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A Meta-Analysis of Sandplay Therapy Treatment Outcomes

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Sandplay therapy is a cross-cultural, psychodynamic, nondirective, multisensory psychotherapy method founded by Dora Kalff. Sandplay is used with children and adults with a range of mental health problems. Despite sandplay's growing popularity, its empirical evidence base is less developed than more well-known therapies. This international study provides a meta-analysis of the available quantitative outcome studies in order to summarize the growing evidence base of sandplay. The meta-analysis specifically examined emotional and behavioral outcome measures of treatment with sandplay therapy. The initial search identified 1,715 potential records from over 16 countries. After screening, 40 studies from eight countries representing 1,284 participants met the inclusion criteria. Mean effect sizes were calculated using a random effects model with the Comprehensive Meta-Analysis (CMA) program. The overall effect size was large (Hedges' $g = 1.10$). Large effect sizes were maintained for internalizing, externalizing, and attention-deficit/hyperactivity disorder (ADHD) symptoms. Improved effect sizes were associated with individual treatment over the group format. These results suggest that sandplay therapy is an effective treatment method for children and adults with a wide variety of mental health concerns. Limitations and suggestions for further research are discussed.

Keywords: sandplay therapy, sandtray therapy, play therapy, meta-analysis, Dora Kalff

Current trends in mindfulness-based, embodied therapies, and trauma-informed care have fueled growing interest in sandplay therapy. Sandplay is a cross-cultural, multisensory, psychodynamic treatment method that incorporates these approaches, thereby promoting mind–body healing (Freedle, 2017, 2019a). Founded by Swiss psychoanalyst Dora Kalff, in 1956, sandplay has strong theoretical roots in play therapy, the depth psychology of C. G. Jung, and Eastern contemplative practices (Kalff, 2020). In the safe presence of the therapist, an individual makes images using sand, water, and miniatures, accessing conscious and unconscious processes and the natural healing capacities of nature and the psyche to advance psychological development (Kalff, 2020). The client may choose to play out or tell a story and may speak or remain silent. At the same time, the sandplay therapist listens empathically and provides what Kalff termed, "a free and protected space" for healing (Kalff, 2020, p. 16). With a series of sandplay images a "natural transformation" takes place with movement toward wholeness of personality, a process Jung referred to as individuation (Jung, 1950/1959, para. 234; Kalff, 1966/2020).

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Although there is a spectrum of ways to use sand and miniatures in psychotherapy, sandplay emphasizes self-directed, nonverbal, hands-on expressive work without interference on the part of the therapist. Sandplay therapy is often confused with sandtray therapy. Both have origins in Margaret Lowenfeld's World Technique (Lowenfeld, 1993) but have evolved somewhat differently. With a foundation in Jungian and psychodynamic theories, *sandplay* has emerged with a specific treatment protocol that emphasizes a nondirective, noninterpretive approach that can tap into unconscious processes (Sandplay Therapists of America, 2012; Turner, 2005). With diverse theoretical orientations, *sandtray* therapy includes a variety of methods and may use directives or interpretation during the session to help clients process presenting problems (Homeyer & Sweeney, 2017). Where sandplay therapy and sandtray therapy sometimes overlap is in how the therapist follows the client's process, creates the free and protected space, and uses the power of play and symbolic language. For example, the nondirective approach of client-centered sandtray therapy involves a similar therapeutic stance to that used in sandplay therapy.

Used with children and adults alike, sandplay therapy "changes the focus of therapy away from solely verbal communication or cognitive insight" (Roesler, 2019, p. 93). Working nonverbally in the sand also appears to enhance treatment engagement and provides those who have difficulty verbalizing their feelings and experiences a tangible means to express themselves and work through their struggles (Freedle et al., 2015; Homeyer & Sweeney, 2017; Kalff, 2020; Roesler, 2019). With "generous attunement" from the therapist (Freedle, 2017 p. 195), sandplay activates multiple brain systems that regulate sensory input and the stress response system and provides the conditions necessary for healing at a preverbal, body-based level (Badenoch, 2008; Freedle, 2017, 2019a; Kalff, 2021). Sandplay allows traumatized people to safely access and reprocess traumatic memories while preventing retraumatization (Freedle, 2017; Freedle et al., 2020; Gil, 2010; Ramos & da Matta, 2018; Roesler, 2019). Emerging neuroimaging studies have found that sandplay therapy improved synchrony in frontotemporal networks of the brain, potentially facilitating the retrieval and reprocessing of memories with an optimal amount of cognitive control (Akimoto et al., 2018). Moreover, sandplay therapy effected symptom improvement in patients with generalized anxiety that was associated with improved brain functioning in the limbic system and prefrontal cortex (Foo et al., 2020; Foo & Pratiwi, 2021).

