2022

The Effectiveness of Psychodynamic Psychotherapy for the Treatment of Substance Use Problems: A Systematic Review and Meta-Analysis

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The Effectiveness of Psychodynamic Psychotherapy for the Treatment of Substance Use Problems: A Systematic Review and Meta-Analysis

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A DOCTORAL DISSERTATION SUBMITTED

TO THE FACULTY OF

THE GRADUATE STUDIES PROGRAM

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF PSYCHOLOGY

LONG ISLAND UNIVERSITY—POST CAMPUS

April, 2022

MAJOR DIVISION: PSYCHOLOGY

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ACKNOWLEDGMENTS

There are many who helped me on this journey, and I want to take a moment to thank them.

First, I want to thank my dissertation committee. Without their guidance, I would not have made it. Dr. Eva Feindler and Dr. Tamar Kraft served as valuable committee members and supported me through my academic undertakings. I also want to thank my chair, Dr. Marc Diener, who spent the last three years in weekly meetings, answering my incessant questioning of "are we there yet?" and reassuring me that this day will come. Thank you all for helping me reach my goal and for your unwavering support throughout the years.

To my parents, you have consistently gone above and beyond to support me through the challenging process that is juggling a doctoral program and life. I cannot say thank you enough for all of your warmth, kindness, and utmost understanding. Thank you for your tremendous amount of patience and unconditional love. You both earned this degree right along with me. (Congrats to you!)

To my family and friends, thank you for all of your support and for believing in me. Thank you for putting up with my unanswered text messages and limited free time. Thank you for the spontaneous late-night ventilation sessions and reminding me not to sweat the small stuff. Let's finally make plans!

Lastly, I want to acknowledge the dedicated researchers involved in this project and their contributions which made the completion of this dissertation possible. Thank you.

Abstract

Millions of people worldwide use and misuse psychoactive and alcoholic substances, which can cause a plethora of negative outcomes (WHO, 2018). A handful of studies have researched the efficacy of psychodynamic interventions in randomized clinical trials (RCTs) for individuals with substance use problems, with most only examining treatment for specific substances (Crits-Christoph et al.; Imel et al., 2008). These studies are thus limited by their narrow focus on specific substances, and their (between-group comparison) findings have not always been consistent. The present study aims to fill several gaps in the literature, in part by broadening the types of eligible outcome studies for inclusion in a meta-analysis. More specifically, studies do not have to use an RCT design for inclusion, as studies that examine only pre-post changes in psychodynamic psychotherapy (PDT) are also eligible. Consistent with this broader focus, the research question addresses *within*-study change rather than *between*-groups comparisons. In addition, potential moderator variables were coded and included in specific data analyses to determine the degree to which they predict change in patients with substance use problems who received PDT. The results of this meta-analysis indicated a statistically significant overall effect size of 0.44 and supported the primary hypothesis that PDT is an effective treatment for substance use problems. However, moderator analyses were not statistically significant, indicating that the moderator variables of age and adjunctive treatment did not influence overall treatment outcomes in any meaningful way. All publication bias analyses were not statistically significant, suggesting it is unlikely that issues of publication bias impacted study results.

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Introduction

Approximately 275 million people worldwide used psychoactive and alcoholic substances in 2021, with negative outcomes including financial struggle, loss of social support, and drug overdose (UNODC, 2021; WHO, 2018). As of 2017, one in four deaths was attributable to alcohol, tobacco, and illicit or prescription drug use, and from 1999 to 2017, more than 700,000 people have died from a drug overdose nationally (NIDA, 2017; WHO, 2018). According to the World Health Organization, there are half of a million deaths annually that are attributed to substance misuse/abuse (WHO, n.d.). In 2020, there were nearly 92,000 deaths due to overdose in the United States alone (NIDA, 2022). Additionally, deaths from synthetic opioids, primarily fentanyl, rose by approximately 20,000 people from 2018 to 2020. Substance use problems are known to be an important etiologic factor in many costly health issues, such as cancer, liver failure, heart disease, accidents, and various types of violence (NIDA, 2017). Due to the high prevalence rates of substance abuse and the potentially fatal effects, it is critical that consistently effective treatments be made available.

Typically, patients with substance use problems are prescribed medication to combat their addiction (Knudsen et al., 2006). Since medications are fraught with problems of their own in the treatment of substance use, this can be especially problematic. Consequently, medication as a front-line therapy may discourage patients from exploring nonpharmacological treatments. Other modalities have been explored and either tested alone or in conjunction with medication (Town et al., 2012). Both cognitive and behavioral methods have been utilized to help treat substance use problems (Smedslund et al., 2011b). Research has shown positive pre-post

treatment outcomes using cognitive therapy for those with substance use problems (Bowen et al., 2009). Specifically, Mindfulness-Based Cognitive Therapy (MBCT) has demonstrated increases in patients' awareness, helping them cope with triggering cues and ultimately preventing relapse.

Although studies provide positive outcomes for cognitive interventions, Carroll and Onken (2005) cautioned that additional research needs to address the limitations of several cognitive therapy studies. Mainly, the sparsity and inconsistency in data across substance use problems. In a meta-analytic review assessing whether relapse prevention, a cognitive intervention, is effective in treating substance use problems, results varied across classes of substances (Irvin et al., 1999). Irvin et al. (1999) suggested that further examination of the specific components of relapse prevention would provide a deeper understanding of its impact across substance types and potentially inform treatment. In addition to the barriers of specific studies, Irvin et al. (1999) and Carrol and Onken (2005) emphasize the limited number of studies that measure the effectiveness of cognitive interventions across several classes of substances.

Contingency management, a behavioral intervention, provides empirical support for pre-post change across a range of types of drug use. However, the ability of patients to continuously apply and sustain contingency management in practice is questionable due to inconsistent long-term outcomes (Carroll & Onken, 2005). Additionally, motivational interviewing is a popular nonpharmacological treatment that focuses on increasing patients' motivation to make a lifestyle change and equipping them with the skills to follow through (Smedslund et al., 2011a, 2011b). Although results showed that motivational interviewing could reduce the degree of substance abuse, the researchers reported that there was not enough data to confidently conclude that this intervention is a more effective treatment than others, such as a 12-step program. Due to these inconsistent results, research on the pre-post change effects of motivational interviewing for

people with substance use problems has not always been favorable (Moyers et al., 2009). Research showed that outcome data primarily focused on alcohol use versus other substances, thereby limiting the generalizability of results and determining that the effectiveness of motivational interviewing as a substance use treatment remains inconclusive. Moyers et al. (2009) provided additional evidence for studies with negative treatment outcomes and reported that variability across therapist behaviors, despite similar training experiences, was likely a contributing factor to unreliable results.

Psychodynamic treatment for substance use problems has a long history of relatively inconsistent results, and more recently, psychodynamic approaches have been used in conjunction with medication to treat substance abuse (Khantzian, 2012). While there have been various schools of thought about psychodynamic treatment over the past century, a broad definition of PDT is its inherent focus on exploring the aspects of an individual that are not consciously known. The emphasis on the therapeutic relationship and its influence on the patient is also paramount to PDT (Shedler, 2010). In general, this approach helps patients gain insight into addiction in terms of their interpersonal relationships, unconscious repetitive patterns (e.g., use of maladaptive defense mechanisms), and learn how to make healthier decisions (Shedler, 2010).

In applying a psychodynamic model to addictions, Khantzian (2012) explained that suffering is at the crux of the ailment, and a psychodynamic perspective can be effective in uncovering the suffering. This provides another approach to treatment and highlights the component of the therapist's empathic attunement in treatment, a "variable" that has traditionally not been emphasized in cognitive and behavioral treatments or theoretical conceptualizations (Leichsenring & Rabung, 2011b). Although other methods, such as pharmacological, cognitive,

and behavioral interventions, may be more prevalent in the treatment of addictions, there seems to be a need for emphasis on understanding the human experience and pain (Carroll & Onken, 2005; Khantzian, 2012; Smedslund et al., 2011a). Research on PDT suggests that by tapping into the emotional pain through the unconscious, patients can become more relationally aware and uncover the dynamics of their interpersonal relationships. Moreover, PDT can potentially help patients improve the ways in which they navigate their patterns of suffering that often lead to substance use (Fonagy et al., 2005).

