included it either must have used matching, statistical controls, or the comparison group must have been assessed by us as roughly comparable at baseline and not based on self-selection into conditions.

There were a total of 30 trauma-informed treatment and comparison conditions evaluated within these 29 unique studies. This is due to the fact that one study evaluated two treatment program conditions (a child only and a child/parent condition) compared to one control condition (Deblinger, Lippmann, & Steer, 1996). An overview of youth characteristics evaluated in the 30 conditions is provided in table 9.2. Since one of the goals of this meta-analysis was to evaluate trauma-informed treatment programs for justice-involved and at-risk youth, these groups are presented separately. The majority of treatment and control conditions included at-risk youth (80%) compared to justice-involved youth (20%). At-risk youth were approximately 4 years younger than the justice-involved youth (M = 12.41 and SD = 3.36 vs. M = 16.24 and SD = 1.18, respectively), and had a larger age range compared to the justice-involved youth. However, 8 of the at-risk youth studies and 1 of the justice-involved youth studies did not report mean age.

For the at-risk group, 14 study conditions reported on race, compared to 5 for the justice-involved group. In both groups, White was the predominant racial group, followed by Black. The justice-involved group had a larger mean percentage of Hispanic youth (M = 21.44, SD = 24.74) compared to the at-risk group (M = 8.32, SD = 15.67).

Table 9.3 provides an overview of trauma characteristics for youth included in the analyzed studies. This was evaluated based on whether the study reported on the specific trauma characteristic and, if so, what percentage of youth in the study had this characteristic (broken down into the categories of all, most, or some). The most common trauma characteristic noted was a history of sexual abuse. Approximately 40 percent of conditions included youth that all had a history of sexual abuse. History of trauma (unspecified) and PTSD were the next most common trauma characteristics for youth included in the studies, with approximately 30 percent of conditions including youth that all had these characteristics. Other trauma characteristics noted for all youth participating in studies included exposure to violence, history of delinquency, institutionalization (of any form), as well as a history of physical abuse and neglect. Fewer studies included youth with an explicitly identified history of emotional abuse, youth in foster care, or homeless youth, although information on these characteristics was often not provided.

A breakdown of sample characteristics for treatment and comparison condition types is provided in table 9.4. Most studies included treatment and comparison conditions with between 11 and 40 participants. Roughly 20 percent of conditions had sample sizes of over 51 participants per condition, with the largest study including 115 and 114 individuals in the treatment and control conditions, respectively. In terms of sex distribution, 41 percent of treatment comparisons had a mix of male and female youth participants compared to 37 percent of comparison condition youth. Eight treatment and comparison conditions (27%) were restricted solely to females, with two treatment (7%) and three comparison (10%) conditions being restricted solely to males.

Tables 9.5 and 9.7 provide specific details of the types of treatment and control programs included in this meta-analysis. In order to be eligible for this meta-analysis, the intervention must have specified an intention of treating youth with trauma histories, PTSD, or other trauma-related symptoms. Half of the treatment programs (50%) evaluated in this meta-analysis included TF-CBT, CBT, or CPT. TF-CBT and CBT are evidence-based treatments aimed to modify cognition, behaviors, and emotions, and have been used to address trauma-related disorders including PTSD. CPT is a type of CBT that is often used to reduce symptoms of PTSD and modify beliefs related to trauma. Social work plus was the next largest treatment type, with 10 percent of interventions falling into this category. The category social work plus included a combination of interventions that consisted of some element of social work or social services, such as peer social work services, a therapeutic child-care program, and case management services. These programs and services were designed specifically to address children and youth with histories of trauma, thus qualifying as trauma-informed in the context of this review. There were two treatment conditions each for the intervention TARGET and MST. A variety of other interventions made up the remaining treatment program types, including EMDR, and Seeking Safety, to name a few.

The control programs consisted of three possible program types: no-treatment and/or waitlist control (39%), other therapy (33%), and treatment as usual (32%). Other therapy comprised of child-centered therapy, dyadic therapy or routine treatment, enhanced treatment as usual, non-directive supportive therapy, play activities or positive attention, and psychiatry services with medication. Table 9.8 provides a descriptive overview of all studies included in this meta-analysis.

6.3. Analysis of effect sizes

We analyzed the effect sizes from the at-risk youth and justice-involved youth studies separately to provide insight into the potential differential effects of trauma-informed programs for these two populations. Recall that the at-risk studies could include children as well as teenagers since the focus was on preventing future involvement in delinquent behaviors.

6.3.1. Studies of justice-involved youth

Six studies evaluated the effectiveness of trauma-informed programs for justice-involved youth (Ford et al., 2012; Chamberlain, Leve, & DeGarmo, 2007; Marrow, Knudsen, Olafson, & Bucher, 2012a; Ahrens & Rexford, 2002a; Krakow et al., 2001; Rivard et al., 2003). Three of these (Ford et al., 2012; Chamberlain et al., 2007; Rivard et al., 2003) used random assignment to conditions and a fourth used a quasi-random assignment method (Ahrens & Rexford, 2002a). The remaining two studies were quasi-experimental (Marrow et al., 2012a; Krakow et al., 2001).

The outcomes reported across these six studies were grouped into four categories: delinquency or analogous measures, affective outcomes (e.g., depression, anxiety),

PTSD, and measures of hope. The meta-analytic results for these four outcome types are shown in table 9.9. Each of these outcomes will be discussed in detail below.

Delinquency or analogous outcomes

Only two justice-involved studies (Chamberlain et al., 2007; Rivard et al., 2003) reported on outcomes that were either direct measures of delinquency (official or self-report measures) or analogous measures of problem-behavior that are highly correlated with delinquency such as the Child Behavior Checklist's (CBCL) delinquency, aggression, and externalizing scales. The nine delinquency type effect sizes reported by these two studies are shown in figure 10.1. As can be seen in this figure, the effects for the number of criminal referrals and number of days locked up from Chamberlain et al. (2007) were meaningfully positive and statistically significant. However, self-reported delinquency (Chamberlain et al., 2007) and CBCL (Rivard et al., 2003) measures were slightly negative and non-significant. Figure 10.2 shows the mean effect size for each of these two studies and the random effects mean effect size. The overall effect is roughly null. However, it is important to note that the 95% confidence interval is large indicating that there is insufficient evidence to draw any meaningful conclusion regarding the effectiveness of these two programs on delinquent type outcomes. It is also worth noting that both of these studies were randomized controlled trials with no-treatment control conditions.

Affective outcomes

Four studies (Ford et al., 2012; Marrow et al., 2012a; Ahrens & Rexford, 2002a; Krakow et al., 2001) reported affective outcomes. These outcomes included measures of depression, anxiety (including panic disorder), anger, negative mood regulation, and nightmare distress and related measures. The 16 effect sizes across these four studies are shown in figure 10.3, with a mixture of findings. Figure 10.4 shows the meta-analysis of these effects, averaging multiple effect sizes within studies. The overall mean effect size is positive and of a small to moderate size ($\overline{g} = 0.30$) but with a large confidence interval. The most positive finding is for Krakow et al. (2001) which has a very small sample size (16 and 14 in the treatment and control conditions, respectively). Two of these studies evaluated TARGET and the evidence from these two studies shows no clear benefit of this program for affective outcomes for justice-involved youth. Thus, these findings are encouraging, but insufficient for drawing any firm conclusions.

PTSD

The four studies (Ford et al., 2012; Marrow et al., 2012a; Ahrens & Rexford, 2002a; Krakow et al., 2001) that reported affective outcomes also reported outcomes related to PTSD symptoms. As with the affective outcomes, the findings were mixed (see figures 10.5 and 10.6). The meta-analytic mean for these outcomes was positive of a small to moderate size ($\overline{g} = 0.28$) but with a large confidence interval. Three of the four studies had a near null average effect size for PTSD outcomes with the remaining study observing a very large ($g > 1.00$) effect. There is therefore insufficient evidence related to

the effectiveness of these programs for justice-involved youth in terms of PTSD symptoms.

Hope

Two studies (Ford et al., 2012; Marrow et al., 2012a) assessed the effectiveness of the trauma-informed programs at improving hope among the youth. These effects are shown in figure 10.7 with heterogeneous results, suggesting inconsistent evidence on this outcome. Thus the amount evidence and consistency of the evidence is insufficient to draw any firm conclusions regarding this outcome.

Overall effects

Unfortunately, with only six studies of five distinct treatment programs, any analysis of differential effectiveness across program types for these justice-involved youth studies would not be meaningful. However, to provide a summary overview of the evidence across these six studies, we created a forest plot that shows the mean effect size for each study (see figure 10.8). Note that this collapses across different outcomes for each study. As such, we have not provided a meta-analytic mean for this forest plot. However, it shows that across the outcomes examined by these studies, the evidence is more positive than negative with four studies showing a positive average benefit of the trauma-informed program, one a null finding, and one a small, negative effect. No pattern emerges in terms of the research design (random assignment or quasi-random assignment, or quasi-experimental).

6.3.2. Studies of at-risk children and youth

Twenty-three studies representing 24 treatment–comparison contrasts examined the effectiveness of a trauma-informed program for non-justice involved youth. To be eligible, such studies must have reported on a delinquency outcome or an analogous outcome, such as externalizing behavior. The latter, while not representative of delinquent behavior *per se*, is highly correlated with delinquency and reducing externalizing behaviors is likely to reduce the risk of future delinquency (Murray & Farrington, 2010).

Half of these evaluations compared the trauma-informed treatment to a no-treatment control, whereas the other half used an active control condition, such as treatment-as-usual (TAU) or enhanced TAU. The majority were either random assignment designs (17) or quasi-random assignment designs (3). Thus, 20 of the 24 used a design with high internal validity. The remaining four studies used a quasi-experimental design.

We grouped the effect sizes into the following outcome categories: delinquency, problem-behaviors (externalizing), aggression, antisocial behavior, and substance use. Table 9.10 provides the random effects mean effect size for each outcome category. Where possible, we have also provided moderator analyses of these effects by control

group type (no-treatment/wait-list versus TAU/other treatment) and design type (random/quasi-random versus quasi-experimental).

Delinquency outcomes

Only four of the 23 at-risk youth studies assessed delinquency, either through an official measure such as arrest, or an unofficial measure, such as parent or self-report. The 17 effect sizes reported across these four studies are shown in figure 10.9. There is a clear pattern of positive results across these outcomes. The mean effect size for this outcome based on a single composite per study is positive, moderate in size, and statistically significant ($\overline{g} = 0.41$, see table 9.10). Figure 10.10 shows the composite mean effect size per study and the overall random effects mean. Individually all of the effects are positive, but not statistically significant. However, the overall mean effect size is significant and homogeneous. Two of these studies used a random assignment design, whereas the other two were quasi-experimental. Only one of these studies used a named program, "Caught in the Crossfire." The other three programs were standard therapeutic approaches with a trauma-informed focus. Three of these studies used a TAU comparison group. Thus, these studies suggest that adding a trauma-informed emphasis to traditional therapeutic approaches can produce reductions in delinquent behavior.

Problem-behaviors (Externalizing)

The most commonly reported outcome across the studies of at-risk children and youth was externalizing type problem-behaviors. These were reported in 18 studies and produced 33 effect sizes. These are shown in figure 10.11. The predominant pattern across the studies is positive. The mean effect size for this outcome based on a single composite per study is positive, moderate in size, and statistically significant ($\overline{g} = 0.40$, see table 9.10). Figure 10.12 shows the composite mean effect size per study and the overall random effects mean.