Systematic reviews of the evidence base for sandplay therapy indicate that sandplay has been found to be effective in treating a wide range of problems in children and adults including anxiety, depression, trauma, addiction, attention-deficit/hyperactivity disorder, borderline personality disorder, autism, disabilities, and migration, as well as other emotional, behavioral, somatic, and social issues (Roesler, 2019; Wen et al., 2019). Used as a short-term or long-term intervention, sandplay therapy may be conducted in an individual or group format in a variety of settings including outpatient clinics, community-based settings, schools, and hospitals. Research in sandplay therapy has historically focused on theoretical and qualitative explorations emphasizing case study and multiple case study designs. However, over the past 12 years, there has been a sharp increase in quantitative studies demonstrating the efficacy of sandplay therapy utilizing pre–post and quasi-experimental research designs, as well as a significant number of randomized controlled trials (RCT; Ahn et al., 2020; Roesler, 2019). With this growing body of research, there is a pressing need to examine the cumulative results of sandplay therapy through meta-analysis (Wiersma, 2019).

According to Cooper (2017), meta-analysis provides a way to report an overview of outcome research that can incorporate studies with larger and smaller numbers of participants. Moreover, a meta-analysis presents cumulative evidence to inform best practice. Finally, state-of-the-art meta-analysis research uses "methodological and statistical techniques meant to reduce bias in accounts of the research surveyed, and to standardize and make explicit the procedures used to collect, catalog and combine primary research" (Cooper, 2017, p. 10).

Several meta-analyses were found that examined the cumulative effects of psychotherapies that share elements with sandplay therapy. These include psychodynamic therapy (Abbass et al., 2013, 2014; Driessen et al., 2010; Shedler, 2010), mindfulness-based therapy (Khoury et al., 2013), and play therapy (Bratton et al., 2005; Jensen et al., 2017; LeBlanc and Ritchie, 2001; Lin & Bratton, 2015; Ray et al., 2015).

These meta-analyses found small to large effect sizes depending on a variety of moderators. However, only one meta-analysis was found on sandplay therapy, which focused solely on studies that occurred in South Korea between 2000 and 2014 (Lee & Jang, 2015). The analysis explored cognitive, emotional, and behavioral outcomes in children and adolescents. A large effect size ($g = 1.089$) was found with the most improvement noted when sandplay was conducted in an individual format, twice per week, and with sessions lasting 50–60 min.

Sandplay therapy is embraced internationally, although research to date on the effectiveness and efficacy of this approach has been scattered across individual studies conducted in a wide variety of settings and locales, with few literature reviews and a single meta-analysis focused on one country. A thorough exploration of this research is long overdue to inform best practices in sandplay and the broader practice of sand therapy. A meta-analysis, by establishing a solid evidence base for sandplay therapy, can also facilitate communication with the wider psychotherapy community and lay a useful foundation for further research.

Method

The purpose of this research was to collect and analyze quantitative studies of sandplay therapy treatment outcomes that met quality standards. To do so, search procedures were established, the definition of sandplay therapy was operationalized with specific inclusion criteria, and quality ratings were developed. Studies with emotional and behavioral outcome measures were selected, and moderator variables were determined to refine the analysis.

Search Procedure

An initial search for studies published between 1990 and June, 2020, was carried out by four independent members of the research team and yielded a total of 1,715 studies. Search terms used were: *sandplay, sandplay therapy, sandplay research, sandplay studies, sandplay quantitative, sandplay and control group, sandplay experimental, sandplay effectiveness, sandplay outcome, sandplay therapy and evidence, sandplay and depression, sandplay and anxiety, sandplay and autism, sandplay and attention-deficit/hyperactivity disorder (ADHD), sandplay and illness,* and various combinations of those terms.