Initially, many original outcomes of psychodynamic treatment came from anecdotal evidence. In these studies, researchers demonstrated a tendency to underestimate the true benefits of PDT in treating mental illness (Fonagy et al., 2005; Shedler, 2010). More recently, research has shown empirical evidence for psychodynamic treatment and its positive outcomes (Keefe et al., 2014; Shedler, 2010). A meta-analysis by Imel, Wampold, Miller, & Fleming (2008) found positive outcomes for psychodynamic treatment and alcohol use. However, there is less research on the outcomes of psychodynamic treatment across substance use problems, none of which has yet been meta-analyzed to obtain the best estimate of its effectiveness. Of the research that does exist, there seems to be limited outcome data on psychodynamic psychotherapy for varying types of substances. Even with the popular NIDA randomized controlled trials found in the major databases, researchers demonstrated divergent results without quantifiably synthesizing the outcome data across their studies (Crits-Christoph et al., 2008; Siqueland et al., 2004; Worley et al., (2008). Therefore, there is a need in the field to examine and empirically aggregate results of PDT outcomes from both existing RCTs and naturalistic studies for those with substance use problems, thus providing an empirical integration of individual studies using PDT for substance use.

In the present study, researchers hypothesized that psychodynamic psychotherapy would be an effective treatment in helping those with substance use problems. More specifically, researchers predicted that participants who received PDT would demonstrate statistically significant improvement in outcomes from pre-to-post treatment, as well as pre-to-follow-up treatment.

Methods

Eligibility

This meta-analytic review of PDT as a treatment for individuals with substance use problems included PDT data from both RCTs and naturalistic studies. For the RCTs, only the data from the groups that received psychodynamic psychotherapy were extracted. The present researchers examined the pre and post outcomes of PDT, as well as follow-up outcomes, when the latter data was available. For studies to be eligible, they had to be published beginning no later than 1970 (see Keefe et al., 2014). A psychodynamic treatment was defined for the purposes of this study by meeting one of the following criteria: (a) the study author explicitly identified the treatment as psychoanalytic/psychodynamic, unless the treatment was IPT—a specific treatment method developed by Klerman, Weissman, and colleagues—in which case it was excluded since IPT and PDT are not isomorphic (Markowitz & Weissman, 2008); (b) the study indicated that it used a treatment based on psychoanalytic/psychodynamic theory; or (c) the treatment included *all* of the following components (Keefe et al., 2014): the treatment focused on transference and/or resistance in the therapeutic relationship; the conceptualization of symptoms/problems emerges from either intrapsychic conflict, developmental arrest, difficulties with separation/individuation, object relations, or attachment; the study focused on the role of

unconscious processes in the development and/or maintenance of symptoms/problems. Eclectic treatments that included psychodynamic interventions were not considered eligible.

For a study to be eligible, participants had to be receiving treatment for a substance use problem or formal substance use diagnosis. Substance use did not have to be the primary target, but data were extracted only when the study provided the necessary data for the subgroup of patients with substance use problems. Studies in which participants were given treatment for nicotine use were not eligible unless all the participants had other substance use problems in addition to their nicotine use (see Appendix A for the complete eligibility criteria).

Procedure

The literature search consisted of a variety of different steps, the first of which was an electronic search of two major scholarly search engines, i.e., PsycInfo and Medline. Each of these databases was searched at several intervals. The exact search terms and limiters for the database searches are provided in Appendix B. Manual searches were also conducted for all issues published between 2014 and 2020 in six major academic journals. The manually searched journals included *Alcohol and Alcoholism, American Journal of Psychiatry, American Journal on Addiction, Archives of General Psychiatry/JAMA Psychiatry, Journal of the American Psychoanalytic Association, and Psychotherapy*.

After completing the online database literature searches and manual searches, the researchers underwent intensive training under the guidance of a meta-analyses expert to determine study eligibility by examining the abstracts of the database search results. All studies that did not use an accepted form of psychodynamic psychotherapy to treat a substance use problem, per the study's eligibility criteria, were discarded. For studies that appeared eligible based on content in the abstract, their full-text articles, book chapters, etc., were retrieved. The

researchers examined these studies further for eligibility criteria and made a final determination about the inclusion of each study in the meta-analysis.

Next, reference sections of all eligible studies were reviewed to locate potentially eligible studies that may not have been obtained in the electronic or manual searches. These potentially eligible studies were retrieved in full text and reviewed for the final determination of eligibility for inclusion in the meta-analysis. Under the guidance of a meta-analysis expert, the present researcher completed intensive training consisting of an overview of meta-analytic methods, uses, purposes, eligibility criteria for study inclusion, and a detailed review of the study level and effect size level coding forms. The training also included how to extract coding data for meta-analyses, and the present researcher coded each eligible study using coding forms created for study level variables (e.g., mean age of participants) and effect size level data (e.g., primary versus secondary outcome data; see Appendix C for coding forms).

The study-level data included information about the structural and study participant characteristics. Structural characteristics included identifying the specific forms of psychodynamic psychotherapy, length of treatment, as well as medications and interventions that were possibly used in conjunction with treatment, if applicable. Moreover, structural characteristics included the time gap between the end of treatment and the first follow-up, researcher allegiance, supervision and training of therapists, the utilization of more experienced therapists, dosage adjustments during treatment, study location, and the sample size after attrition. Study participant characteristics also included the mean age of the sample at the time of treatment, sample race, ethnicity, and gender, the diagnoses used for an outcome, and diagnostic comorbidities. The present researcher coded according to a specific model of psychodynamic treatment and the types of substances used by study participants.

These study level codes were used for both descriptive purposes and to provide relevant data for moderator analyses (Keefe et al., 2014). Codes for *effect* size level data included the following: type of outcome measure used (e.g., Beck Depression Inventory-2), the source of information on outcome measure (e.g., self-report, clinician or non-clinical informant), as well as the type of data the effect size was based on (e.g., means, standard deviation, and sample sizes, phi correlation, or chi-square), type of outcome (e.g., substance use, depression, anxiety, and somatic symptoms) and type of substance used for an outcome (e.g., alcohol, opioids, and cannabis). Both the study level and effect-size level coding forms are provided in full in Appendix C.

Data Analyses

The data necessary to calculate pre-post and pre-follow-up (when available) effect sizes were extracted. The effect size for the present study is the pre-post standardized mean difference score, i.e., *d* for dependent groups, using the following equation (adapted slightly for some notation to increase clarity from Equation 4.26 in Borenstein, Hedges, Higgins, & Rothstein, 2009, p. 29):

$$d_{pre-post} = \frac{M_{pre-} M_{post}}{S_{within}} \quad (1)$$

where S_{within} refers to the pooled within-groups standard deviations, calculated using Equation 4.19 or 4.27 from Borenstein et al. (2009) when the primary study provided data in this format. Standard equations (e.g., Lipsey & Wilson, 2001) were used in instances in which data from the primary study were presented in an alternative format. The variance and standard error of the pre-post effect size were calculated using Equations 4.28 and 4.29, respectively, from Borenstein et al. (2009). When studies presented varying sample sizes for the PDT group at the different time points (e.g., different sample sizes for pretest and posttest due to attrition), the smaller

sample size was used to calculate the variance in order to be conservative (personal correspondence of M. Borenstein to M. Diener, April 20, 2010). When an individual study provided data for more than one effect size (e.g., outcome data for substance use as well as outcome data for occupational functioning), these effect sizes were averaged to obtain a single effect size per study to avoid violating the assumption of independence of data necessary for meta-analyses. Study calculations were performed using version 2 of the *Comprehensive Meta-Analysis* (CMA; Borenstein et al., 2005) software. Homogeneity tests and related analyses (e.g., calculation of I^2) were conducted to examine the degree of variation between effect sizes (Borenstein et al., 2009).