These effects, however, reflect of variety of treatment types, comparison types, and design types and are heterogeneous, as evidence by the significant Q statistic. Not surprisingly, studies with no-treatment or wait-list controls observed larger effects than those with active control conditions ($\overline{g} = 0.56$ vs. $\overline{g} = 0.27$, respectively), although the difference between these means is not significant at a conventional level ($Q_{Between} = 3.263$, $df = 1, p = 0.071$). A majority of these studies used random assignment designs (15 of 18) and the randomized designs had a smaller mean effect size than the quasi-experimental designs ($\overline{g} = 0.22$ vs. $\overline{g} = 1.43$, respectively, $Q_{Between} = 16.134$, $df = 1, p = 0.000$). Within the 15 random assignment studies, the no-treatment/wait-list control designs had a moderate and statistically significant positive effect ($\overline{g} = 0.39$). Thus, there is credible evidence that trauma-informed programs, relative to no treatment, can produce positive reductions in problem-behaviors.

Aggression

Aggression was measured by five studies (Becker-Weidman, 2006; Carbonell & Parteleno-Barehmi, 1999; Tourigny, Hebert, Daigneault, & Simoneau, 2005; Cheng et al., 2008; Moore, Armsden, & Gogerty, 1998), generating a total of seven effect sizes. These are shown in figure 10.13. The overall pattern of effects is positive with a moderate to large random effects mean effect size ($\overline{g} = 0.62$, see figure 10.14). Unfortunately, the mean effect is substantially smaller for the three random assignment studies than the quasi-experimental studies ($\overline{g} = 0.27$ vs. $\overline{g} = 1.02$, respectively, $Q_{Between} = 2.839, df = 1, p = 0.092$). Counter-intuitively, the effects are also smaller for the no-treatment/wait-list control studies than active treatment studies, although with only three and two studies in each of these groups, respectively, this finding may well reflect other study differences. Thus, we assess the evidence for this outcome as promising but inconclusive.

Antisocial behavior

Four studies (Najavits et al., 2006; Diehle, Opmeer, Boer, Mannarino, & Lindauer, 2014; Farkas, 2008; O'Callaghan, McMullen, Shannon, Rafferty, & A., 2013) reported antisocial behavior outcome data, shown in figure 10.15. All of these effects are positive, with a large positive random effects mean effect size ($\overline{g} = 0.83$, see figure 10.16). All four of these studies used random assignment designs. As shown in table 9.10, the difference between the two no-treatment/wait-list control studies and the two TAU/other treatment studies is trivial. In terms of treatment types, two were TF-CBT, one was a MASTR-EMDR program, and the other was Seeking Safety. These findings suggest, albeit based on only a few studies, that these types of programs can produce beneficial effects on antisocial behavior.

Substance use

Substance use was examined by two studies (Danielson et al., 2012; Najavits et al., 2006), with a total of nine distinct substance use outcomes reported. All but one of these effects is positive and large (see figure 10.17). Collapsing within studies produced two positive and significant overall effects along with a positive and significant overall random effects mean effect size ($\overline{g} = 0.66$, see figure 10.18). Both of these studies are random-assignment to conditions studies and both used a no-treatment comparison condition. While the treatments were different (Seeking Safety and risk reduction through family therapy), the findings suggest that trauma-informed therapeutic approaches can bring about meaningful reductions in substance use.

Treatment types and treatment elements

As was shown in table 9.5, we grouped the various treatment programs into conceptually distinct treatment types. However, many programs were too distinct to group with others. An analysis of potential differential effects of these programs for

at-risk youth is shown in 9.11. The most common treatment type was some variant of a cognitive-behavioral therapy (CBT) program, whether that be explicitly designated as TF-CBT, CBT, or CPT. These comprised 14 of the 24 studies of at-risk children and youth. The overall mean effect size for these studies was small to moderate ($\overline{g} = 0.28$) and statistically significant. Three studies examined social work plus which, as previously discussed, included of a combination of interventions that consisted of some element of social work or social services that was intended to address histories of trauma. These programs had a roughly similar overall mean effect size to that of the CBT category ($\overline{g} = 0.25$), but given less statistical power, this effect was not statistically significant. MST was evaluated by two studies and also had a roughly similar effect size ($\overline{g} = 0.22$), but as with the social work plus categories, was not statistically significant. All other programs had only a single evaluation within either the at-risk or delinquent youth populations, and while some of these effect sizes are individually large (and statistically significant), little weight should be put on these findings without replication.

Also shown in table 9.11 is an effect size analysis by control group type. Not surprisingly, studies that used a no-treatment or wait-list control condition observed slightly larger effect sizes, on average. However, the differences across these control condition types was not statistically significant ($Q_{Between} = 2.162$, $df = 2$, $p = 0.393$). Focusing solely on the FT-CBT/CBT/CPT studies, the control type does appear to matter, with no-treatment controls having a larger average effect than other therapy controls ($\overline{g} = 0.53$ vs. $g = 0.12$, respectively, $Q_{Between} = 6.977$, $df = 2$, $p = 0.008$).

The above collapses all CBT-type programs into a single category. To explore possible differential effects within this group, we also compared programs that were explicitly identified as trauma-focused CBT (TF-CBT) with CBT programs that were not explicitly identified with this label. These results are shown in table 9.12. This analysis differentiates the control-type as well. Under both the no-treatment/wait-list control and TAU/other treatment control, TF-CBT had a larger mean effect size. The difference was rather larger for the no-treatment studies ($\overline{g} = 0.98$ vs. $g = 0.20$, respectively, $Q_{Between} = 10.354$, $df = 1$, $p = 0.001$), although there were only two studies contributing to the TF-CBT mean. The findings suggest, however, that the TF-CBT programs may be more effective or at least have stronger evidence of effectiveness than the more generic CBT programs. Additional studies directly comparing these models are needed.

We also had two studies that directly compared CBT to EMDR, allowing for a head-to-head comparison of these two popular approaches to treating individuals with histories of trauma and suffering from PTSD. The data were not sufficient for a full network meta-analysis, but in table 9.12 we present a moderator analysis that compares the mean effect size for CBT versus EMDR, CBT versus no-treatment control, and EMDR versus no-treatment control. These effect sizes are also shown in figure 10.19. The two studies that compared CBT to EMDR had a mean effect size that favored CBT ($\overline{g} = 0.42$). However, given the low statistical power of this mean effect size, it is not statistically significant. The effect for EMDR, based on a single study, was large ($\overline{g} = 0.75$) but also not statistically significant. Thus, we do not have sufficient evidence to conclude which is more effective at reducing acting out behaviors, CBT or EMDR.

The treatment programs for children and youth with trauma histories rarely have a single treatment element, but rather are an amalgamation of therapeutic techniques. To explore whether a particular technique or treatment element seems to produce better

average outcomes, we coded each treatment program according to whether it included any of a list of 32 elements. Not all of these 32 elements were observed across the collection of studies identified. Descriptive statistics for the frequency of these elements across all 30 studies are shown in table 9.6 for all elements that were observed across these studies. For the at-risk studies, we examined moderator analyses for those elements identified in at least 3 of the 24 studies. These findings are shown in table 9.13.

A few interesting patterns emerge, although none of the differences are statistically significant indicating that these differences may not hold up as additional studies are conducted. Programs with a cognitive-restructuring element and those that incorporated creating a trauma narrative were slightly more effective, on average, than other programs. These findings should only be viewed as suggested avenues for future research given that none of these elements were individually significant. A meta-analytic regression model (not shown) examined all of these elements in a single model and none emerged as producing an added benefit above and beyond the other elements.

6.3.3. Publication bias

An important consideration in terms of the robustness of the findings from a meta-analysis is publication selection bias (Lipsey & Wilson, 2001; Rothstein, Sutton, & Borenstein, 2006). It is well established that statistically significant findings are more likely to be published than non-significant findings (Rothstein et al., 2006). To minimize this bias, we searched for grey literature studies (e.g., technical reports, theses, other unpublished works) (Rothstein & Hopewell, 2009). However, only one of the 29 studies included in this review was from the grey literature. To assess the risk of our inferences evolving from publication selection bias we used the interrelated method of trim-and-fill and visual examination of the funnel plot (Duval & Tweedie, 2000). This was done on the full set of 30 treatment comparison contrasts using the average within contrast effect size. That is, for studies reporting multiple effect sizes, we averaged these within each study and used that average in the analyses below.

Figure 10.20 shows the funnel plot. This scatter plot of the effect sizes by the standard error of the effect size shows a clear asymmetry with an absence of studies in the lower left of the plot. This is suggestive of publication selection bias. The trim-and-fill method also supports this conclusion and suggests that there are 10 missing effect sizes to the left of the mean effect. This reduces the overall random effects mean from $\overline{g} = 0.38$ to $\overline{g} = 0.12$. This is a major reduction in the size of the mean effect. The implication is that the findings presented above, even those based on multiple strong, randomized controlled trials, may be upwardly biased and must be interpreted cautiously. Clearly, additional research is needed for all treatment types and across all outcomes examined in this meta-analysis. The results for many outcomes and treatment types are clearly positive and encouraging but are far from definitive.

7. Discussion

There is growing recognition of the consequences of traumatic experiences on healthy youth development, as well as the importance for the juvenile justice system to adopt trauma-informed practices to ensure positive development (Buckingham, 2016; Ford et al., 2016). Despite this growing awareness, Buckingham (2016) details the many ways that the current justice system fails those with histories of trauma and advocates for numerous system changes to better address the needs of this population.

> Adopting a trauma-informed response to childhood offending will necessitate a reorientation of our juvenile justice system, infusing every aspect of how the juvenile system responds to the children who come to its attention. Trauma must be identified, considered, and constructively addressed by actors in the juvenile and criminal justice systems and in all settings (stationhouse, courthouse, and detention center alike). Offenders should be presumed to suffer from trauma. Children in the juvenile justice system should be accurately, compassionately, and constructively viewed as trauma sufferers. . . . By recognizing the significance of a child's experience of trauma, the juvenile justice system will provide appropriate individualized and needs-based treatment and ensure that the children in its care are helped, and never harmed and re-traumatized by incarceration as it exists today. (Buckingham, 2016)

One of these changes is the implementation of "needs-based treatment" that is inclusive of and directly addresses youths' histories of trauma. The purpose of this review was to examine the existing evidence-base to gain insights into the effectiveness of trauma-informed programs across various outcomes, treatment types, and treatment elements.

Below we summarize the main findings from this meta-analysis for both justice-involved youth and children and youth not yet involved in the justice system. We then discuss the implications and limitations of this work, as well as recommendations for future research within this area.

7.0.1. Summary of Findings for Trauma-Informed Programs for Justice-Involved Youth

The current evidence base for the effectiveness of trauma-informed programs for justice-involved youth is clearly inadequate. We were only able to identify six experimental (random assignment or quasi-random assignment) and quasi-experimental studies addressing the effectiveness of these programs. Furthermore, only two of these studies examined the effectiveness with respect to delinquency as an outcome. The

overall effect with respect to delinquency was null. However, the most positive effects were measured at 24-months post-treatment, suggesting the need for studies to assess delinquency over a reasonably long time frame. It is possible that the benefits of these programs in terms of delinquency accrue slowly and may not emerge post-test or shortly after the end of treatment.

In terms of non-delinquency outcomes, the evidence was more positive but far from definitive. A positive pattern of evidence was seen for affective outcomes, with more mixed results for PTSD symptoms and hope. However, none of the mean effect sizes were statistically significant. Thus, the current and rather limited evidence-base for trauma programs that treat justice-involved youth is encouraging at best, but also suggestive of possible small to null effects. There was insufficient evidence to examine differential effects by treatment type. The only program type with at least two evaluation was TARGET. The evidence across the two evaluations of this program was mixed.

7.0.2. Summary of Findings for Trauma-Informed Programs for At-Risk Children and Youth

The findings are more encouraging with regards to the effectiveness of trauma-informed programs for at-risk children and youth in their ability to produce meaningful change on delinquency and related outcomes. Part of this stems from the larger evidence-base of included studies. We identified 24 such studies that meet our eligibility criteria, 20 of which used random or quasi-random assignment to condition designs. The strongest evidence for positive-benefits of these programs is for problem behaviors, mostly measured by the CBCL externalizing behavior scale. A total of 18 comparisons existed for this analysis and the overall finding was moderate in size and statistically significant, suggesting that these programs as a whole can produce meaningful reductions in problem behaviors. The finding for delinquency was roughly the same size but based on only four studies, lending cautious support to the interpretation that these programs can reduce future delinquency among youth with histories of trauma. Other analogous outcomes, such as aggression, antisocial behavior, and substance abuse, also evidenced positive patterns of benefit. However, the number of studies reporting effects for these outcomes was too few for any strong conclusions regarding these outcomes.