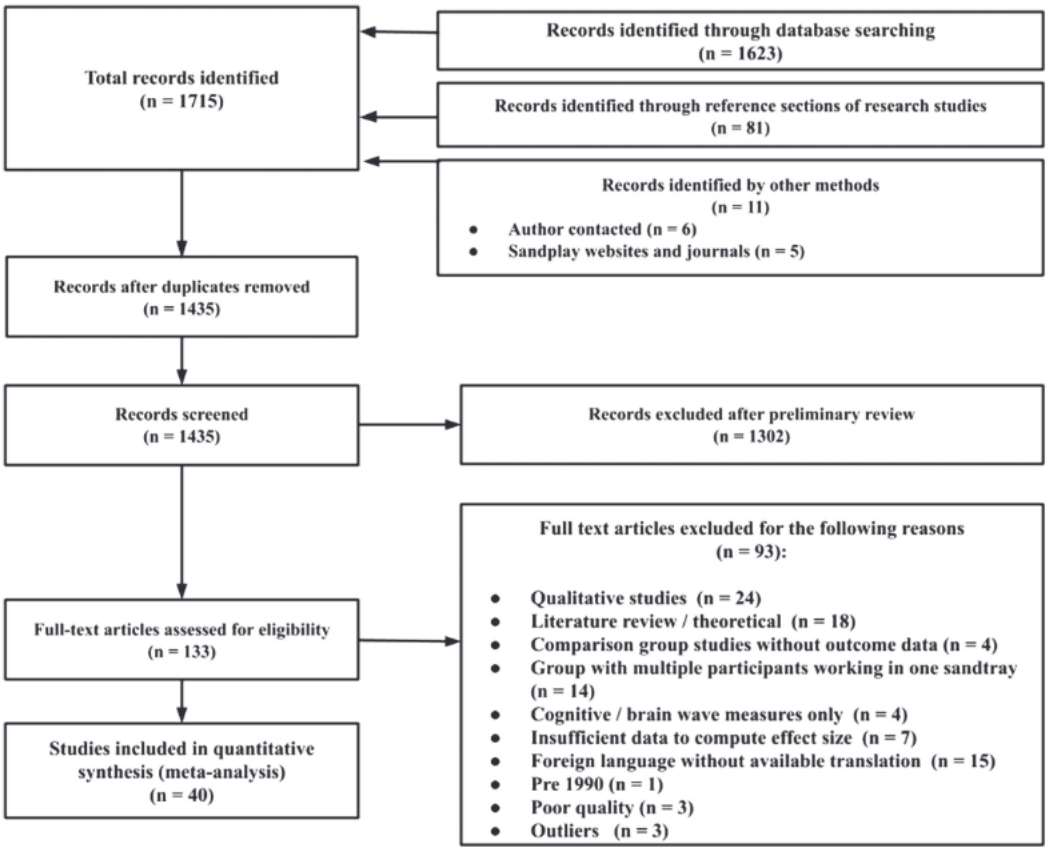
Databases searched included EBSCO, PsychINFO, PsychARTICLES, Academic Search Complete, SuperSearch, Science Direct, ProQuest (Psychology database, Science, and Dissertations and Theses), Research Gate, Semantic Scholar, Google Scholar, CINAHL, ERIC, and China Asia on Demand (CAOD). Searches were also conducted in the reference sections of already identified full text articles. The full texts of 33 studies were obtained directly from Christian Roesler, author of the 2019 systematic review of sandplay therapy. Websites and journals of domestic and international sandplay organizations were also searched, as were unpublished dissertations, conference presentations, and direct communication with authors. After duplicates were eliminated, 1,435 studies remained. After an initial screening by title and abstract, 1,302 studies did not meet criteria. The full texts of the remaining 133 studies from nine countries were closely examined by the research team. Most of these studies were published in English. Seventeen full-text studies were available in Chinese and were translated by a native Chinese speaker and academic. A PRISMA flowchart (Moher et al., 2009) of all steps in the selection process is shown in Figure 1.

Although the terms *sand tray* and *sandtray* therapy were not used in the initial search, a number of studies with these terms in the title and/or abstract were repeatedly found in the search for *sandplay* studies. This was not surprising because studies with overlapping features of sandplay and client-centered sandtray are frequently cited in the literature for both methodologies. To ensure that relevant research was not omitted, we conducted a secondary search using the terms sandtray and sand tray therapy. This secondary search did not yield any additional studies that met our criteria.