Individual effect sizes, their variances, and their standard errors were aggregated across all included studies, providing the best estimate of the true pre-post (or pre-follow-up) change for patients with substance use problems who received PDT (Borenstein et al., 2009), thereby testing the hypothesis that psychodynamic psychotherapy is an effective treatment for such individuals.

One thorny data analytic issue when calculating pre-post effect sizes (or pre-follow-up effect sizes) is that the correlation between Time 1 scores and Time 2 scores on the outcome variable is necessary for accurately calculating the aforementioned effect sizes, variances, and standard errors (Borenstein et al., 2009). In almost all cases, however, this data was *not* presented in the individual primary studies. Researchers, therefore, weighed a variety of factors in determining how to proceed. For the present study, researchers imputed a Time 1- Time 2 correlation of .7, following Wampold (personal communication to M. Diener, February 17, 2015; *cf.,* Minami, Serlin, Wampold, Kircher, & Brown, 2008).

Effect sizes were aggregated across studies to quantify the degree of change for pre-and post-treatment outcomes using the random-effects method of Hedges and colleagues (Hedges &

Vevea, 1998). This method is more generalizable to real world data than a fixed effect method (National Research Council, 1992).

In order to examine the study's categorical moderator, a Q test was used, analogous to the analysis of variance in primary research, and associated *p*-values were calculated to determine statistical significance (Lipsey & Wilson, 2001). When these tests are found to be statistically significant, post hoc analyses comparing all possible pairs of the specific categorical codes for that particular variable are conducted. However, the categorical moderator in the present study was not statistically significant, and post hoc analyses were not completed. For continuous moderators, meta-regression analyses were used to assess the relationship between the study effect sizes and the individual continuous predictor. The present study conducted two primary moderator analyses based on a priori hypotheses derived from previous research (details for each hypothesis are provided below): (a) age of participants; (b) adjunctive treatment.

The research by Schuman-Oliver et al. (2014) provided evidence for examining the moderator of age, as results showed that emerging adults (ages 18-25, $n = 70$) were more likely to test positive for illicit opioids, relapse, or drop out of treatment when compared to older adults (ages 26+, $n = 224$; Schuman-Oliver et al., 2014). Furthermore, emerging adults were more likely to test positive for a form of substance use at intake, specifically cannabis, than older adults. Treatment retention has also been shown to be lower for emerging adults in part due to their willingness to stop using substances and interpersonal motivation, as well as their reluctance to enroll in continuing care programs after detoxification (Smith et al., 2011).

Additionally, Bertrand et al. (2013) examined the covariates of drug use trajectories among adolescents ($N = 102$) admitted to a residential treatment program. Results indicated that although older participants had more severe drug use problems at treatment entry, they were

more receptive to treatment, with drug use decreasing more rapidly than younger participants. Due to this evidence that older adults are more receptive to drug use treatment, it was predicted that there would be a positive association between age and effect sizes across studies.

Irvin et al. (1999) conducted a meta-analytic review on the efficacy of relapse prevention, a cognitive-behavioral treatment for various substances. Results showed that therapy and adjunctive use of medication, specifically anti-craving agents or opioid antagonists, enhanced overall treatment effectiveness. Although there are certainly differences between relapse prevention and psychodynamic psychotherapy, they both target underlying psychological processes that are presumed to affect change (Suchman et al., 2008). Therefore, the present researcher hypothesized that the studies using adjunctive treatments would have larger pre-post effect sizes than the studies without adjunctive treatments.

Publication Bias Analyses

Several analyses were conducted to assess the possibility of publication bias due to the criticism that meta-analyses may be biased in favor of studies that demonstrate positive findings (Rosenthal, 1991). These analyses included Begg and Mazumdar's (1994) rank correlation, Egger's regression intercept analysis (Egger et al., 1997), and Duval and Tweedie's (2000a, 2000b) trim and fill procedure. All publication bias analyses were conducted to be conservative.

Results

Inclusion of Studies

From the initial comprehensive database search results, PsycInfo identified 7,355 studies, and Medline identified 5,380 studies to be screened for eligibility (see Figure 1 for the breakdown of included samples). The number of studies found via citation searching and other methods to be screened for eligibility was 79 and 36, respectively. As previously noted,

researchers completed intensive training under the guidance of a meta-analysis expert to determine study eligibility. Researchers, including the present researcher, screened a total of 12,580 studies per inclusion criteria, sought 329 studies for full-text retrieval, and excluded 12,521 studies. There were eight studies for which the full text could not be retrieved and, therefore, were not included in the present study. The present researchers assessed 321 full-text studies for eligibility and included a total of 32 studies in this meta-analysis, while excluding the remaining 289 studies per study inclusion criteria in Appendix A. The number of studies that were deemed ineligible and their justification for exclusion are provided in Figure 1. Of the 32 studies included, there were 15 independent samples. The types of psychodynamic treatment included in the independent samples can be found in Table 5.

Quantitative Data Synthesis

Results from the aggregated effect sizes of psychodynamic psychotherapy pre-post and pre-follow-up treatment (when provided) data showed a statistically significant improvement in the overall outcome of substance use problems ($d = .44$, $p < .001$). The aggregated effect size data can be found in Table 1.

Moderator analyses using a mixed-effects regression for age and the $Q_{between}$ test for the use of adjunctive treatment revealed that both age (intercept = 0.01, $p = .56$) and adjunctive treatment ($Q = .78$, $p = .38$) were not statistically significant. The mixed-effects regression data can be found in Table 2. When meta-analyzed separately, studies that included PDT as well as adjunctive treatment demonstrated statistically significant results ($d = .47$, $p < .001$), whereas studies which did not include adjunctive treatment did not demonstrate statistically significant results ($d = .26$, $p = .25$). Adjunctive treatment effect size data can be found in Table 3. The types of adjunctive treatment included in the independent samples can be found in Table 4.

Heterogeneity test results for the overall meta-analysis were statistically significant (Q = 45.48, $p < .001$) with a medium to large degree of heterogeneity ($I^2 = 69.22$). This indicates that there was more variability across effect sizes than would have occurred by chance and suggests there may be other moderator variables that might account for the degree of heterogeneity, as age and adjunctive treatment did not.

Results assessing for publication bias using the Begg and Mazumdar's (1994) rank correlation method show no indication of publication bias for the overall meta-analysis of pre-post and pre-follow-up treatment outcomes (Kendall's tau [with continuity correction,] = 0.19, p[one-tailed] = 0.16) or Egger's (Egger et al., 1997) regression intercept method (intercept = 1.14, p[one-tailed] = .17). Moreover, results from Duval and Tweedie's (2000a, 2000b) trim and fill procedure suggested that any impact of potential publication bias was likely minimal at this point in time (zero studies were trimmed, and the adjusted and observed estimates of effect size were identical).

Discussion

The overall results of this meta-analysis showed statistically significant improvement in pre-post and pre-follow-up treatment outcomes, supporting the primary hypothesis that psychodynamic psychotherapy is an effective treatment for individuals with substance use problems (d = 0.44). It is worthy to note that contextualizing the magnitude of the present study's aggregated results posed challenges. One of the main barriers included the sparsity of pre-post treatment effectiveness studies for nonpharmacological treatments for substance use problems, as the bulk of the literature seems to primarily consist of between-groups studies.