Examining specific treatment types, we found that CBT-type programs as a category (TF-CBT, CBT, CPT) were effective, as were the social-work plus-type programs. Other program types had positive effects but too few studies (generally only one) to allow for any meaningful inference regarding effectiveness. Differentiating between TF-CBT and CBT showed a stronger effect for the former than the latter, particularly when the control was a no-treatment condition. This is not surprising as TF-CBT was designed specifically to address histories of trauma. We also compared CBT to EMDR with no clear differential effectiveness pattern emerging.

We were unable to identify treatment components or elements that clearly had an additive-effect to a treatment modality. Small but insignificant positive effects were seen for programs that use a cognitive restructuring component or a creating a trauma narrative component. This is consistent with Cohen et al. (2000) who also failed to find differential effects for various components of cognitive behavioral therapies for

traumatized children and youth. Cohen et al. (2000) examined the following components: imaginal flooding, gradual exposure, cognitive processing therapy, cognitive coping, stress management, muscle relaxation and breathing techniques, and thought-stopping and thought-replacement. Cohen et al. (2000) concluded that while there is a body of evidence supporting trauma-informed CBT interventions, less is known about the relative effectiveness of cognitive components.

7.0.3. Limitations

An important limitation of the above analyses is the risk of publication selection bias. It is well established that studies with statistically significant findings are more likely to be published, and outcomes and analyses within a study that are statistically significant are more likely to be included in a published article (Rothstein et al., 2006). Although we searched for grey-literature studies to minimize this threat, we only identified one such study. Furthermore, our analyses of publication selection bias strongly suggest that this collection of studies is at high risk of being affected by this threat. Both the funnel-plot and trim-and-fill method suggest that null and small, but negative effects from small sample size studies are likely to be missing as a result of publication selection bias. In our judgment, this is the most serious threat to the validity of the findings of this meta-analysis, which raises an important caution that these results must be viewed as potentially upwardly biased and in need of further replication.

The modest sample size of many of the studies contributes to this problem (26% had treatment and control group sizes of 20 or less, see table 9.4), given the very low statistical power of such studies. We recognize that conducting high quality, particularly randomized controlled trials, with this client population is difficult and imposes very real constraints on developing a feasible sample size. Most studies evaluating these programs will need to be treatment–treatment comparisons given ethical concerns regarding denial of treatment, reducing the potential size of the effect, assuming that both treatments have at least a non-zero benefit. A study with a small sample size and treatment–treatment comparison runs a high risk of null or even negative results even if the underlying program being evaluated is genuinely effective. Thus, it is critical that such studies be available to the academic community, whether formally published in peer-reviewed journals or not, so that they can be aggregated with other small studies, increasing statistical power. Toward this aim, we strongly recommend that all future clinical trials in this area prospectively register in a trials database, such as *ClinicalTrials.gov* (https://clinicaltrials.gov). We also strongly recommend that all future studies both clearly identify *a priori* what their primary and secondary outcomes are and also report basic findings for all measured outcomes irrespective of statistical significance.

7.1. Implications for Research

The first implication for research is simply the need for more high-quality randomized experiments that directly address the effectiveness of different approaches to trauma-informed treatment for both youth involved in the justice system and children

and youth with trauma histories, but not involved in the justice system. Studies are needed that explicitly manipulate treatment elements, such as comparing two treatments that are identical except for the inclusion of creating a trauma narrative. This will provide insight into the added value of specific therapeutic program elements, helping to refine the general effectiveness of these programs suggested by the evidence, such as for TF-CBT. Additional studies are also needed that compare trauma-informed programs to both no treatment and treatment-as-usual. That said, manuscripts and documents describing these studies need to be much more detailed with respect to the specific nature and characteristics of the treatment provided to both conditions to allow for more meaningful research synthesis.

The second implication was previously discussed under limitations and concerns the need for any new study to be registered in a trial registry. Only in this way will future research syntheses be able to establish an unbiased population of studies and outcomes on which to base their review, or at least clearly establish what evidence may be missing from the synthesis.

A third implication is a need for longer follow-up periods for key outcomes, such as delinquency. We do not yet know the nature and timing of the effects of trauma-informed programs on distal outcomes such as delinquency. These programs do not directly focus on delinquent behavior but rather address the psychosocial health of the youth, with a particular focus on addressing trauma histories. As discussed by Oudshoorn (2016), an important focus of many trauma-informed treatments is building on existing strengths with the goal of enhancing a youth's resilience. Thus, any change in delinquent-type behavior occurs via other more proximal changes more directly induced by the treatment. Changes in delinquency may thus develop slowly over time. That is, trauma-informed treatments may represent a shift in the trajectory for youth rather than a sharp discontinuity with the past. To better assess this possibility, two and three-year follow-ups of key outcome variables are needed.

7.2. Implication for Policy and Practice

The implications of the meta-analysis for policy and practice are modest. Overall, the evidence is encouraging in terms of the effectiveness of trauma-informed treatment programs, albeit far from conclusive given the small number of studies examining any given treatment approach and the small sample size of most studies. However, combined with evidence from other meta-analyses (e.g., Leenarts et al., 2013) that also suggest that these programs are effective, the implication is that the use of these programs or referral to these programs from the juvenile justice system should be expanded. The strong theoretical connection between histories of trauma and victimization with later criminality along with evidence suggestive of positive benefits reinforces this conclusion.

In terms of specific treatment type and treatment elements, the evidence is less clear. However, the evidence suggests that TF-CBT is an effective approach for this population. This is consistent with the conclusion of Leenarts et al. (2013) who concluded that TF-CBT is the "best-supported treatment" for children with histories of trauma. The CBT technique of cognitive-restructuring appears to have value, as does the therapeutic

approach of creating a trauma narrative. However, the evidence for the added value of these specific treatment elements is small and not statistically significant. We did not have sufficient evidence to establish the value of EMDR for reducing problem-behaviors and delinquency, although the evidence is promising. A meta-analysis of the evidence of treatments for PTSD for adults by Cusack et al. (2016) concluded that EMDR is effective, although they rated the strength of evidence as low to moderate. We also found support for the effectiveness of enhanced social work programs with a focus on addressing histories of trauma. This, however, is not a standardized treatment approach and the effectiveness may well depend on the particular enhancements used.

7.3. Conclusions

The high percentage of youth within the criminal justice system with histories of trauma and the well-established relationship between such histories and later criminality speaks to the importance of treatment for these youth and treatments that directly address traumatic experiences. Our meta-analysis suggests that trauma-informed programs for children and youth with histories of trauma can be effective at reducing problem behaviors predictive of delinquency. The effectiveness of these programs at reducing recidivism for justice-involved youth is less clear, but the evidence is promising. Thus, these findings suggest that the juvenile justice system increase the emergent practice of referring youth with histories of trauma to evidence-based trauma-informed treatment programs, such as TF-CBT.

Clearly, additional high quality randomized controlled trials of these treatment programs are needed, particularly for youth already in the justice system. A mix of studies that manipulate treatment components, as well as treatment versus control type evaluations, are needed to fully understand both the added value of specific treatment techniques in addition to the complete treatment approach.

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9. Studies Included in the Meta-analysis

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Becker-Weidman, A. (2006). Treatment for children with trauma-attachment disorders: Dyadic developmental psychotherapy. *Child and Adolescent Social Work Journal*, *23*(2), 147–171.

Study ID 94

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Study ID 522

Najavits, L. M., Gallop, R. J., & Weiss, R. D. (2006). Seeking safety therapy for adolescent girls with ptsd and substance use disorder: A randomized controlled trial. *The Journal of Behavioral Health Services & Research*, *33*(4), 453–463.

Study ID 525

Celano, M., Hazzard, A., Webb, C., & McCall, C. (1996). Treatment of traumagenic beliefs among sexually abused girls and their mothers: An evaluation study. *Journal of Abnormal Child Psychology*, *24*(1), 1–17.

Study ID 529

Danielson, C., McCart, M., Walsh, K., de Arellano, M., White, D., & H.S., R. (2012). Reducing substance use risk and mental health problems among sexually assaulted adolescents: A pilot randomized controlled trial. *Journal of Family Psychology*, *26*(4), 628–635.

Study ID 531

Diehle, J., Opmeer, B. C., Boer, F., Mannarino, A. P., & Lindauer, R. J. L. (2014). Trauma-focused cognitive behavioral therapy or eye movement desensitization and reprocessing. what works in children with posttraumatic stress symptoms? A randomized controlled trial. *European Child and Adolescent Psychiatry*, *24*(2), 227–236.

Study ID 533

Farkas, L. (2008). *The effects of motivation-adaptive skills-trauma resolution (MASTR): Eye movement desensitization and reprocessing (EMDR) on traumatized adolescents with conduct problems* (Doctoral dissertation, Université df Montréal).

Study ID 535

Jaberghaderi, N., Greenwald, R., Rubin, A., Zand, S. O., & Dolatabadi, S. (2004). A comparison of CBT and EMDR for sexually-abused iranian girls. *Clinical Psychology and Psychotherapy*, *11*(5), 358–368.

Study ID 536

O'Callaghan, P., McMullen, J., Shannon, C., Rafferty, H., & A., B. (2013). A randomized controlled trial of trauma-focused cognitive behavioral therapy for sexually exploited, war-affected congolese girls. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*(4), 359–369.

Study ID 537

Overbeek, M., de Schipper, J. C., Lamers-Winkelman, F., & Schuengel, C. (2013). Effectiveness of specific factors in communitybased intervention for child-witnesses of interparental violence: A randomized trial. *Child Abuse and Neglect*, *37*, 1202==1214.

Study ID 543

Ahrens, J. & Rexford, L. (2002a). Cognitive processing therapy for incarcerated adolescents with PTSD. *Trauma and Juvenile Delinquency*, *6*(1), 201–216.

Study ID 546

Krakow, B., Sandoval, D., Schrader, R., Keuhne, B., Mcbride, L., Yau, C. L., & Tandberg, D. (2001). Treatment of chronic nightmares in adjudicated adolescent girls in a residential facility. *Journal of Adolescent Health*, *29*(2), 94–100.

Study ID 568

Cheng, T. L., Haynie, D., Brenner, R., Wright, J. L., Chung, S. E., & Simons-Morton, B. (2008). Effectiveness of a mentor-implemented, violence prevention intervention for assault-injured youths presenting to the emergency department: Results of a randomized trial. *Pediatrics*, *122*(5), 938–946.

Study ID 569

Shibru, D., Zahnd, E., Becker, M., Bekaert, N., Calhoun, D., & Victorino, G. P. (2007). Benefits of a hospital-based peer intervention program for violently injured youth. *Journal of the American College of Surgeons*, *205*(5), 684–689.

Study ID 571

Bagley, C. & LaChance, M. (2000). Evaluation of a family-based programme for the treatment of child sexual abuse. *Child and Family Social Work*, *5*(3), 205–214.

Study ID 572

Moore, E., Armsden, G., & Gogerty, P. L. (1998). A twelve-year follow-up study of maltreated and at-risk children who received early therapeutic child care. *Child Maltreatment*, *3*(1), 3–16.

Study ID 574

Rivard, J. C., Bloom, S. L., McCorkle, D., & Abramovitz, R. (2005). Preliminary results of a study examining the implementation and effects of a trauma recovery framework for youths in residential treatment. *Therapeutic Community: The International Journal for Therapeutic and Supportive Organizations*, *26*(1), 83–96.