Inclusion and Exclusion Criteria

The variable of interest in this meta-analysis was the effect of sandplay therapy with heterogeneous populations, assessed by emotional and behavioral outcome measures. Studies included participants with different ages, diagnoses, presenting problems, and other demographic characteristics, and were conducted in many different countries.

Figure 1
Flow Diagram of Search and Inclusion Procedure



Studies that met the following criteria were included in the meta-analysis[1]:

Conduct of the therapy session. (a) Therapy sessions were conducted using primarily a nondirective and noninterpretive stance by the therapist. (b) Each participant made their own picture in their own sand tray regardless of whether the therapy took place in an individual or group format.

Research methodology. The following research methods were included: (a) The study utilized a quantitative experimental or quasi-experimental research design which looked at treatment outcomes for sandplay (or sandtray) therapy. This excluded all qualitative studies (e.g., case studies, narrative or phenomenological studies, literature reviews, thematic, theoretical, or validity studies) and quantitative studies that measured other aspects of treatment than therapy outcome (e.g., studies that compared the sand pictures of abused to nonabused populations). (b) Each study utilized a treatment group and a comparison group, which was either a control group or a paired samples research design which compared the same participants pre- and posttreatment. (c) Outcome measures were standardized and had established validity and reliability. (d) The study reported adequate data to compute an effect size. (e) The study was adequately sized and complete such that each study had five or more participants, less than 10% attrition, and involved four or more treatment sessions.

Language. The study was available in English or in an accessible translation.

[1] Regardless of the term used in the title of the study (e.g., *sand tray, sandtray, or sandplay therapy*), if the study met inclusion criteria, it was retained. Five of the final 40 studies had the term sandtray or sand tray in the title.

Quality Ratings

Because of the enduring emphasis on study quality in meta-analyses (Lipsey & Wilson, 2001; Nathan & Gorman, 2015), the research team created a scoring system to rate each study's quality. Using the APA Division 12 quality criteria suggested for the evaluation of empirically supported treatments (APA Task Force on Evidence-Based Practice, 2006; Chambless & Hollon, 1998), the research team established five criteria for rating the quality of each study: (a) appropriate comparison or control groups; (b) random assignment of participants to experimental or control conditions; (c) clearly defined inclusion and exclusion criteria for study participants; (d) fidelity to inclusion criterion as defined; and (e) outcome measures with well-established reliability and validity. Other quality assessment criteria measures, including CONSORT (Schulz et al., 2010), Cochrane Risk of Bias Tool (Higgins et al., 2011), and Study DIAD (Cooper, 2017), suggested similar parameters and the addition of three more criteria to make sure the intervention was sufficiently described to allow replication: (f) little or no attrition; (g) clear and adequate reporting of study method; and (h) comprehensive reporting of data collected. The criterion of double blinding was not included because most of the studies did not state whether the researcher was blind to participation status when analyzing data, and, as with much of psychotherapy research, it was not possible to conceal treatment modality from participants. Quality ratings were performed by two senior researchers and two graduate students by consensus on each of these eight equally weighted indicators. A scale of 0 (*nonexistent*) to 3 (*excellent*) was utilized with justifications noted for each rating. An overall quality rating was computed for each study by averaging the eight scores. After quality ratings were performed, 18 studies were determined to be "very good" (with a score of 2.6–3.0), 22 studies were rated "acceptable" (with a score of 2.0–2.5), and three studies were judged "poor" (with a score of 0–1.9) and were eliminated from the meta-analysis.

Three other studies displayed effect sizes that would be considered highly unlikely in psychotherapy research. Upon further examination, these studies appeared to show a ceiling effect in that the treatment group scores were uniformly high rather than clustering into a normal distribution. In order to avoid concerns about inflation of the overall effect size, we conservatively excluded these three studies (with effect sizes $g = 3.42$, 3.46, and 4.51). A total of 40 studies remained and were included in the final meta-analysis.