Another barrier was that the researchers used inverse-variance weighting to calculate the results for this meta-analysis. This method is a precise way to aggregate the effect size data from

individual samples, as it systematically weighs each piece of data to provide the most accurate results. The advantage of using the inverse-variance weighting method is to provide optimal weighting of individual studies in yielding the overall effect size. The disadvantage, however, is that there seems to be a limited number of studies examining the pre-post effects of a treatment for substance use problems that also used this particular weighting method.

A meta-analysis conducted by Burke et al. (2003) researched the efficacy of motivational interviewing and adaptations of motivational interviewing (AMIs) as a treatment for several outcome variables, including alcohol and drug addiction. This research provides some basis for comparison to the present meta-analysis, as one component Burke et al. (2003) included pre-post treatment outcomes for 11 studies using AMIs as stand-alone interventions. The combined within-AMI effect size was 0.82, which is greater than the present study's overall effect size of 0.44. However, Burke et al. (2003) did not use inverse-variance weighting to aggregate data and instead used sample size, a less specific weighting method. While these results are not directly comparable to the present meta-analysis due to varying weighting methods, it emphasizes the issue of limited literature examining pre-post treatment effects for substance use problems that utilize the same methodology and statistical analysis as the present study.

Although the moderator analysis results did not reach statistical significance for age and adjunctive treatment, statistically significant heterogeneity test results provide empirical support to search for other moderator variables in future research to account for variability across samples. Since the publication bias analyses results were not statistically significant, it is likely that the overall results of this meta-analysis were not influenced by a potential publication bias.

While the present study was successful in determining the effectiveness of psychodynamic psychotherapy for the treatment of substance use problems, there were

limitations. It is important to note that there were studies included in this meta-analysis that did not provide all the information ideally needed for coding purposes. Thus, for example, Shaffer et al. (1997) referred to non-significant pre-post analyses, without providing more specific data to allow for precise coding of effect sizes. Despite the present researcher's efforts to obtain essential data through personal correspondence with the study's first author, the data could not be retrieved. Data for this study were therefore coded as effect sizes of zero, in order to be conservative. This suggests that the outcome data of the present study might be an underestimate of the true effect sizes. Future research using a larger sample size could possibly provide more accurate results. Another consideration would be to run the data analysis twice, one time including studies with missing data and another time excluding studies with missing data. This could potentially provide a more accurate effect size for the overall results of this meta-analysis.

Another limitation to the present study is that there was only one rater who coded all the eligible studies, i.e., the present researcher. While questions about coding were discussed with a senior meta-analyst before the analyses were conducted, it is possible that the addition of another trained rater would have contributed to greater accuracy of coded data, potentially influencing the overall results of this meta-analysis.

It is also worthy to note limitations within the moderator analyses. The use of adjunctive treatment was not a statistically significant moderator in determining the effectiveness of PDT as a treatment for substance use problems. However, based on the 15 independent samples included in the present study, only two of these samples did not include adjunctive treatment. Therefore, the unequal proportion of studies providing adjunctive treatment could be limiting the interpretation of how this moderator variable might be influencing overall treatment outcomes.

Conclusion

Psychodynamic psychotherapy is an effective treatment for substance use problems and shows promise in improving the quality of life for millions of individuals. Throughout the literature searches, it became evident that there are limitations in terms of the number of studies examining whether PDT can successfully reduce substance use and the challenges that people face as a result of their dependence. Despite study limitations, the results of this meta-analysis emphasize the need for more literature on this topic and provide empirical support for continued research on the effects of PDT on substance use problems. This meta-analysis provides credence to the notion that implementing PDT into substance use treatment may be an essential component in addressing the rising numbers of substance users around the world.

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Appendix A

Eligibility Criteria for PDT for Substance Use MA

1. Study Design: Eligible studies can use either naturalistic (i.e., no control/comparison group) or controlled/quasi-experimental (i.e., use of a control/comparison group, can be either randomly assigned or nonrandomly assigned) design.

2. Age: No limitations for age were applied.

3. Problem/Diagnosis: Participants had to be receiving treatment for a substance use problem/diagnosis. The substance use does not have to be the primary problem/diagnosis, but the only eligible data are for those participants who **all** have a substance use problem/diagnosis. That is, an eligible study **can** include a study in which

- participants have a primary diagnosis, for example, of Borderline PD but who all have substance use problems/diagnosis
- participants do **not** all have a substance use problem/diagnosis, but the study provides separate subgroup data for participants who *all* have substance use problems/diagnosis

4. Nicotine use: Studies that provided treatment for individuals who have problems with *only* nicotine use are **not** eligible. If, however, a study includes individuals who **all** have *other* relevant substance use problem(s)—as well as problems with nicotine use—then that study **would** be considered eligible.

5. Treatment: Studies had to provide treatment(s).

6. Definition of PDT: To be considered PDT, the intervention had to meet **one** of the following criteria:

a. The study authors explicitly identify the treatment as psychoanalytic/psychodynamic, unless the treatment is IPT—a specific treatment method developed by Klerman, Weissman, and colleagues—in which case it would be excluded based on criterion #8 below.

b. The study indicates that it used a treatment based on a psychoanalytic/psychodynamic theory

c. The treatment included **all** of the following components (Keefe et al., 2014):

i. focus on transference and/or resistance in the therapeutic relationship

ii. conceptualization of symptoms/problems as emerging from either intrapsychic conflict, developmental arrest, difficulties with separation/individuation, object relations, or attachment

iii. focus on the role of unconscious processes in the development and/or maintenance of symptoms/problems

d. Examples (this list is ***not*** exhaustive) of psychoanalytic/psychodynamic treatments include:

.Supportive-Expressive psychotherapy

i. Time-limited dynamic psychotherapy (TLDP)
ii. Mentalization therapy/treatment
iii. Transference-Focused Psychotherapy
iv. Relational psychotherapy (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)
v. Dynamic Deconstructive Psychotherapy (DDP)
vi. Interpersonal Reconstructive Therapy (IRT)
vii. Reconstructive Learning therapy (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)
viii. Insight-oriented therapy (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)
ix. Time-Limited Psychotherapy (TLP) (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)
x. Brief Relational Therapy (BRT)
xi. Object relations therapy
xii. Self-psychology therapy
xiii. Short-term anxiety-provoking psychotherapy
xiv. Intensive short-term dynamic psychotherapy
xv. Accelerated experiential dynamic psychotherapy (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)
xvi. Brief Adaptive therapy (this should be verified eventually by checking the full text because it may or may not be a psychoanalytic/psychodynamic treatment)

7. Further Specification of PDT Definition: Theoretically integrative or eclectic treatments that included use of PDT techniques in the intervention group were **not** considered eligible.

8. Interpersonal Therapy (IPT): IPT—a specific treatment method developed by Klerman, Weissman, and colleagues—in and of itself is **not** considered to be an eligible PDT intervention.

9. Individual/Group Format: PDT intervention group could be either individual or group modalities.

10. Short-term-Long-term: PDT intervention group could be either short-term or long-term treatment.

11. Manual: PDT intervention group could either use a manual or not use a manual.

12. Art therapy or drama therapy or music therapy: If the only psychodynamically-oriented treatment in the study is art therapy, drama therapy, or music therapy, the study is **not** eligible.

13. Use of Adjunctive Treatments in the Intervention Group: Studies in which participants in the intervention group received treatment that met criteria for PDT (as per above) and also received adjunctive treatment (e.g., milieu therapy, art therapy) were considered eligible.

14. Use of Medication: Studies in which participants took psychiatric medications in addition to receiving PDT were considered eligible.

15. Sample Size: Studies had to include a sample size greater than 1.

16. Effect Size Data: In order to be eligible, the study had to provide sufficient data to permit calculation of effect size(s) or this information needed to be provided by the author(s) of the study. *If the study is otherwise eligible and indicates only that there were no significant findings in terms of (a) pre-post change or (b) between-groups differences*, *study would still be eligible.*

17. Date of study: Based on Keefe et al. (2014) and Leichsenring and Klein (2014), only studies from 1970 on were considered eligible.