Rivard, J., Bloom, S., Abramovitz, R., Pasquale, L., Duncan, M., McCorkle, D., & Gelman, A. (2003). Assessing the implementation and effects of a trauma-focused intervention for youths in residential treatment. *Psychiatric Quarterly*, *74*(2), 137–154.

Table 9.1.: Study Descriptives

Variable	Frequency	Percent
Country of study		
United States	21	72
Canada	3	10
European Union	2	7
Other	3	10
Publication decade		
1990s	6	21
2000s	15	52
2010s	8	28
Publication type		
Journal article/book chapter	28	97
Thesis-dissertation	1	3
Author developer of treatment/intervention		
Yes	14	48
No	15	52
Research funded by external agency		
Yes	27	93
No	2	7
Research design		
Random with matching	4	14
Random without matching	15	52
Quasi-random assignment	4	14
Quasi-experiment with matching	1	3
Quasi-experiment with statistical controls	2	7
Quasi-experiment with no statistical controls	3	10

Note: Study demographics based on 29 unique studies.

Table 9.2.: Characteristics of Youth Included in Studies

	No. of Studies	Mean	Standard Deviation	Minimum	Maximum
Age					
At-risk[a]	16	12.41	3.36	4.68	17.50
Justice-involved[b]	5	16.24	1.18	14.70	17.40
Race - At-risk					
White	14	46.39	28.50	0.00	87.53
Black	14	36.71	21.44	3.00	75.00
Hispanic	14	8.32	15.67	0.00	54.00
Asian	14	2.30	4.09	0.00	12.10
American Indian	14	0.30	1.22	0.00	4.20
Other	14	4.61	6.14	0.00	22.93
Race - Justice-involved					
White	5	49.10	29.37	11.02	75.00
Black	5	23.68	17.94	2.00	51.09
Hispanic	5	21.44	24.74	0.00	59.00
Asian	5	0.20	0.48	0.00	1.00
American Indian	5	3.44	5.29	0.00	12.00
Other	5	1.32	1.23	0.00	2.60

Note: Based on 30 treatment and control conditions evaluated within 29 unique studies.

[a] Total at-risk youth studies was 24 (80%).

[b] Total justice-involved youth studies was 5 with 6 treatment–comparison contrasts (20%).

Table 9.3.: Trauma Characteristics of Youth Included in Studies

	Frequency				Percent			
Trauma Characteristics of Youth	All	Most	Some	No Information	All	Most	Some	No Information
History of sexual abuse	11	5	6	8	37	17	20	27
History of trauma (unspecified)	8	4	4	14	27	13	13	47
PTSD[a]	8	2	2	18	27	7	7	60
Exposure to violence	4	7	2	17	13	23	7	57
History of delinquency	3	1	2	24	10	3	7	80
Institutionalized	3	0	1	26	10	0	3	87
History of physical abuse	2	9	7	12	7	30	23	40
History of neglect	1	3	1	25	3	10	3	83
History of emotional abuse	0	3	2	25	0	10	7	83
Youth in foster care	0	1	4	25	0	3	13	83
Homeless	0	0	1	29	0	0	3	97

Note: Based on 30 treatment and control conditions evaluated within 29 unique studies; All $\geq$ 90%, most 89–51%, some 50–1%

[a] PTSD=Post-Traumatic Stress Disorder

Table 9.4.: Trauma-informed Treatment and Comparison Condition Sample Characteristics

	Trauma		Comparison	
Variable	Frequency	Percent	Frequency	Percent
Sample sizes				
<10	1	3	1	3
11–20	6	20	7	23
21–30	7	23	9	30
31–40	6	20	2	7
41–50	5	17	5	17
51–100	3	10	5	17
>100	2	7	1	3
Sex distribution				
0% Male	8	27	8	27
1–25% Male	0	0	0	0
26–50% Male	5	17	6	20
51–75% Male	5	17	3	10
76–99% Male	2	7	2	7
100% Male	2	7	3	10
Unknown	8	27	8	27

Note: Based on 30 treatment and control conditions evaluated within 29 unique studies.

Table 9.5.: Trauma Treatment Program Types

Treatment Type	Frequency	Percent
TF-CBT/CBT/CPT	15	50
Social work plus	3	10
TARGET	2	7
MST	2	7
CSA group therapy	1	3
EMDR	1	3
Humanistic	1	3
Imagery rehearsal	1	3
MTFC	1	3
Psychodynamic	1	3
Sanctuary (Sage Framework)	1	3
Seeking safety	1	3
Total	30	100

Note: TF-CBT/CBT/CPT = Trauma-focused Cognitive Behavioral Therapy, Cognitive Behavioral Therapy, Cognitive Processing Therapy; MST = Multisystemic therapy; CSA group therapy = Child Sexual Abuse group therapy; MTFC = Multidimensional Treatment Foster Care; TARGET = Trauma Affect Regulation: A Guide for Education and Therapy; EMDR = Eye Movement Desensitization & Reprocessing.

Table 9.6.: Trauma Treatment Program Elements

Treatment Elements	Frequency	Percent
Coping skills	16	53
Psychoeducation	9	30
Creating a trauma narrative	6	20
Cognitive restructuring	5	17
Planning for the future	4	13

Note: Each treatment program ($N = 30$) coded "yes" or "no" for each element. 9.5.

Table 9.7.: Control Program Types

Control Type	Frequency	Percent
No treatment/waitlist control	11	39
Other therapy	10	33
Treatment as usual	9	32

Note: Other therapy types include: child-centered therapy, dyadic therapy/routine treatment, enhanced treatment as usual, non-directive supportive therapy, play activities/positive attention, psychiatry services with medication, and EMDR (for two studies, EMDR was the control condition compared to TF-CBT/CBT as the treatment condition).

Table 9.8.: Treatment, Comparison and Research Design of Included Studies

Author	Treatment	Comparison	Design[a]	Youth[b]	Sample Size
Becker-Weidman (2006)	Dyadic Developmental Therapy	TAU	Quasi-experiment[c]	At-risk	64
Carbonell & Parteleno-Barehmi (1999)	Cognitive Behavioral Therapy	Wait-list control	Random	At-risk	28
Cohen et al. (2004)	TF-CBT	Child-Centered Therapy (CCT)	Random	At-risk	229
Cohen & Mannarino (1998)	SA-CBT	Nondirective supportive therapy	Random	At-risk	82
Cohen & Mannarino (1996)	CBT-SAP	Nondirective supportive therapy	Random	At-risk	86
Cohen et al. (2005)	TF-CBT	Non-directive supportive therapy	Random	At-risk	82
Deblinger et al. (1996) (Child only)	CBT Child only	Community control	Random	At-risk	50
Deblinger et al. (1996) (Child/parent)	CBT Child/parent	Community control	Random	At-risk	50
McMullen et al. (2013)	TF-CBT	Wait-list control	Quasi-random	At-risk	50
Stein et al. (2003)	CBITS	Wait-list delayed intervention	Random	At-risk	126
Swenson et al. (2010)	MST-CAN	Enhanced Outpatient Treatment	Random	At-risk	90
Tourigny et al. (2005)	Group therapy	No treatment	Quasi-experiment	At-risk	42
Najavits et al. (2006)	Seeking safety	TAU	Random	At-risk	33
Celano et al. (1996)	Recovering from Abuse	TAU	Random	At-risk	32
Danielson et al. (2012)	Risk reduction thru family therapy	TAU	Random[d]	At-risk	30
Diehle et al. (2014)	TF-CBT	EMDR	Random[d]	At-risk	48
Farkas (2010)	MASTR-EMDR	Routine treatment	Quasi-random	At-risk	65
Jaberghaderi et al. (2004)	CBT	EMDR	Random[d]	At-risk	14
O'Callaghan et al. (2013)	TF-CBT	Wait-list control	Quasi-random	At-risk	52
Overbeek et al. (2013)	Cognitive Behavioral Therapy	No treatment	Random[d]	At-risk	164
Cheng et al. (2008)	Violence prevention intervention	List of community resources	Random	At-risk	166
Shibru et al. (2007)	Caught in the Crossfire	No treatment	Quasi-experiment[e]	At-risk	154
Bagley & LaChance (2000)	CSATP	No treatment	Quasi-experiment[c]	At-risk	57
Moore et al. (1998)	Therapeutic child-care program	Standard CPS/community services	Random	At-risk	61
Chamberlain et al. (2007)	MTFC	Group care	Random	Delinquent	81
Ford et al. (2012)	TARGET	ETAU	Random	Delinquent	59
Marrow et al. (2012)	TARGET	TAU	Quasi-experiment	Delinquent	74
Ahrens & Rexford (2002)	CPT	Wait-list control	Quasi-random	Delinquent	38
Krakow et al. (2001)	Imagery Rehearsal Therapy	No treatment	Quasi-experiment	Delinquent	30
Rivard et al. (2003)	Sanctuary Model	Standard residential services	Random	Delinquent	111

[a] Quasi-random designs classified as random in this table.
[b] Refers to whether youth were at-risk of justice system involvement or already involved in the justice system (delinquent).
[c] Statistical controls for baseline differences.
[d] Random assignment after matching.
[e] Matching at the individual level.
Note: TF-CBT = Trauma-focused Cognitive Behavioral Therapy; SA-CBT = Sexual Abuse Cognitive Behavioral Therapy; CBT-SAP = Cognitive Behavioral Therapy for Sexually Abused Preschool Children; CBITS = Cognitive-Behavioral Intervention for Trauma in Schools; MST-CAN = Multisystemic Therapy for Child Abuse and Neglect; TAU = Treatment as usual; ETAU = Enhanced Treatment as Usual; CSATP = Child Sexual Abuse Treatment Program.

Table 9.9.: Justice-Involved Youth Studies: Mean Effect Size and Related Statistics by Outcome

Outcome	Mean g	95% CI		SE	z	p	k	Q	p
		Lower	Upper						
Delinquency	-0.03	-0.64	0.58	0.311	-0.09	0.924	2	3.34	0.07
Affective	0.30	-0.07	0.68	0.193	1.57	0.116	4	4.21	0.24
PTSD	0.28	-0.19	0.74	0.237	1.16	0.244	4	6.35	0.10
Hope	0.45	-0.98	1.88	0.728	0.62	0.535	2	14.59	0.00

All models estimated as random effects models using the method-of-moments estimate for τ^2.

Effects are coded such that positive values reflect positive effects, that is, less delinquency.

Table 9.10.: At-Risk Youth Studies: Mean Effect Size and Related Statistics by Outcome

Outcome	Mean g	95% CI		SE	z	p	k	Q	p
		Lower	Upper						
Delinquency	0.41	0.09	0.73	0.164	2.53	0.011	4	1.09	0.78
Problem Behaviors (Externalizing)	0.40	0.13	0.68	0.142	2.85	0.004	18	73.88	0.00
Control type[a]									
No treatment/wait-list	0.56	0.14	0.99	0.217	2.60	0.009	8		
TAU/Other treatment	0.27	-0.12	0.66	0.197	1.37	0.169	10		
Design type[b]									
Random/Quasi-Random[c]	0.22	-0.01	0.44	0.114	1.91	0.057	15		
No treatment/wait-list	0.39	0.12	0.65	0.135	2.88	0.004	9		
TAU/Other treatment	0.06	-0.17	0.30	0.120	0.51	0.610	6		
Quasi-experimental	1.43	0.88	1.98	0.280	5.11	0.000	3		
Aggression	0.62	0.04	1.20	0.297	2.08	0.038	5	15.73	0.00
Design type[d]									
Random/Quasi-Random	0.27	-0.31	0.85	0.295	0.92	0.359	3		
Quasi-experimental	1.02	0.37	1.66	0.329	3.09	0.002	2		
Control type[e]									
No treatment/wait-list	.30	-.09	.69	.199	1.51	0.131	3		
TAU/Other treatment	1.28	.64	1.92	.326	3.92	0.000	2		
Antisocial Behavior	0.83	0.40	1.25	0.219	3.77	0.00	4	4.45	0.22
Control type[f]									
No treatment/wait-list	0.76	0.08	1.43	0.345	2.20	0.03	2		
TAU/Other treatment	0.92	0.13	1.72	0.406	2.27	0.02	2		
Substance Use	0.66	0.10	1.23	0.287	2.31	0.02	2	0.00	0.97

All models estimated as random effects models using the method-of-moments estimate for τ^2.
Effects are coded such that positive values reflect positive effects, that is, less delinquency.