Measures

Most studies used widely available outcome measures, and many included multiple outcome measures. The large number of measures reported were too diverse to be meaningfully compared individually. However, the measures did group somewhat naturally into three clusters: measures of internalizing symptoms, externalizing behavioral symptoms, and symptoms characteristic of attention deficit hyperactivity disorder. We termed these three clusters "domains of behavior" and categorized each measure as falling into one of these three domains. Internalizing measures included all those describing internally experienced emotional states and feelings (e.g., anxiety, depression, self-concept, somatic symptoms). Externalizing measures described behaviors that were externally directed from the subject to others, expressing some aspect of the subject's relation with others (e.g., social interactions, parent–child relationships, aggressive behavior, or defiance). The internalizing–externalizing distinction has a long history in psychological assessment and research (Achenbach, 1966; Achenbach et al., 2016) and has been empirically validated as two separate dimensions of behavior (Cicchetti & Toth, 1991). A third category was created from studies which used measures specifically designed to assess ADHD symptoms or diagnoses (e.g., hyperactivity, inattention, or impulsive behavior). Two types of measures did not clearly fit into the three domains: autism-specific scales and measures of saliva cortisol. These outcomes were included in the calculation of the overall effect size for each study, but were not included in the calculation of effect sizes for the three domains. Table 1 shows the measures from the studies included in this meta-analysis and their assigned domains.

Moderator Variables

Moderator variables were selected based on a review of meta-analytic studies of sandplay and related therapies, along with questions raised

Table 1
Characteristics of the 40 Studies Included in the Meta-Analysis

Study	Country of origin	Domain	Measure(s)	Effect size (*g*)	*N*	Sample characteristics	Design	Control group	Age	Session format	Number of sessions	Setting	Journal type
Chen and Chen (2018)	China	Int	PSQ-anxiety	1.24	24	ASD	RCT	TAU	Child	Ind	24	Clinic	Other
		Ext	PSQ-behavior	2.69									
		—	ATEC	2.53									
		A/H	PSQ-hyperactivity	2.56									
Chen (2015)	China	A/H	ADHD-RS	1.99	34	ADHD	RCT	NT	Child	Ind	12	Clinic	Other
		A/H	PSQ-hyperactivity	1.28									
Cui and Ye (2014)	China	—	ATEC; CARS	0.73	8	ASD	RCT	TAU	Child	Ind	21	School	Other
Flahive and Ray (2007)	USA	Int	BASC-internalizing	0.37	28	EB problems,	RCT	NT	Child	Ind	10	School	Other
		Ext	BASC-externalizing	0.48		disadvantaged							
Foo et al. (2017)	Indonesia	Int	HAM-A	2.23	22	GAD, women	RCT	NT	Adult	Ind	10	Clinic	SP
Freedle et al. (2015)	USA	Int	CAFAS Mood Scale	1.05	22	Substance abuse, trauma	PP	—	Youth	Ind	avg 9	IOP	SP
Freedle (2019b)	USA	Int	CROPS; RCMAS-2	1.10	12	Natural disaster, trauma	PP	—	Child	Grp	5	School	Unpub
Freedle et al. (2020)	USA	Int	OQ45	0.71	58	Wilderness treatment	Quasi	TAU	Youth	Ind	5–20	IP	SP
Han et al. (2017)	So. Korea	Ext	PSBS	0.06	12	Aggressive behavior	RCT	NT	Child	Ind	16	Pre-S	SP
Jang and Kim (2012)	So. Korea	Int	SIAS; UCLA-LS	0.76	11	Immigrant women	PP	—	Adult	Grp	10	Comm	Other
Keivani and Alhosseini (2018)	Iran	Int	CBCL-internalizing	0.27	24	EB problems,	RCT	NT	Child	Ind	10	School	Other
		Ext	CBCL-externalizing	0.90		kindergartners							
		A/H	CBCL-attention	0.53									
Kim and Kim (2015)	So. Korea	Int	SAS-A	1.55	32	Smart phone addiction	Quasi	NT	Youth	NR	10	School	SP
		Ext	IPPA-R	0.99									
		A/H	BIS-11	1.12									
Kim (2014)	So. Korea	Int	BDI; DS	2.59	10	Depressed mothers	RCT	NT	Adult	Ind	10	Clinic	SP
		Ext	MCRHS	1.69		of teens							
Kwak and Seo (2018)	So. Korea	Int	CDI	1.47	11	Depression	Quasi	NT	Child	Ind	10	Comm	SP
		Ext	BDHI/BPAQ	1.07		aggression							
Lee and Jang (2012)	So. Korea	Int	BDI; STAI-trait	1.48	8	Depression, anxiety in	PP	—	Youth	Ind	10	Univ	SP
		—	Saliva cortisol value	1.44		ADHD students							
Lee and Jang (2013)	So. Korea	Int	TMMS	1.29	20	Female offenders	Quasi	NT	Youth	Ind	10	IP	SP
Lee and Kowen (2016)	So. Korea	Int	K-ASR-anxiety	0.95	24	Mothers of disabled	RCT	NT	Adult	Ind	12	Clinic	SP
		Ext	K-DSQ	1.22		children							