18. Review articles: Review articles were not included in the meta-analysis (although they may be used to obtain additional references).

19. Outcome data: Eligible studies must provide outcome data. If the only data provided by the study is dropout rates/attrition but no actual outcome data, the study is NOT eligible.

20. Case studies: Studies that consisted of single case study or multiple case studies were excluded.

Appendix B

Database Search Terms

Database search terms included the following: (psychodynamic* OR psycho-dynamic* OR dynamic* OR psychoanaly* OR analytic* OR insight* OR interpret* OR (object W0 relation*) OR transference* OR supportive-expressive OR (supportive W0 expressive) OR mentalization OR relational OR (interpersonal W0 reconstructive) OR (short* W0 anxiety-provoking) OR (short-term W0 anxiety-provoking) OR (short* W0 anxiety W0 provoking) OR (time* W0 limited) OR (brief W0 adaptive) OR (reconstructive W0 learning) OR (self W0 psycholog*) OR (self-psycholog*)) AND (therap* OR psychotherap* OR treatment* OR counseling OR counselling) AND (addict* OR substance* OR drug* OR alcohol* OR cocaine* OR opiate* OR opioid* OR marijuana* OR cannabis* OR ecstasy* OR LSD* OR amphetamine* OR methamphetamine* OR heroin* OR prescript* OR stimulant* OR hallucinogen* OR inhalant* OR barbiturate* OR phencyclidine* OR PCP* OR sedative* OR anxiolytic* OR hypnotic*) AND (study OR studies OR trial*).

Appendix C

Study-Level Coding Form for PDT SUD MA

1) Indicate the study's research design [DESIGN]
   - (a) Randomized controlled trial
   - (b) Quasi-experimental study (i.e., there is a comparison group in addition to the PDT treatment group, but there was no random assignment)
   - (c) Single treatment group, using pre-post design

2) Type of publication [PUBTYPE]
   - (a) Book
   - (b) Book chapter
   - (c) Journal article
   - (d) Master's thesis
   - (e) Doctoral dissertation

3) Publication year [Code "Unknown" if unknown; PUBYEAR]

4) Mean Age [MEANAGE; if there is more than one group, code the mean age of both groups; if there is only group, code the mean age of that group; code "Cannot tell" if cannot tell]

5) Percentage white [RACE; code to two decimal places, e.g., code "50.24" if percentage white is 50.24%]

6) Percentage female [GENDER; code to two decimal places, e.g., code "50.24" if percentage female is 50.24%]

7) Were patients given a formal diagnosis (note: formal diagnosis can be done using, for example, ICD or DSM; note: if patients are described as just having substance use "problems," for example, then code "0" for "No" [Dx])?
   (0) No
   (1) Yes

8) Primary substance being treated [PrimSub]
   - (a) Alcohol
   - (b) Cannabis
   - (c) Opiate
   - (d) Mixed substances (that is, patients had substance use problem[s]/diagnosis, but no specific primary substance was required for receiving treatment)
   - (e) Other: _____ (code "e" and write in next to it the substance)

9) Did the study have an adjunctive treatment in the PDT group [AdjPDT]?
   - 0 (No)
   - 1 (Yes)

10) What was the adjunctive treatment given to the PDT group? _____ (write in; if not applicable, code "N/A") [AjdPDTname]

11) Amount of intervention (number of hours) for PDT group: (Note: Code only the amount of PDT intervention- if there was adjunctive treatment[s] provided to the PDT group, do *not* code the amount of the adjunctive treatment[s]; DOSAGE_PD]

12) Type of comparison group [CGTYPE; coded "N/A" if study has only a single group]
- (a) No treatment control group
- (b) Waiting list
- (c) CT/BT/CBT
- (d) Non-specific "supportive therapy"
- (e) Drug counseling
- (f) Medication
- (g) Placebo pills
- (h) Other (write in):_____

13) Percentage attrition for PDT participants at posttest (i.e., take the number of participants who completed PDT, divide by the number of participants who started PDT, and then multiply by 100, and code to 2 decimal places. Then subtract that number from 100. [ATTRIT_PD; If cannot tell, code "Cannot Tell"]

14) Number of conditions/groups beyond the PDT group (e.g., if a study had two intervention conditions, one being PDT and one being Motivational Interviewing, both of which were compared to a no-treatment control group, you would code "2") [#_INTRVN]

Researcher Allegiance

Items 15 through 36 should be coded only when the study has PDT and a comparison group. The comparison group could have been formed using random assignment (that is, a "true experiment") or non-random assignment (that is, a quasi-experiment). If the study only contains PDT, code "N/A" for all items 15 through 36.

15) Rate the degree of researcher allegiance to **PDT** by assessing study design issues, such as if the author(s) developed or advocated one of the treatments, supervised or trained the therapists for one particular treatment in the study, or if more experienced therapists were utilized for one of the treatments. Use a five-point scale, where 0 represents no researcher allegiance and 4 represents evidence of strong researcher allegiance [ALLEG_PDT]
- 0 (no researcher allegiance)
- 1
- 2
- 3
- 4 (strong researcher allegiance)

16) Rate the degree of researcher allegiance to the **non-**PDT by assessing study design issues, such as if the author(s) developed or advocated one of the treatments, supervised or trained the therapists for one particular treatment in the study, or if more experienced therapists were utilized for one of the treatments. Use a five-point scale, where 0 represents no researcher allegiance and 4 represents evidence of strong researcher allegiance [ALLEG_NonPDT]
    - 0 (no researcher allegiance)
    - 1
    - 2
    - 3
    - 4 (strong researcher allegiance)

17) Author developed the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER1]
    - 0 (No)
    - 1 (Yes)

18) Author advocates the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER2]
    - 0 (No)
    - 1 (Yes)

19) Author contributed to an etiological model which is consistent with the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER3]
    - 0 (No)
    - 1 (Yes)

20) Author published supporting evidence for the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER4]
    - 0 (No)
    - 1 (Yes)

21) Review of previous evidence favors the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER5]
    - 0 (No)
    - 1 (Yes)

22) Hypothesis in favor of the PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER6]
    - 0 (No)
    - 1 (Yes)

23) Treatment description of PDT included in the article? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER7]
- 0 (No)
- 1 (Yes)

24) Author developed the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER8]
- 0 (No)
- 1 (Yes)

25) Author advocates the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER9]
- 0 (No)
- 1 (Yes)

26) Author contributed to an etiological model which is consistent with the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER10]
- 0 (No)
- 1 (Yes)

27) Author published supporting evidence for the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER11]
- 0 (No)
- 1 (Yes)

28) Review of previous evidence favors the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER12]
- 0 (No)
- 1 (Yes)

29) Hypothesis in favor of the **non-**PDT treatment? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER13]
- 0 (No)
- 1 (Yes)

30) Treatment description of **non-**PDT included in the article? [Code this variable based on the information specifically presented in the Background and Method sections of the study; MUNDER14]
- 0 (No)
- 1 (Yes)

31) Sum of the **direct** researcher allegiance items for **PDT** [Sum Direct PDT; **Note: An Excel formula with calculate this value]**

32) Sum of the **direct** researcher allegiance items for the **non-**PDT treatment [Sum Direct non-PDT; **Note: An Excel formula with calculate this value]**

33) Sum of the **indirect** researcher allegiance items for **PDT** [Sum Indirect PDT; **Note: An Excel formula with calculate this value]**

34) Sum **indirect** researcher allegiance for the **non-**PDT treatment [Sum Indirect non-PDT; **Note: An Excel formula with calculate this value]**