[a] $Q_{Between} = 3.263$, $df = 1, p = 0.071$
[b] $Q_{Between} = 16.134$, $df = 1, p = 0.000$
[c] $Q_{Between} = 3.263$, $df = 1, p = 0.071$
[d] $Q_{Between} = 2.839$, $df = 1, p = 0.092$
[e] $Q_{Between} = 6.524$, $df = 1, p = 0.011$
[f] $Q_{Between} = 0.095$, $df = 1, p = 0.758$

Table 9.11.: At-Risk Youth Studies: Mean Effect Size and Related Statistics by Treatment and Control Type

		95% CI					
Treatment/Control Type	Mean g	Lower	Upper	SE	z	p	k
Treatment type							
TF-CBT/CBT/CPT	0.28	0.07	0.49	0.106	2.66	0.01	14
Social work plus	0.25	-0.19	0.69	0.224	1.10	0.27	3
MST	0.22	-0.31	0.76	0.272	0.81	0.42	2
CSA Group Therapy	0.35	-0.46	1.17	0.417	0.85	0.40	1
EMDR	0.75	-0.07	1.57	0.419	1.80	0.07	1
Humanistic	1.70	0.58	2.83	0.574	2.97	0.00	1
Psychodynamic	1.79	1.01	2.56	0.396	4.52	0.00	1
Seeking Safety	0.68	-0.34	1.71	0.523	1.31	0.19	1
Control type							
No treatment/waitlist	0.59	0.26	0.92	0.168	3.50	0.00	9
Other therapy	0.23	-0.11	0.57	0.175	1.32	0.19	8
TAU	0.43	0.05	0.81	0.192	2.23	0.03	7
Control type (TF-CBT/CBT/CPT only)							
No treatment/waitlist	0.53	0.25	0.81	0.144	3.68	0.00	6
Other therapy	0.12	-0.13	0.38	0.129	0.95	0.34	7
TAU	-0.40	-1.23	0.44	0.427	-0.93	0.35	1

All models estimated as random effects models using the method-of-moments estimate for τ^2.

Effects are coded such that positive values reflect positive effects, that is, less delinquency or other problem behaviors.

Table 9.12.: At-Risk Youth Studies: Head-to-head comparison of CBT versus EMDR and TF-CBT versus CBT

		95% CI					
Compairson[a]	Mean g	Lower	Upper	SE	z	p	k
TF-CBT vs. CBT[a]							
No treatment/wait list control							
TF-CBT	0.98	0.56	1.41	0.216	4.53	0.00	2
CBT	0.20	-0.02	0.42	0.110	1.82	0.07	5
TAU/Other therapy[b]							
TF-CBT	0.17	-0.30	0.63	0.238	0.70	0.48	3
CBT	0.09	-0.37	0.55	0.236	0.37	0.71	4
CBT vs. EMDR[c]							
CBT vs. EMDR	0.42	-0.40	1.25	0.423	1.00	0.32	2
CBT vs. no treatment	0.43	0.11	0.76	0.167	2.59	0.01	7
EMDR vs. no treatment	0.75	-0.17	1.67	0.470	1.60	0.11	1

All models estimated as random effects models using the method-of-moments estimate for τ^2.

Effects are coded such that positive values reflect positive effects, that is, less delinquency or other problem behaviors.

[a] $Q_{Between} = 10.354, df = 1, p = 0.001$

[b] $Q_{Between} = 2.656, df = 1, p = 0.494$

[c] $Q_{Between} = 0.424, df = 2, p = 0.515$

Table 9.13.: At-Risk Youth Studies: Mean Effect Size and Related Statistics by Program Elements

		95% CI					
Program Element	Mean g	Lower	Upper	SE	z	p	k
Cognitive-restructuring[a]							
Yes	0.67	0.25	1.10	0.217	3.12	0.00	5
No	0.34	0.11	0.58	0.120	2.87	0.00	19
Coping skills training[b]							
Yes	0.39	0.12	0.66	0.138	2.87	0.00	13
No	0.46	0.14	0.77	0.160	2.85	0.00	11
Creating a trauma narrative[c]							
Yes	0.59	0.13	1.05	0.234	2.53	0.01	5
No	0.38	0.14	0.61	0.120	3.16	0.00	19
Psychoeducation[d]							
Yes	0.32	-0.03	0.68	0.181	1.78	0.08	8
No	0.47	0.22	0.72	0.127	3.69	0.00	16
Planning for the future[e]							
Yes	0.33	-0.23	0.88	0.281	1.16	0.25	3
No	0.44	0.21	0.66	0.114	3.83	0.00	21

All models estimated as random effects models using the method-of-moments estimate for τ^2.

Effects are coded such that positive values reflect positive effects, that is, less delinquency or other problem behaviors.

[a] $Q_{Between} = 1.785$, $df = 1, p = 0.181$

[b] $Q_{Between} = 0.091$, $df = 1, p = 0.763$

[c] $Q_{Between} = 0.657$, $df = 1, p = 0.418$

[d] $Q_{Between} = 0.445$, $df = 1, p = 0.505$

[e] $Q_{Between} = 0.135$, $df = 1, p = 0.713$

10. Forest Plots

10.1. Forest Plots for Studies of Justice-Involved Youth

10.2. Forest Plots for Studies of At-Risk Youth

Figure 10.1.: Justice-Involved Youth: All Delinquency or Analogous Outcomes

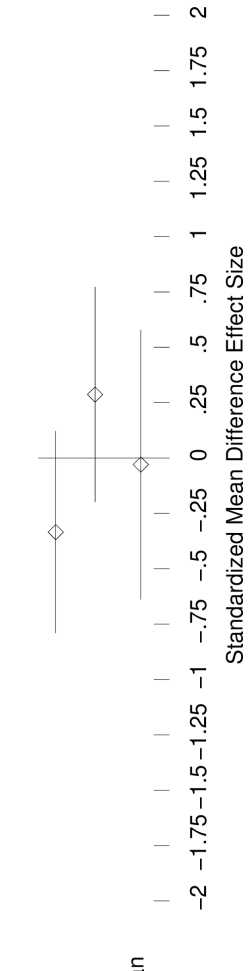

Figure 10.2.: Justice-Involved Youth: Delinquency or Analogous Outcome Meta-analysis