(*table continues*)

Table 1 (*continued*)

Study	Country of origin	Domain	Measure(s)	Effect size (*g*)	*N*	Sample characteristics	Design	Control group	Age	Session format	Number of sessions	Setting	Journal type
Lee et al. (2018)	So. Korea	Int	CBCL-internalizing	1.31	24	Ethnic discrimination	RCT	NT	Child	Grp	8	Comm	SP
		Ext	CBCL-externalizing	0.77									
Maeng and Jang (2014)	So. Korea	Int	ASB; HPCSC	1.26	22	Blind students	RCT	NR	Youth	Ind	10	Univ	SP
		Ext	Sociality Scale	0.73									
Mejia (2005)	USA	Int	OQ45; RAS	0.38	40	Women migrant workers	Quasi	NT	Adult	Ind	6	Comm	Unpub
Nasab and Alipour (2015)	Iran	Int	CSI-4	1.73	30	Separation anxiety	Quasi	NT	Child	Ind	10	Clinic	Other
No and Kim (2013)	So. Korea	Int	STAI-trait	1.42	8	Anxiety, distress in ADHD students	PP	—	Youth	Ind	10	Univ	SP
		Ext	ISC	0.73									
		—	Saliva cortisol value	1.65									
Park and Lee (2013)	So. Korea	Int	ABS, KDS-30, PWBS	0.98	24	Blind students	RCT	NR	Youth	Ind	10	Univ	SP
Plotkin (2011)	USA	Int	CBCL-internalizing	0.17	32	Children of divorce	RCT	NT	Child	Ind	8	Comm	Unpub
		Ext	CBCL-externalizing	0.75									
Ramos and da Matta (2018)	Brazil	Int	CBCL-internalizing	1.48	40	Foster care, shelter care	Quasi	NT	Child	Ind	20	IP	Other
		Ext	CBCL-externalizing	1.04									
Ramos & da Matta, 2019a	Brazil	Int	CBCL-internalizing	0.19	16	Abused, neglected	RCT	NT	Child	Ind	20	Clinic	Unpub
		Ext	CBCL-externalizing	0.63									
Ramos & da Matta, 2019b	Brazil	Int	YSR Internalizing	0.89	9	Abused, neglected	RCT	NT	Youth	Ind	20	Clinic	Unpub
		Ext	YSR-externalizing	0.79									
Roubenzadeh et al. (2012)	Iran	Int	GEQ-34	1.09	20	Grieving adolescents	RCT	NT	Youth	Grp	12	Comm	Other
Rousseau et al. (2009)	Canada	Int	SDQ P and T-emo	0.41	105	Multiethnic preschoolers	RCT	NT	Child	Grp	10	Pre-S	Other
		Ext	SDQ P and T-behav	0.13									
		A/H	SDQ P and T-hyper	0.17									
Shen and Armstrong (2008)	USA	Int	SPPC-self worth	1.08	37	Girls, low self-esteem	Quasi	NT	Child	Grp	9	School	Other
		Ext	SPPC-conduct, social	1.05									
Shin and Jang (2016)	So. Korea	Int	BAI; CES-D; YSAS	0.74	32	Smart phone addiction	Quasi	NT	Youth	NR	10	School	SP
Song et al. (2016)	China	Int	SWLS	2.38	60	Hospitalized with depression and anxiety	RCT	TAU	Adult	Ind	12	IP	Other
		Ext	SDSS	3.00									
von Gontard et al. (2010)	Germany	Int	CBCL-internalizing	0.64	32	Mental health diagnosis	PP	—	Child	Ind	avg 16	Clinic	SP
		Ext	CBCL-externalizing	0.39									