35) Overall score for Munder scale [MUNDER_Overall]
- 0 (if there was no difference in the direct and indirect indicators)
- 1 (if the treatments were equal in terms of the direct indicators and differed by one point in terms of the sum of the indirect indicators)
- 2 (if the treatments were equal with regard to the direct indicators and differed by two points or more in terms of the sum of the indirect indicators)
- 3 (if the treatments differed by one point in terms of the sum of the direct indicators)
- 4 (if the treatments differed by two points or more in terms of the sum of the direct indicators)

36) Overall Munder scale score indicates researcher allegiance for which treatment [MUNDER_Tx]?
- (a) PDT
- (b) Non-PDT
- (c) Neither; Munder scale indicates balanced researcher allegiance between the PDT and non-PDT treatments

37) The country in which the study was conducted [CNTRY]
- (a) USA
- (b) UK
- (c) Netherlands
- (d) Italy
- (e) Canada
- (f) Australia
- (g) Germany
- (h) Sweden
- (i) Norway
- (j) Other (code "j" and then write in next to it the country:_____)

38) Country Condensed [CntryCndsd]
- (a) USA
- (b) UK

- (c) Canada
- (d) Europe
- (e) Australia
- (f) Other (code "f" and then write in next to it the country:_____)

39) Rate the setting in which the treatment was delivered [Setting]
- (a) Inpatient
- (b) Public Outpatient Clinic/ Community Mental Health
- (c) University Affiliated Outpatient Clinic
- (d) Counseling Center Primarily Designated to Serve Students
- (e) Day Treatment / Partial Hospitalization
- (f) Research Clinic
- (g) Substance Use Disorder Clinic
- (h) Private Practice
- (i) Inpatient then Outpatient
- (j) Mixed (i.e., > 1 of the previous categories with the exception of "Inpatient then Outpatient" which would get coded as "i" above)
- (k) Other (code "k" and then write in next to it the setting:_____)
- (l) Cannot tell

40) Condensed setting [SettingCndnsd]
- (a) Inpatient
- (b) Outpatient
- (c) Counseling Center Primarily Designed to Serve Students
- (d) Research Clinic
- (e) Cannot tell

41) Number of therapists in the PDT condition [#ThrpstsPDT]: _____

42) Number of therapists in the non-PDT condition [Note: If the study only has PDT and no other psychotherapy, code "N/A"; #ThrpstsNonPDT]: _____

43) Total number of therapists across both PDT and non-PDT conditions [#ThrpstsTtl]: _____

44) Use of meds in PDT group [MedsPDT]?
(0) No
(1) Yes

45) Use of meds in non-PDT group [Note: If the study only has PDT and no other psychotherapy, code "N/A"; MedsNonPDT]?
(0) No
(1) Yes
N/A = Not Applicable

Effect Size Level Coding Form for PDT SUD MA

1. Effect Size Type [ESTYPE]
    a. Change in PDT group from pretest to posttest
    b. Change in PDT group from pretest to follow-up

2. Interval in months between completion of intervention and ***follow-up*** (if applicable to the particular effect size being coded on this particular coding form) [FaInt] [Code "N/A" if not applicable; if applicable but cannot tell from the study, use "Cannot Tell"]

3. % Attrition at ***follow-up*** (N.B.: calculate attrition rate relative to posttest; Code "N/A" if not applicable; Code "Cannot Tell" if cannot tell) [FuAttrit]

4. Outcome Measure: Note the full name and version of the measurement tool that the study data reported in this row was collected using (e.g., Beck Depression Inventory II) [OutcomeMeasureName]:_____

5. Type of Outcome [TypeOfOutcome]

    Note regarding full scale vs. subscale data: *If a study reports both total score data (i.e., GSI on the BSI) as well as subscale data (e.g., Anxiety subscale of BSI and Depression subscale of BSI), only code the* ***total*** *score data.*

    a. Substance use
    b. Depression
    c. Anxiety
    d. General psychiatric symptoms (e.g., the GSI from the Brief Symptom Inventory)
    e. Somatic symptoms
    f. Interpersonal problems
    g. Social functioning
    h. Personality functioning/traits (e.g., a measure of reflective functioning or measures of disturbance in personality functioning, such as MCMI-III Borderline personality pathology scale or Personality Disorder Belief Questionnaire)
    i. Other psychiatric complaints and common symptoms (e.g., other Axis I symptom measures [e.g., EAT-26], behavioral measures [e.g., attempts at self-harm], or measures of common symptoms [e.g., impulsivity and aggression measures]).
    j. Other (write in): _____

6. Type of data effect size based on [DataFormat]
    a. Means, standard deviations, and sample sizes
    b. Frequencies or proportions, dichotomous
    c. Frequencies or proportions, polychotomous
    d. Pearson's product-moment correlation
    e. Spearman rank-order correlation
    f. Point-biserial correlation
    g. Phi correlation
    h. Chi Square (with $df = 1$)

i. *t* –value testing the statistical significance of *r*
j. Cohen's *d,* also known as standardized mean difference score
k. Exact two-tailed *p* value (when all of the above are not available)
l. Other (Code "L" and then write in specific data format; e.g., "L; multi-group contrast analysis"): _____

7. Type of control/comparison group [CgTypeES]
    a. Active comparison group
    b. Waiting list
    c. Treatment as usual
    d. Other (write in): _____
    e. N/A (no control comparison group)

8. Type of Outcome [TYPE of OUTCOME]
    1) Substance use symptoms or substance use diagnosis (i.e., presence/absence of substance use diagnosis)
    2) Urine toxicology result
    3) Substance use frequency or severity
    4) Depression symptoms or depression diagnosis (i.e., presence/absence of depression)
    5) Anxiety symptoms or anxiety diagnosis (i.e., presence/absence of anxiety diagnosis)
    6) Overall psychopathology
    7) Dosage of medication assisted treatment
    8) Legal problems
    9) Work-related problems
    10) Physical health (e.g., # of doctor visits in the last month, blood pressure, etc.)
    11) Overall well-being/quality of life
    12) Other (write in): _____

9. Primary/Target symptoms versus secondary outcomes [PRIMARY/TARGET]
    a. Primary/Target symptoms
        i. Code if the study author *specifically* indicates that the outcome measure is the primary/target symptom
        ii. If unclear, code "primary" if the data is for the primary substance being studied (for example, if it's a study of opiate use and the authors provide data on opiate and cocaine use, code the opiate use data as the primary/target outcome).
        iii. If there is more than one type of data for the primary substance being studied, code the outcome that is *continuous* rather than *categorical*
    b. Secondary
        i. Code as per guidelines above

10. Type of substance for outcome variable (N.B.: only code this if the type of outcome is substance-related outcome data; otherwise, code N/A [SbstncOutcm])

a. Alcohol
b. Cannabis
c. Hallucinogen (e.g., phencyclidine)
d. Inhalant
e. Opioid
f. Sedative/Hypnotic/Anxiolytic
g. Stimulant
h. Tobacco
i. Other (write in): _____
j. N/A (code if the type of outcome you are coding is ***not*** a substance-related one)

11. Source of information for outcome measures [SOURCE]
    a) Self-report
    b) Clinician (e.g., diagnosis)
    c) Non-clinician informant (e.g., report of spouse)
    d) Medication-assisted treatment dosage or urinalysis results
    e) Other (write in): _____

12. Used WebPlotDigitizer to extract effect size data from graphs or figures [WebPltDgtzr]?
    (0) No
    (1) Yes

Note: This section is used for when you are coding Ms, SDs, and N sizes. If you are coding different data, code all of these variables as "N/A".