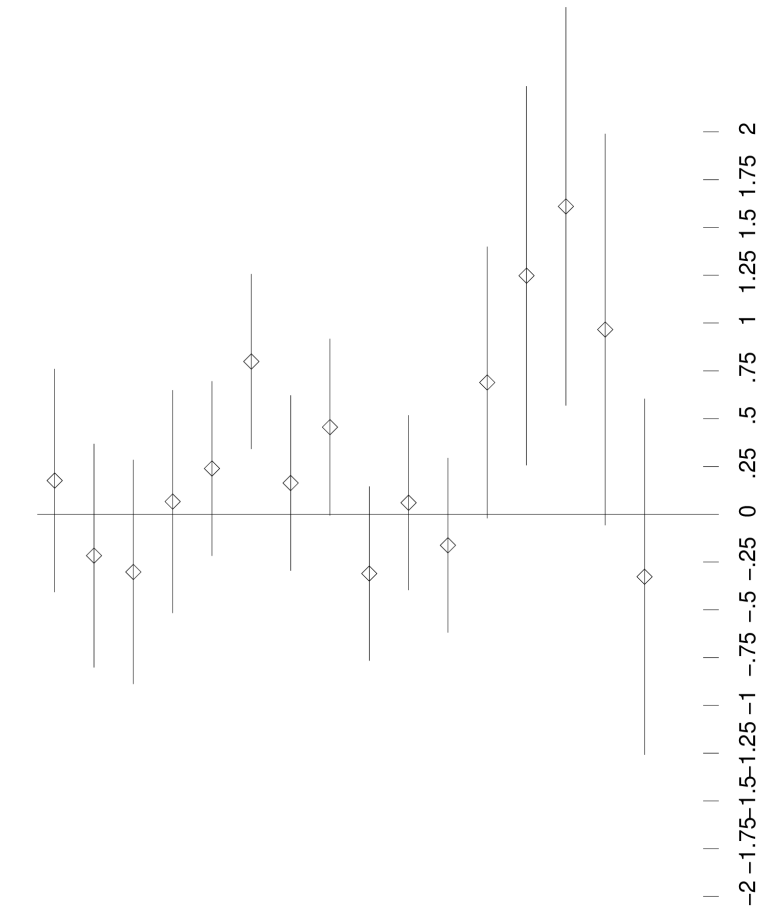

Figure 10.3.: Justice-Involved Youth: All Affective Outcomes

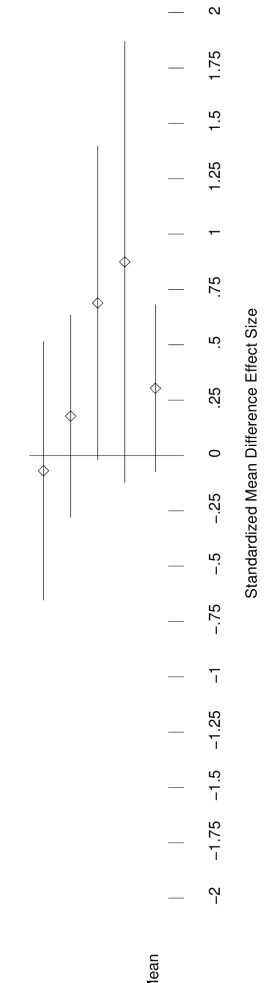

Figure 10.4.: Justice-Involved Youth: Affective Outcomes Meta-analysis

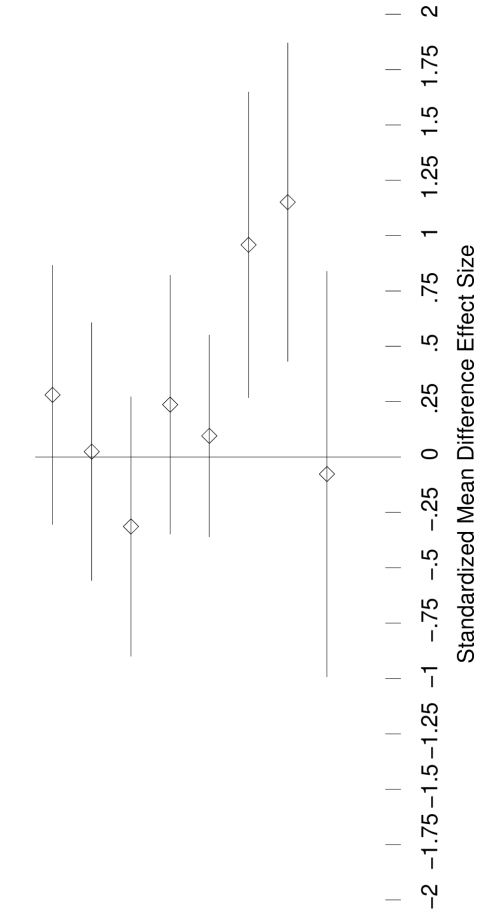

Figure 10.5.: Justice-Involved Youth: All PTSD Outcomes

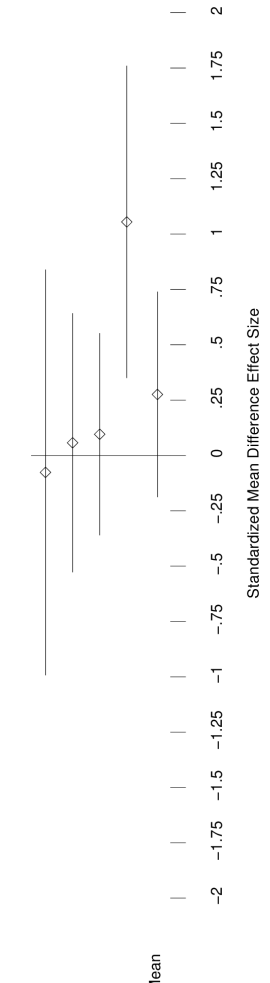

Figure 10.6.: Justice-Involved Youth: PTSD Outcomes Meta-analysis

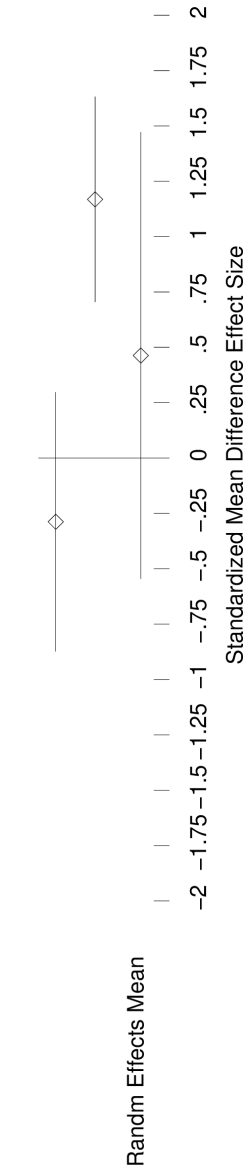

Figure 10.7.: Justice-Involved Youth: Hope Outcomes Meta-analysis

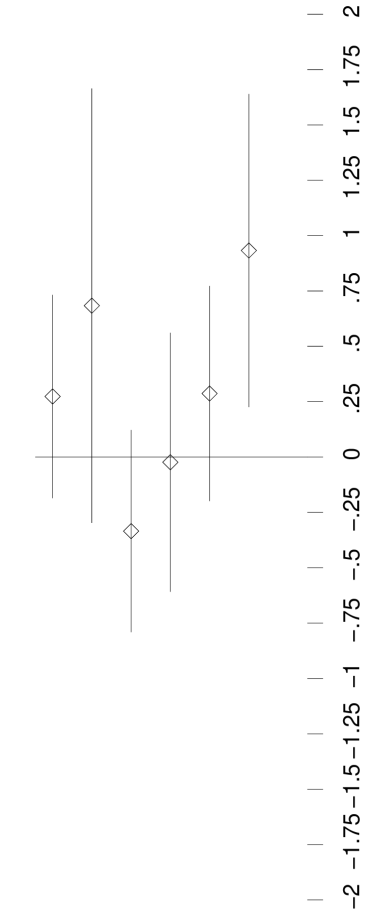

Figure 10.8.: Justice-Involved Youth: Average Effect Size and Treatment Type within Each Study