(*table continues*)

Table 1 (*continued*)

Study	Country of origin	Domain	Measure(s)	Effect size (*g*)	*N*	Sample characteristics	Design	Control group	Age	Session format	Number of sessions	Setting	Journal type
Wang and Zhang (2015)	China	Int	PSQ-anx; SAS; SDS	1.94	150	Cerebral palsy	RCT	TAU	Child	Ind	36	Clinic	Other
		Ext	PSQ-behavior	3.38									
		A/H	PSQ-hyperactivity	2.39									
Wang et al. (2010)	China	A/H	ADHRS-IV; PSQ-hyper	1.54	30	ADHD	RCT	NT	Child	Ind	12	School	Other
Wang et al. (2017)	China	Int	Kern's Security Scale	0.57	32	ADHD	RCT	NT	Child	Ind	12	School	Other
		A/H	SNAP-IV	1.66									
Yahaya et al. (2018)	Malaysia	Int	CSEI	1.69	32	Low self-esteem	RCT	NT	Youth	Ind	4	School	Other
Yang et al. (2015)	China	Int	PSQ-anxiety	0.57	70	ADHD	RCT	NT	Child	Ind	20	Clinic	Other
		A/H	PSQ-hyperactivity	1.27									
Yang (2014)	So. Korea	Int	SEI; EIS; TRF-ext	1.56	30	Children raised by grandparents	RCT	NT	Child	Ind	12	School	SP
		Ext	TRF-int	0.86									
Zhao et al. (2017)	China	Int	PSQ-anxiety	0.14	28	ADHD	RCT	TAU	Child	Ind	12	Pre-S	Other
		Ext	PSQ-behavior	0.46									
		A/H	PSQ-ADHD	1.77									

Note. Int = internalizing behavior; Ext = externalizing behavior; A/H = attention and hyperactivity characteristic of ADHD. ADHD-RS = Attention Deficit Hyperactivity Disorder Rating Scale; ASB = Anxiety Scale for the Blind; ATEC = Autism Treatment Evaluation Checklist; BAI = Beck Anxiety Inventory; BASC = behavior assessment system for children; BDHI = Boss Durkee Hostility Inventory; BDI = Beck Depression Inventory; BIS-11 = Barratt Impulsiveness Scale; BPAQ = Buss-Perry Aggression Questionnaire; CAFAS = Child and Adolescent Functional Assessment Scale; CARS = Childhood Autism Rating Scale; CBCL = Child Behavior Checklist; CDI = Children's Depression Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; CSEI = Coopersmith Self-Esteem Inventory; CROPS = child report of posttraumatic symptoms; CSI-4 = Child Symptom Inventory; DS = differentiation of self; EIS = Emotional Intelligence Scale; GEQ-34 = Grief Experience Questionnaire; HAM-A = Hamilton Anxiety Rating Scale; HPCSC = Harter's Perceived Competence Scale for Children; IPPA-R = inventory of parent and peer attachment; ISC-Interpersonal Stress Scale; K-ASR = anxiety-Korean adult self-report; K-DSQ = Korean Defense Style Questionnaire; KSD-30 = Korean Depression Scale; MCRHS = Mother–Child Relationship Harmony Scales; OQ45 = Outcome Questionnaire; PSBS = Preschool Social Behavior Scale-Teacher Form; PSQ = Perceived Stress Questionnaire; PWBS = Psychological Well-Being Scale; RAS = Resiliency Attitudes Scale; RCMAS-2 = Revised Children's Manifest Anxiety Scale; SAS = Social Anxiety Scale; SEI = Self-Esteem Inventory; SDS = Self-Rated Depression Scale; SDSS = aocial disability screening schedule; SDQ = Strengths and Difficulties Questionnaire; SIAS = Social Interaction Anxiety Scale; SNAP-IV = Swanson, Nolan, and Pelham Rating Scale; SPPC = self-perception profile for children; SWLS = Satisfaction With Life Scale; STAI = State Trait Anxiety Inventory; TMMS = Trait Meta-Mood Scale; TRF = teacher's report form; UCLA-LS = UCLA Loneliness Scale; YSAS = Youth Smartphone Addiction Self-Report Scale; YSR = youth self-report. ASD = autism spectrum disorder; EB = emotional–behavioral problems; GAD = generalized anxiety disorder. PP = pre- and posttreatment only; RCT = randomized controlled trial; Quasi = quasi-experimental with nonrandomized control group. TAU = treatment as usual; NT = no treatment; NR = not reported. Ind = Sandplay conducted individually; Grp = Sandplay conducted in a group setting (with each individual working in their own sand tray); NR = not reported. IOP = intensive outpatient program; IP = inpatient and residential programs; Pre-S = preschool; Comm = community; Univ = university. SP = sandplay journal; Unpub = unpublished; Other = academic or journals of general interest.