13. Mean for PDT group at pretest [MeanPDTpre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

14. Standard deviation for PDT group at pretest [SdPDTpre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

15. N size for PDT group at pretest [nPDTpre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

16. Mean for PDT group at posttest [MeanPDTpost; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

17. Standard deviation for PDT group at posttest [SdPDTpost; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

18. N size for PDT group at posttest [nPDTpost; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

19. Pre-Post Correlation on Outcome Measure for PDT group [rPrePst_PDT; input the correlation between the outcome data at pretest and at posttest; if this is not reported in the

study, impute a correlation of .70; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

20. Mean for PDT group at follow-up [MeanPDTf/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

21. Standard deviation for PDT group at follow-up [SdPDTf/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

22. N size for PDT group at follow-up [nPDTf/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

23. Pre-Follow/Up Correlation on Outcome Measure for PDT group [rPreF/U_PDT; input the correlation between the outcome data at pretest and at follow-up; if this is not reported in the study, impute a correlation of .70]

Note: This section is used for when you are coding outcome data that are dichotomous. If you are coding different data, code all of these variables as "N/A".

24. Number of events for PDT group for pretest plus number of events for PDT group for posttest [nEventsPre-Post; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

25. Number of events for PDT group for pretest [nEventsPre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

26. Number of events for PDT group for posttest [nEventsPost; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

27. Number of **non**-events for PDT group for pretest plus number of **non-**events for PDT group for posttest [nNonEventsPre-Post; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

28. Number of events for PDT group for pretest plus number of events for PDT group for follow-up [nEventsPre-F/U; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

29. Number of events for PDT group for pretest [nEventsPre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

30. Number of events for PDT group for follow-up [nEventsF/U; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

31. Number of **non**-events for PDT group for pretest plus number of **non-**events for PDT group for follow-up [nNonEventsPre-F/U; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

Note: This section is used for when you are coding outcome data from a dependent t-statistic. If you are coding different data, code all of these variables as "N/A".

32. Mean for PDT group at pretest when using dependent t-test data [MeanPDTpre_dpndntT; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

33. Mean for PDT group at posttest when using dependent t-test data [MeanPDTpost_dpndntT; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

34. Mean for PDT group at follow-up when using dependent t-test data [MeanPDTf/u_dpndntT; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

35. Dependent t-statistic [DpndntT; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

Note: This section is used for when you are coding outcome data from an exact p-value for dependent data. If you are coding different data, code all of these variables as "N/A".

36. *p*-value (two-tailed) for the statistical test at posttest [pValue_dpndntData_post; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
37. Degrees of freedom for the statistical test at posttest [df_dpndntData_post; if not applicable (e.g., the only data reported is an independent t-test], code "N/A")
38. Pre-Post Correlation on Outcome Measure for PDT group [rPrePst_PDT; input the correlation between the outcome data at pretest and at posttest; if this is not reported in the study, impute a correlation of .70; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
39. *d_equivalent* for dependent data for posttest [d_equiv_dpndnt_post; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
40. *p*-value (two-tailed) for the statistical test at follow-up [pValue_dpndntData_f/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
41. Degrees of freedom for the statistical test at follow-up [df_dpndntData_f/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
42. Pre-Follow/Up Correlation on Outcome Measure for PDT group [rPreF/U_PDT; input the correlation between the outcome data at pretest and at follow-up; if this is not reported in the study, impute a correlation of .70]
43. *d_equivalent* for dependent data for follow-up [d_equiv_dpndnt_f/u; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

Note: This section is used for when you are coding Ms, N size, paired groups p-value, and number of tails. If you are coding different data, code all of these variables as "N/A".

44. Mean for PDT group at pretest [MeanPDTpre; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
45. Mean for PDT group at posttest [MeanPDTpost; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
46. Sample size for PDT group [N_PDT; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
47. *p*-value for paired group comparison for PDT group [p_PDTPaired; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]
48. Number of tails of the paired group comparison for PDT group [tails_PDTPaired; if not applicable (e.g., the only data reported is an independent t-test), code "N/A"]

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49. Page number where effect size data found [PAGENUM]

50. Sign of the effect size at posttest (assign a "1" if the PDT group improved from pre- to post-treatment, or a -1" if the PDT group got worse over the course of treatment; Code N/A if coding follow-up) [SIGN_POST]

51. Sign of the effect size at follow-up (assign a "1" if the PDT group improved from pretreatment to follow-up, and a "-1" if the PDT group got worse from pretreatment to follow-up; Code "N/A" if there is no follow-up data) [SIGN_FU]

Table 1. *Overall Aggregated Effect Size Data for Pre-Post/Pre to Follow-Up Treatment Outcomes*

Study Name	Standardized Difference in Means	Standard Error	95 % CI Lower Limit	95 % CI Upper Limit	Z-value	*p*-value
Crits-Christoph et al. (2008)/Crits-Christoph et al.(2001)/ Crits-Christoph et al. (1999)	0.426	0.083	0.263	0.589	5.122	< .001
Gregory et al. (2008)/Gregory et al. (2010)	0.720	0.2093	0.145	1.294	2.456	0.014
Halliday (1992)	0.065	0.116	- 0.162	0.293	0.561	0.574
Hellerstein et al. (1995)	1.163	0.213	0.746	1.581	5.464	< .001
Hoyer et al. (2001)	0.442	0.128	0.191	0.694	3.450	0.001
Mcclanahan (2000)	- 0.014	0.264	- 0.530	0.503	- 0.052	0.958
Pavia et al. (2017)	0.770	0.372	0.041	1.499	2.070	0.038
Sandahl et al. (1998)/Sandahl et al. (2004)	0.734	0.209	0.324	1.143	3.514	< .001
Shaffer et al. (1997)	0.000	0.141	- 0.277	0.277	0.000	1.000
Suchman et al. (2008)	0.964	0.384	0.213	1.716	2.514	0.012
Suchman et al. (2010/Suchman et al. (2011)	0.258	0.167	- 0.070	0.586	1.541	0.123
Wennberg et al. (2005)	0.418	0.125	0.172	0.664	3.328	0.001
Willet (1973)	0.003	0.329	- 0.642	0.647	0.008	0.993
Woody et al. (1990)	0.738	0.158	0.427	1.048	4.654	< .001
Woody et al. (1995)	0.412	0.109	0.199	0.624	3.788	< .001
d	0.436	0.078	0.283	0.590	5.576	< .001

Table 2. *Mixed Regression Effects Moderator Analysis for Age*

	Point Estimate	Standard Error	95 % CI Lower Limit	95 % CI Upper Limit	Z-value	*p*-value
Slope	0.00958	0.01633	- 0.02243	0.04160	0.58664	0.55744
Intercept	0.09118	0.59524	- 1.07546	1.25782	0.15318	0.87825
Tau-squared	0.05822					
	Q-Value	df	*p*-value			
Model	0.34415	1	0.55744			
Residual	16.65605	13	0.21551			
Total	17.00020	14	0.25617			

Table 3. *Meta-Analytic Results, Divided by Studies that Did Not Versus Did Have Adjunctive Treatment*

Study Name	Adjunctive Treatment (Adj Tx)	Standardized Difference in Means	Standard Error	95 % CI Lower Limit	95 % CI Upper Limit	Z-value	*p*-value
Mcclanahan (2000)	No Adj Tx	- 0.014	0.264	- 0.530	0.503	- 0.052	0.958
Wennberg et al. (2005)	No Adj Tx	0.418	0.125	0.172	0.664	3.328	0.001
d	No Adj Tx	0.257	0.221	- 0.177	0.691	1.161	0.246
Crits-Christoph et al. (2008)/Crits-Christoph et al.(2001)/ Crits-Christoph et al. (1999)	Yes Adj Tx	0.426	0.083	0.263	0.589	5.122	< .001
Gregory et al.(2008)/ Gregory et al. (2010)	Yes Adj Tx	0.720	0.293	0.145	1.294	2.456	0.014
Halliday (1992)	Yes Adj Tx	0.065	0.116	- 0.162	0.293	0.561	0.574
Hellerstein et al. (1995)	Yes Adj Tx	1.163	0.213	0.746	1.581	5.464	< .001
Hoyer et al. (2001)	Yes Adj Tx	0.442	0.128	0.191	0.694	3.450	0.001
Pavia et al. (2017)	Yes Adj Tx	0.770	0.372	0.041	1.499	2.070	0.038
Sandahl et al. (1998)/Sandahl et al. (2004)	Yes Adj Tx	0.734	0.209	0.324	1.143	3.514	< .001
Shaffer et al. (1997)	Yes Adj Tx	0.000	0.141	- 0.277	0.277	< .001	1.000
Suchman et al. (2008)	Yes Adj Tx	0.964	0.384	0.213	1.716	2.514	0.012
Suchman et al. (2010/Suchman et al. (2011)	Yes Adj Tx	0.258	0.167	- 0.070	0.586	1.541	0.123
Willet (1973)	Yes Adj Tx	0.003	0.329	- 0.642	0.647	0.008	0.993
Woody et al. (1990)	Yes Adj Tx	0.738	0.158	0.427	1.048	4.654	< .001
Woody et al. (1995)	Yes Adj Tx	0.412	0.109	0.199	0.624	3.788	< .001
d	Yes Adj Tx	0.467	0.088	0.295	0.639	5.315	< .001