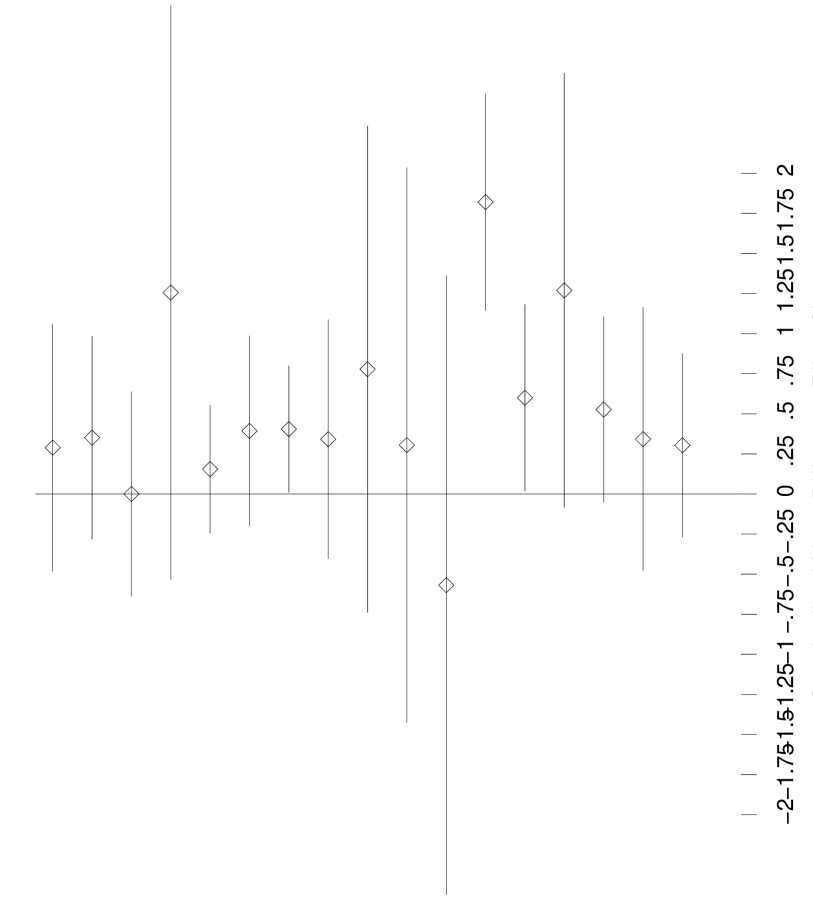

Figure 10.9.: At-Risk Youth: All Delinquency Outcomes

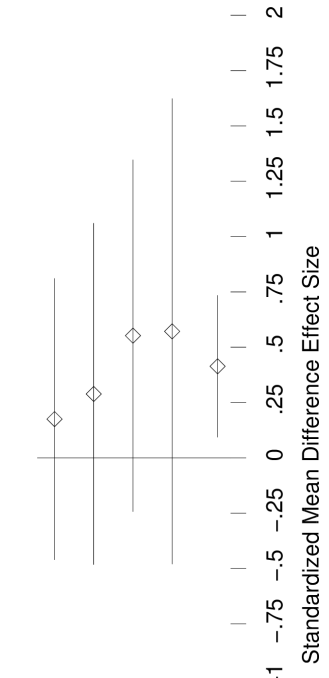

Figure 10.10.: At-Risk Youth: Delinquency Outcomes Meta-analysis

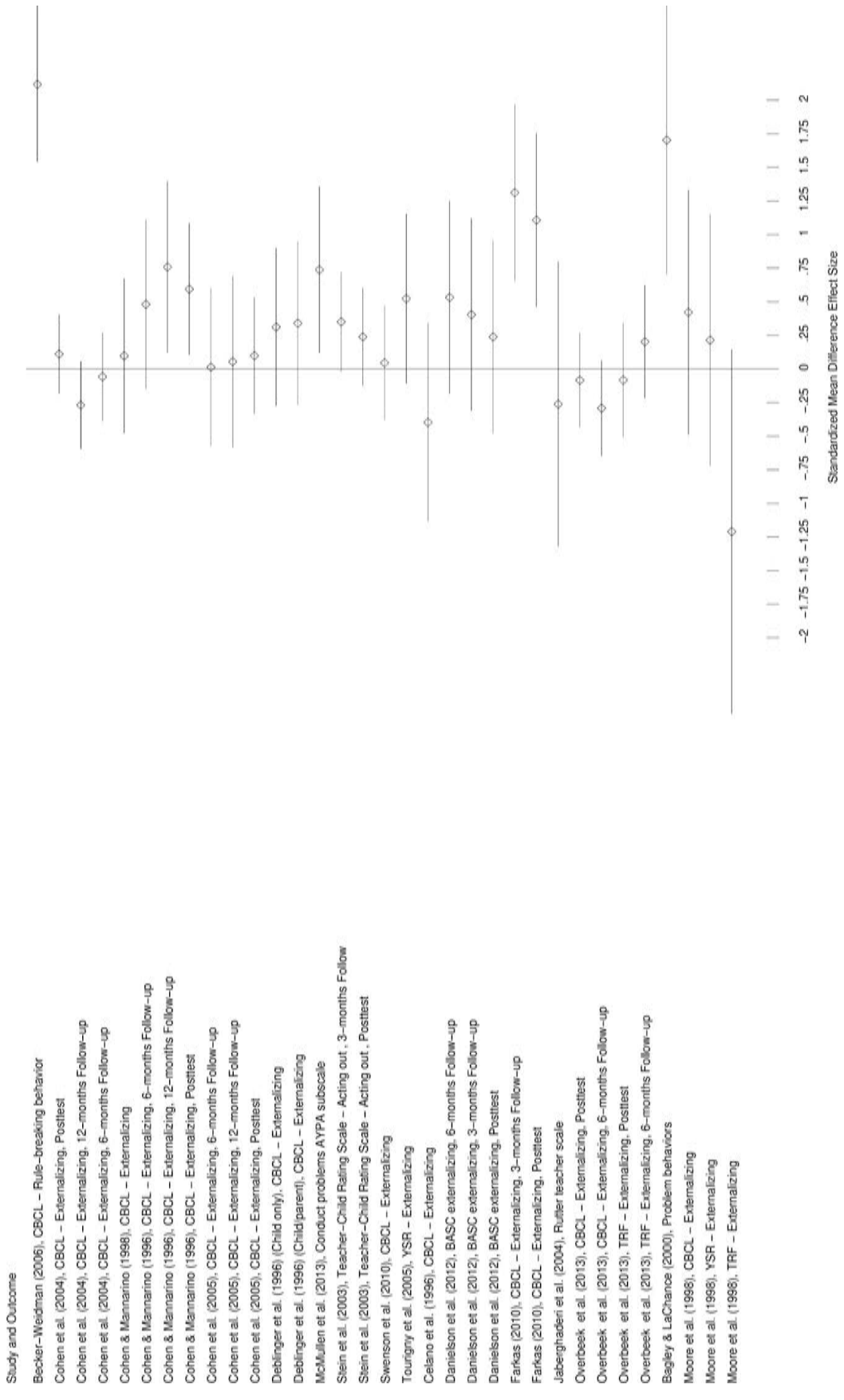

Figure 10.11.: At-Risk Youth: All Problem Behaviors (Externalizing) Outcomes

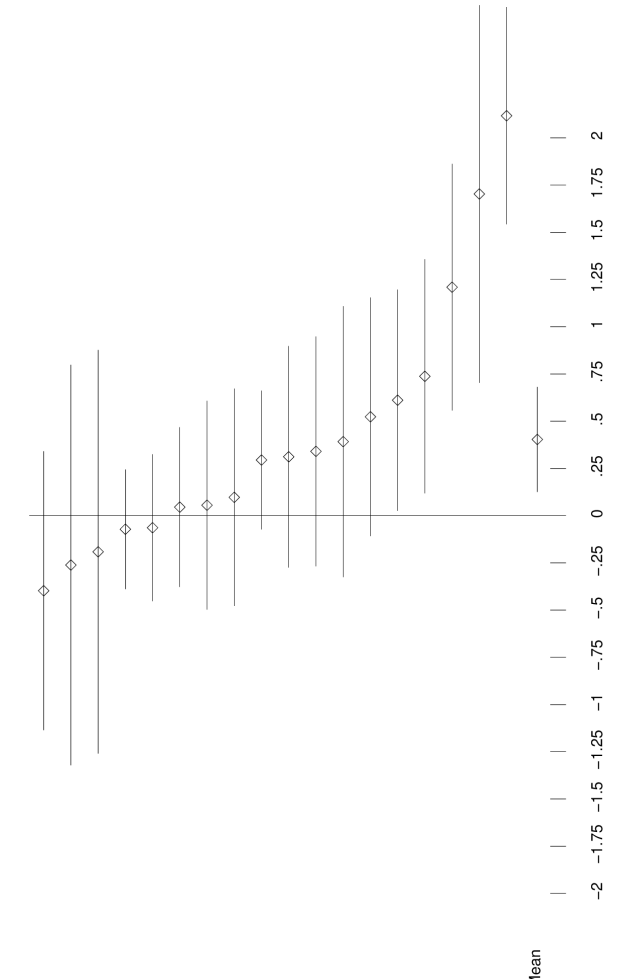

Figure 10.12.: At-Risk Youth: Problem Behaviors (Externalizing) Meta-analysis

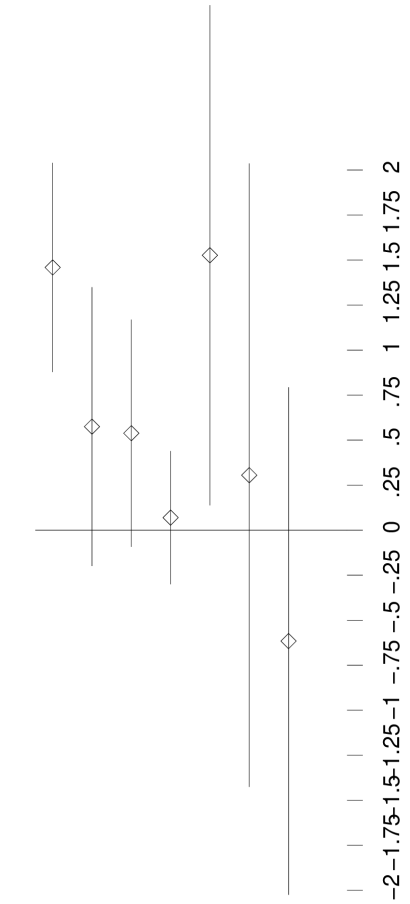

Figure 10.13.: At-Risk Youth: All Aggression Outcomes

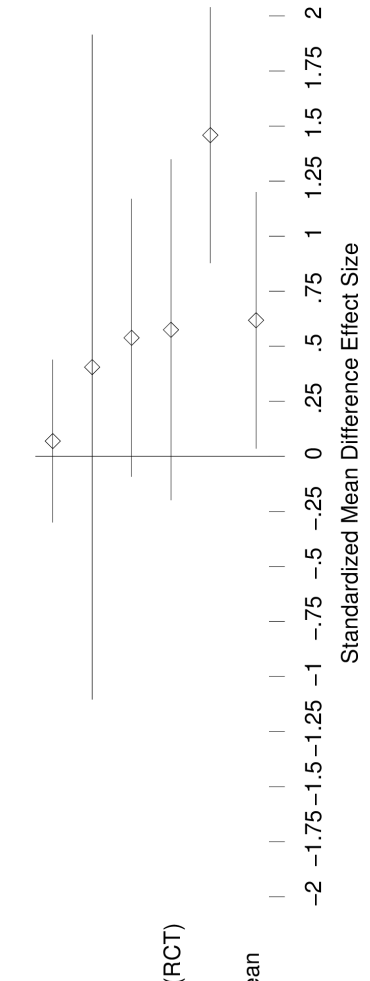

Figure 10.14.: At-Risk Youth: Aggression Meta-analysis

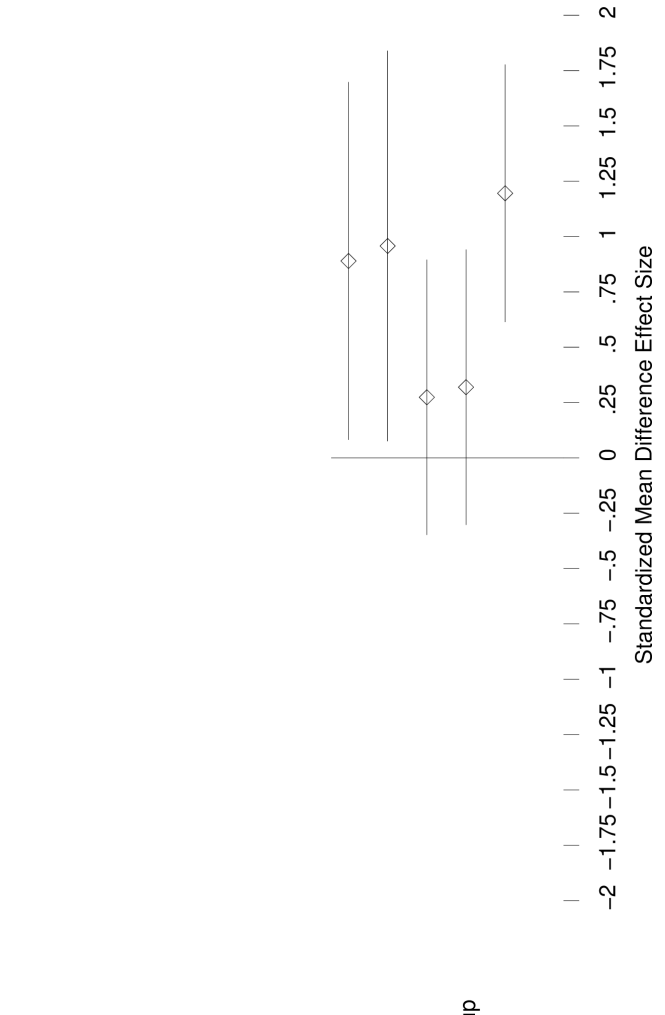

Figure 10.15.: At-Risk Youth: All Antisocial Outcomes

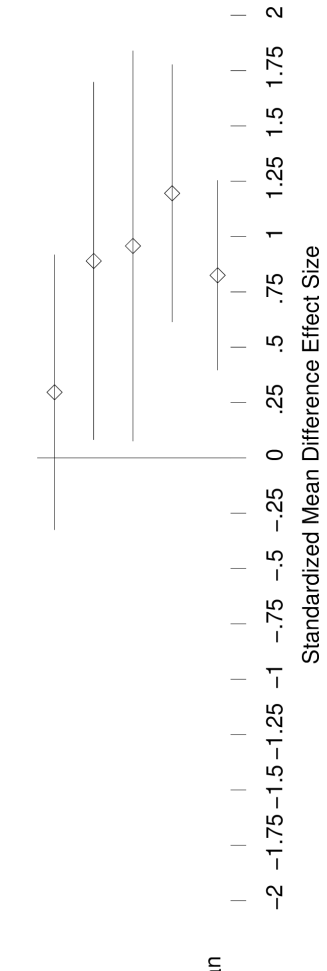

Figure 10.16.: At-Risk Youth: Antisocial Meta-analysis

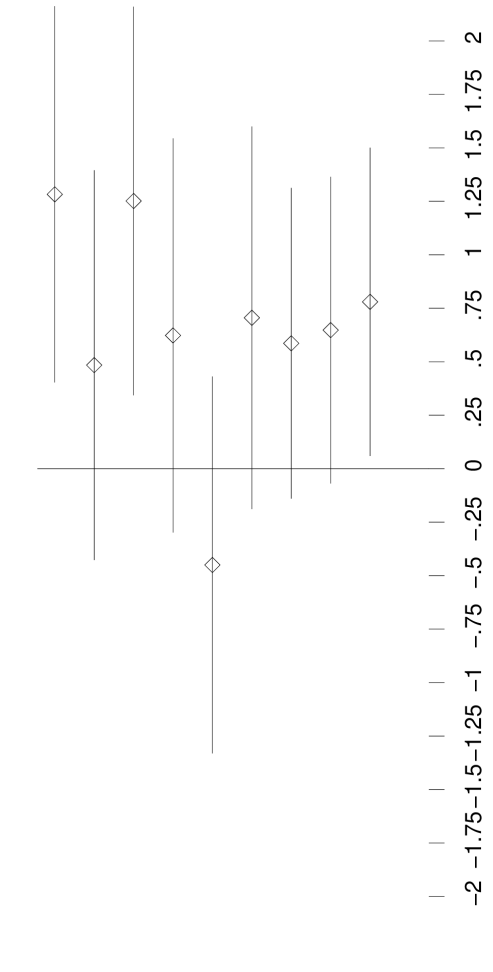

Figure 10.17.: At-Risk Youth: All Substance Use Outcomes

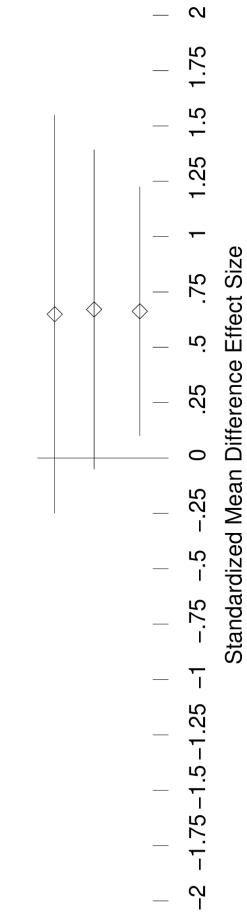

Figure 10.18.: At-Risk Youth: Substance Use Meta-analysis

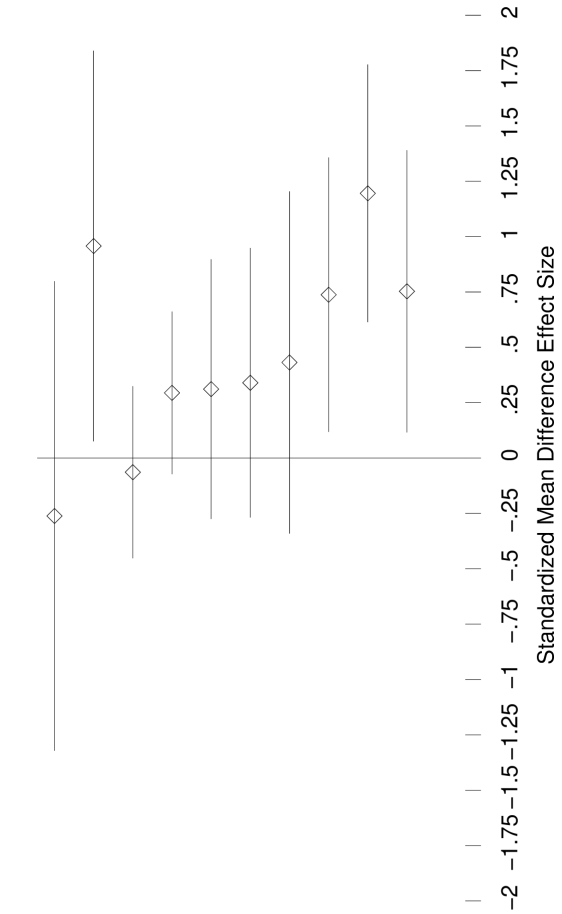

Figure 10.19.: At-Risk Youth: Head-to-head comparison of CBT versus EMDR

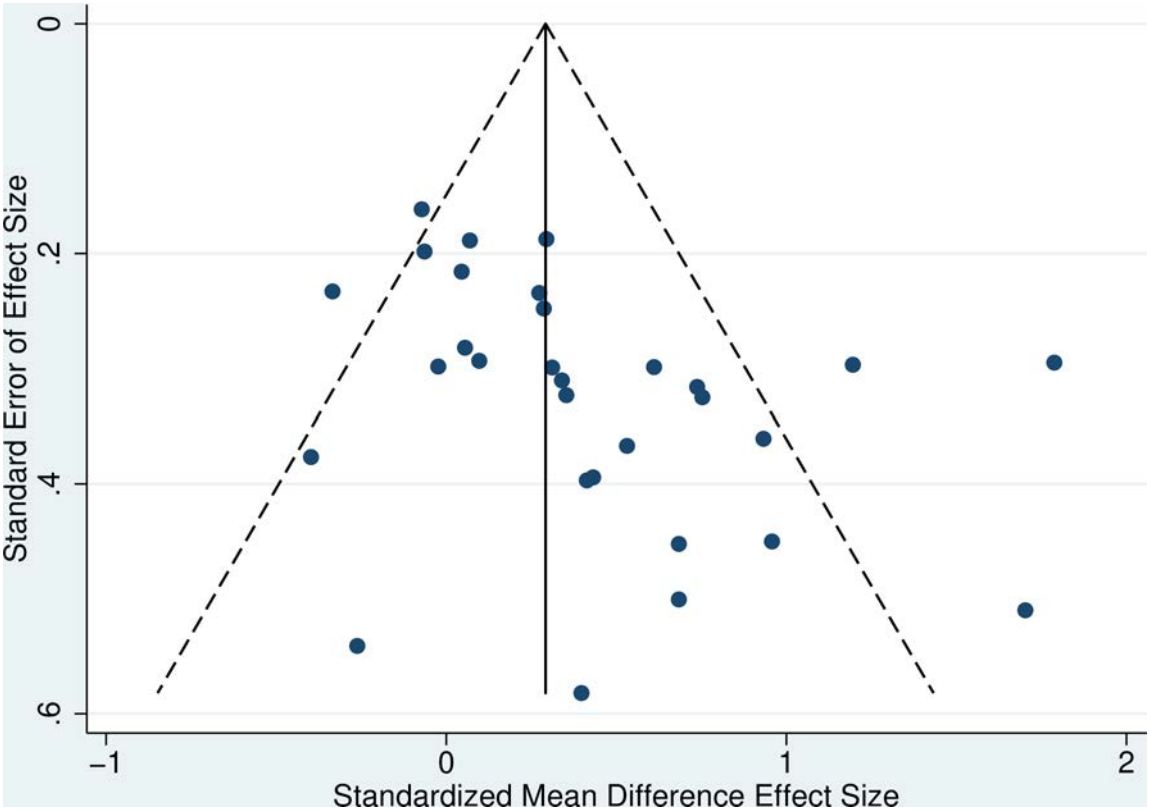

Figure 10.20.: Funnel Plot for Assessing Publication Selection Bias

Appendices

A. Systematic Search Information

Table A.1.: Systematic Search Information

Field	Desription
Search date	4/24/2017
Database/Website	Academic search complete/EBSCO Host
Search string	abuse OR neglect OR "exposure to violen*" OR "adverse childhood experienc*" OR adversity OR "online child sex* exploitation" OR "virtual child sex* exploitation" OR "physical abuse" OR "emotional abuse" OR neglect OR "sexual abuse" OR "sex* violence" OR "sex* assault" OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR "abusive head trauma" OR "trauma exposure" OR retraumatization OR "re-traumatization" OR victimization
Yield	513
Notes	Searched in abstracts; Databases selected: Academic search complete, Child Development & Adolescent studies, Criminal justice abstracts, Econlit, ERIC, Family studies abstracts, LGBT Life, Medline, NCJRS (National Criminal Justice Reference Service), Psychology and behavioral sciences collection, Social Work Abstracts, SocINDEX, Urban Studies Abstracts, Violence and abuse abstracts
Search date	4/24/2017
Database/Website	APA PsychNet
Search string	Abstract : abuse OR neglect OR " exposure to violen*" OR " adverse childhood experienc*" OR adversity OR " online child sex* exploitation" OR " virtual child sex* exploitation" OR " physical abuse" OR " emotional abuse" OR neglect OR " sexual abuse" OR " sex* violence" OR " sex* assault" OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR " abusive head trauma" OR " trauma exposure" OR retraumatization OR " re-traumatization" OR victimization AND Any Field: delinquen* OR Any Field: adjudicated OR Any Field: arrest OR Any Field: offender OR Any Field: offense OR Any Field: recidivism AND Any Field: care OR Any Field: treatment OR Any Field: intervention OR Any Field: therapy OR Any Field: therapeutic OR Any Field: program OR Any Field: prevention AND Any Field: outcome OR Any Field: evaluat* OR Any Field: effectiv* OR Any Field: experiment OR Any Field: quasi OR Any Field: assessment OR Any Field: RCT OR Any Field: randomiz*
Yield	421
Notes	Selected databases: PsychBOOKS, PsycARTICLES, PsycEXTRA
Search date	4/27/2017
Database/Website	Australian Institute of Criminology
Search string	trauma youth
Yield	116
Notes	Publications only
Search date	4/27/2017
Database/Website	Center for Disease Control
Search string	see notes
Yield	331

(continued)

Field	Desription
Notes	Final search string 1: Under Publications. Filter by Programs - Violence Prevention: Child Maltreatment; Yield: 7 Final search string 2: Under Publications. Filter by Programs - Violence Prevention: Youth Violence; Yield: 4 Final search string 3: Under Publications. Filter by Programs - Violence Prevention: Youth Violence; Yield: 320
Search date	5/2/2017
Database/Website	Cochrane Library
Search string	Trauma
Yield	337
Notes	Searched Trauma abstracts and youth (all text) and only had 11 hits. Opened it up to Trauma in abstracts to be more inclusive.
Search date	5/4/3017
Database/Website	Crimesolutions.gov
Search string	Trauma
Yield	36
Notes	36 (31 Programs & 5 Practices); Could not save webpage with snapshot. Will have to research term "trauma" when screening. Downloaded studies from each study from programs
Search date	5/9/2017
Database/Website	FirstSearch - Database=Articles First
Search string	trauma AND child OR youth OR adolescent OR juvenile OR delinquen OR student OR adjudicated OR arrest OR youthful offender
Yield	1,439
Notes	Advanced search; ranked by relevancy; stopped uploading at 500
Search date	5/9/2017
Database/Website	FirstSearch - Database=World Cat
Search string	trauma AND child OR youth OR adolescent OR juvenile OR delinquen OR student OR adjudicated OR arrest OR youthful and offender OR offense OR recidivism AND care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention
Yield	90
Notes	Language = English; Search by: Relevancy
Search date	5/16/2017
Database/Website	FirstSearch - Database=World Cat Dissertations
Search string	Trauma AND youth
Yield	407
Notes	
Search date	5/15/2017
Database/Website	FirstSearch - Database= Eco
Search string	Trauma AND youth
Yield	374
Notes	Rank by: Relevancy
Search date	5/2/2017
Database/Website	GoogleScholar
Search string	trauma AND (child OR youth OR adolescent OR juvenile* OR delinquen* OR student OR adjudicated OR arrest OR "youthful offender" OR offense OR recidivism) AND (care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention) AND eval*
Yield	63,500
Notes	Downloaded the first 500 references
Search date	5/15/2017

(continued)

Field	**Desription**