Table 4. *Type of Adjunctive Treatment and Frequency*

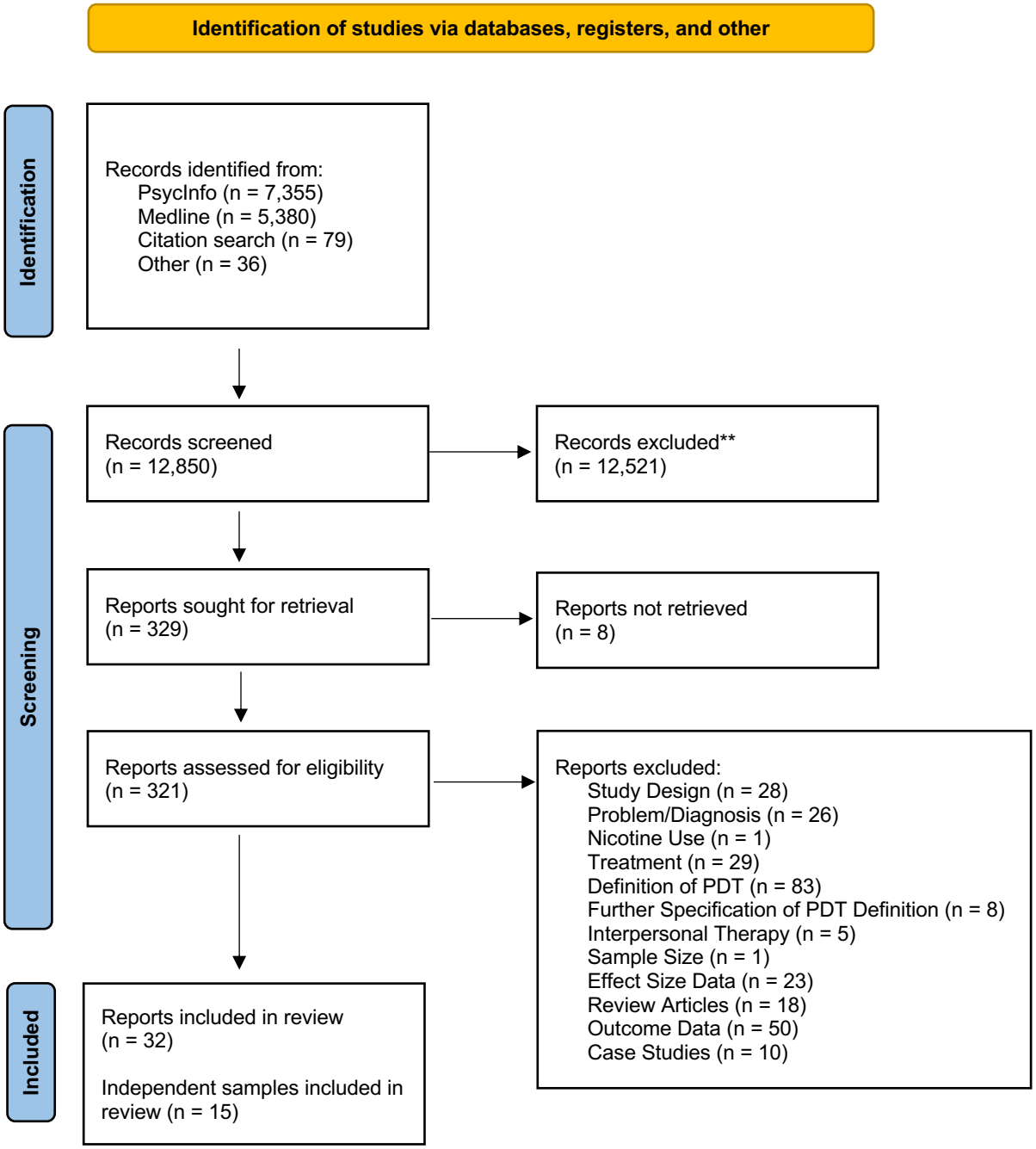
Adjunctive Treatment (Adj Tx)	Number of Independent Samples	Study Name
Medication	7	Gregory et al.(2008)/ Gregory et al. (2010); Halliday (1992); Sandahl et al. (1998)/Sandahl et al. (2004); Shaffer et al. (1997); Willet (1973); Woody et al. (1990); Woody et al. (1995)
Medication offered but not necessarily used by all participants	4	Hellerstein et al. (1995); Pavia et al. (2017); Suchman et al. (2008); Suchman et al. (2010/Suchman et al. (2011)
Drug Counseling	4	Crits-Christoph et al. (2008)/Crits-Christoph et al. (2001)/ Crits-Christoph et al. (1999); Halliday (1992); Woody et al. (1990); Woody et al. (1995)
Individual Psychotherapy	3	Halliday et al. (1992); Pavia et al. (2017); Shaffer et al. (1970)
CBT group therapy	1	Suchman et al. (2010/Suchman et al. (2011)
Substance-replacement therapy	1	Suchman et al. (2010/Suchman et al. (2011)
Vocational Counseling	1	Suchman et al. (2010/Suchman et al. (2011)
Social Support Group	1	Sandahl et al. (1998)/Sandahl et al. (2004)
Social Skills Training	1	Hoyer et al. (2001)
Music Therapy	1	Hoyer et al. (2001)
Sports Therapy	1	Hoyer et al. (2001)
Family Group Counseling	1	Hoyer et al. (2001)

Table 5. *Type of Psychodynamic Treatment and Frequency*

Psychodynamic Treatment	Number of Independent Samples	Study Name
Analytically- Oriented Group Therapy	3	Sandahl et al. (1998)/Sandahl et al. (2004); Wennberg et al. (2005); Willet (1973)
Supportive-Expressive Therapy	3	Woody et al. (1990); Woody et al. (1995); Crits-Christoph et al. (2008)/Crits-Christoph et al. (2001)/ Crits-Christoph et al. (1999)
Modified Dynamic Group Therapy	2	Halliday et al. (1992); Shaffer et al. (1970)
Interpersonally- Oriented Group Psychotherapy	1	Pavia et al. (2017)
Psychodynamic Therapy (with focus on conflict reduction)	1	Hoyer et al. (2001)
Dynamic Deconstructive Psychotherapy	1	Gregory et al. (2008)/ Gregory et al. (2010)
Attachment-Based Parenting Intervention	2	Suchman et al. (2008); Suchman et al. (2010/Suchman et al. (2011)
Insight- Oriented Psychodynamic Psychotherapy	1	Mcclanahan (2000)
Supportive Psychotherapy	1	Hellerstein et al. (1995)

Figure 1

Flow Diagram for Search Process of Mindfulness for Soldiers Meta-Analysis



Adapted from: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.