Database/Website	HeinOnline
Search string	(abuse OR neglect OR exposure to violen OR adverse childhood experience OR adversity OR online child sex exploitation OR virtual child sex exploitation OR physical abuse OR emotional abuse OR neglect OR sexual abuse OR sex violence OR sex assault OR mistreatment OR maltreatment OR maldevelopment OR trauma OR abusive head trauma OR trauma exposure OR retraumatization OR re-traumatization OR victimization) AND (child OR youth OR adolescent OR juvenile OR delinquen OR student OR adjudicated OR arrest OR youthful offender OR offense OR recidivism) AND (care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention) in Law Journal Library. , sorted by "Relevance"
Yield	10,200
Notes	Downloaded the first 500 references
Search date	5/15/2017
Database/Website	JAMAevidence
Search string	trauma
Yield	163
Notes	
Search date	5/10/2017
Database/Website	JBIConnect plus
Search string	Abuse
Yield	129
Notes	Completed two separate searches: trauma (yield: 104) and abuse (yield: 25)
Search date	5/10/2017
Database/Website	National Guideline Clearinghouse
Search string	trauma
Yield	66
Notes	Target population characteristics: Child (2-12) and Adolescent (13-18)
Search date	5/1/2017
Database/Website	OJJDP.gov
Search string	trauma
Yield	44
Notes	Performed two searches: (1) generic search; selected publications; (2) publications search
Search date	5/1/2017
Database/Website	OVID
Search string	see notes
Yield	707
Notes	Journals @OVID Full text; Books @OVID Searched in abstracts: abuse OR neglect OR (exposure to violen*) OR (adverse childhood experienc*) OR adversity OR (online child sex* exploitation) OR (virtual child sex* exploitation) OR (physical abuse) OR (emotional abuse) OR neglect OR (sexual abuse) OR (sex* violence) OR (sex* assault) OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR (abusive head trauma) OR (trauma exposure) OR retraumatization OR (re-traumatization) OR victimization Returned 99,801 Combined with (in abstracts): child OR youth OR adolescent OR juvenile* OR delinquen* OR student Returned 9,775 Combined with (in Full text): delinquen* OR adjudicated OR arrest OR (youthful offender) OR offense OR recidivism Returned 1,531

(continued)

Field	Desription
	Combined with (in abstracts): care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention Returned 707
Search date	5/1/2017
Database/Website	Pew Research Center
Search string	trauma
Yield	24
Notes	
Search date	5/1/2017
Database/Website	Policy Archive
Search string	trauma
Yield	23
Notes	
Search date	5/1/2017
Database/Website	ProQuest
Search string	see notes
Yield	598
Notes	Searched in abstract: abuse OR neglect OR "exposure to violen*" OR "adverse childhood experienc*" OR adversity OR "online child sex* exploitation" OR "virtual child sex* exploitation" OR "physical abuse" OR "emotional abuse" OR neglect OR "sexual abuse" OR "sex* violence" OR "sex* assault" OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR "abusive head trauma" OR "trauma exposure" OR retraumatization OR "re-traumatization" OR victimization Returned 232,079 Combined with (in abstract): child OR youth OR adolescent OR juvenile* OR delinquen* OR student Returned 78,886 Combined with (full text): delinquen* OR adjudicated OR arrest OR "youthful offender" OR offense OR recidivism Returned 14,702 Combined with (in abstract): care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention Returened 7,492 Combined with (in abstract): evaluation Returned 598
Search date	5/1/2017
Database/Website	PubMed Central
Search string	see notes
Yield	476
Notes	Searched in abstract: abuse OR neglect OR "exposure to violen*" OR "adverse childhood experienc*" OR adversity OR "online child sex* exploitation" OR "virtual child sex* exploitation" OR "physical abuse" OR "emotional abuse" OR neglect OR "sexual abuse" OR "sex* violence" OR "sex* assault" OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR "abusive head trauma" OR "trauma exposure" OR retraumatization OR "re-traumatization" OR victimization Returned 55,474 Combined with (in abstract): child OR youth OR adolescent OR juvenile* OR delinquen* OR student Returned 5,281 Combined with (full text): delinquen* OR adjudicated OR arrest OR "youthful offender" OR offense OR recidivism Returned 1,136

(continued)

Field	Desription
	Combined with (in abstract): care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention Returned 600 Combined with (in abstract): assessment Returned 476
Search date	5/1/2017
Database/Website	RAND Pubs
Search string	trauma
Yield	589
Notes	Content type: Research
Search date	5/1/2017
Database/Website	Social Sciences Citation Index (SSCI)
Search string	see notes
Yield	1,118
Notes	Searched in Topic: abuse OR neglect OR "exposure to violen*" OR "adverse childhood experienc*" OR adversity OR "online child sex* exploitation" OR "virtual child sex* exploitation" OR "physical abuse" OR "emotional abuse" OR neglect OR "sexual abuse" OR "sex* violence" OR "sex* assault" OR mistreatment OR maltreatment OR maldevelopment OR trauma* OR "abusive head trauma" OR "trauma exposure" OR retraumatization OR "re-traumatization" OR victimization Returned 210,053 Combined with (in topic): child OR youth OR adolescent OR juvenile* OR delinquen* OR Returned 71,198 Combined with (in topic): delinquen* OR adjudicated OR arrest OR "youthful offender" OR offense OR recidivism Returned 5,123 Combined with (in topic): care OR treatment OR intervention OR therapy OR therapeutic OR program OR prevention Returned 2,471 Combined with (in topic): outcome OR evaluate OR evaluation OR assessment Returned 1,118
Search date	5/1/2017
Database/Website	Social Science Research Network (SSRN)
Search string	trauma
Yield	539
Notes	Searched in titles, abstracts, and keywords

B. Flow Diagram for Search Process