upon review of the literature. The moderator variables were study design, type of control or comparison group, variables of the treatment itself (age, treatment format, and number of sessions), and context (setting of treatment and journal type in which the study was published). The moderator variables are listed in Table 1.

Because of sandplay's positive results with people impacted by trauma (Freedle et al., 2020; Roesler, 2019; Rousseau et al., 2009), the research team considered identifying "trauma" as a moderator variable. However, although the presence of trauma was indicated in many of the studies' participants, there was not sufficient reporting of the differential results of sandplay for individuals experiencing trauma to include it as a moderator variable.

Coding

Of the 47 studies that met initial inclusion criteria, statistical and descriptive data were extracted by two senior researchers and two graduate student research assistants, who cross-checked one another for accuracy of data extraction. The data were evaluated a third time for accuracy during the quality review process. The research team, by consensus, decided on the coding of domains of behavior and moderator variables. When the data were ambiguous, clarification was obtained through direct communication with the author when possible. One senior researcher entered the coded data into a software program for analysis. A second senior researcher then cross-checked these data and the subsequent analyses for accuracy.

Meta-Analysis Procedure

Coded data were entered into the Comprehensive Meta-Analysis Version 3 software (CMA-V3: Borenstein et al., 2013). The CMA is a computational tool commonly used in conducting meta-analyses. Hedges' g was utilized as the measure of effect size. Hedges' g is derived from Cohen's d but incorporates a correction factor (J) that reduces bias in the d statistic in studies with small sample sizes (Borenstein et al., 2009). The equations used for these calculations were those built into the CMA-V3 statistical package. Both the g and the d statistics indicate the magnitude of the difference between two means in standard deviation units. Hence, a value of $g = 1.00$ means that one standard deviation separates the means of the two groups being compared.

All results were coded such that a positive effect size indicated a better outcome for sandplay therapy as compared to the control group. In most cases, data were entered in the form of means and standard deviations for pre- and posttreatment and control groups. If means and standard deviations were not available in the article, effect sizes were calculated from statistical test results. Studies that only reported pre- and posttreatment data and studies that only involved posttreatment comparisons were also included. As pre–post correlation coefficients were not available from the data, these were imputed as .70 because pre- and posttest scores are usually highly correlated. A random effects model was assumed for all analyses because the studies were heterogeneous in terms of samples studied and measures used. Ninety-five percent confidence intervals (CI) are reported for all effect sizes. Analysis of homogeneity was reported using the Q and I^2 statistics. Comparisons of moderator variables were calculated using a mixed model, assuming random effects across studies and fixed effects when comparing levels of moderator variables. The Q_{between} statistic was used to evaluate statistical significance for these comparisons (Borenstein et al., 2009).

Results

A summary of the data from each of the 40 studies included in the meta-analysis is provided in Table 1. Most studies included multiple outcome measures that assessed different kinds of symptoms and behaviors. The individual measures are listed by the name of the scale or test, followed by that measure's behavioral domain. Effect sizes are shown for each domain in each study. When a study utilized several individual measures to assess a particular domain, the overall effect size for the domain is given. Table 1 also lists the total sample size of each study and provides a brief description of the characteristics of the sample. This description varies based on the information given in the article. In some cases, specific diagnostic criteria were reported, in others a more general description of the participants was provided. Finally, Table 1 shows the coding of the various moderator variables included in the analysis.

This study utilized three different analyses: (a) A primary meta-analysis was performed to generate a single effect size (Hedges' g) for all

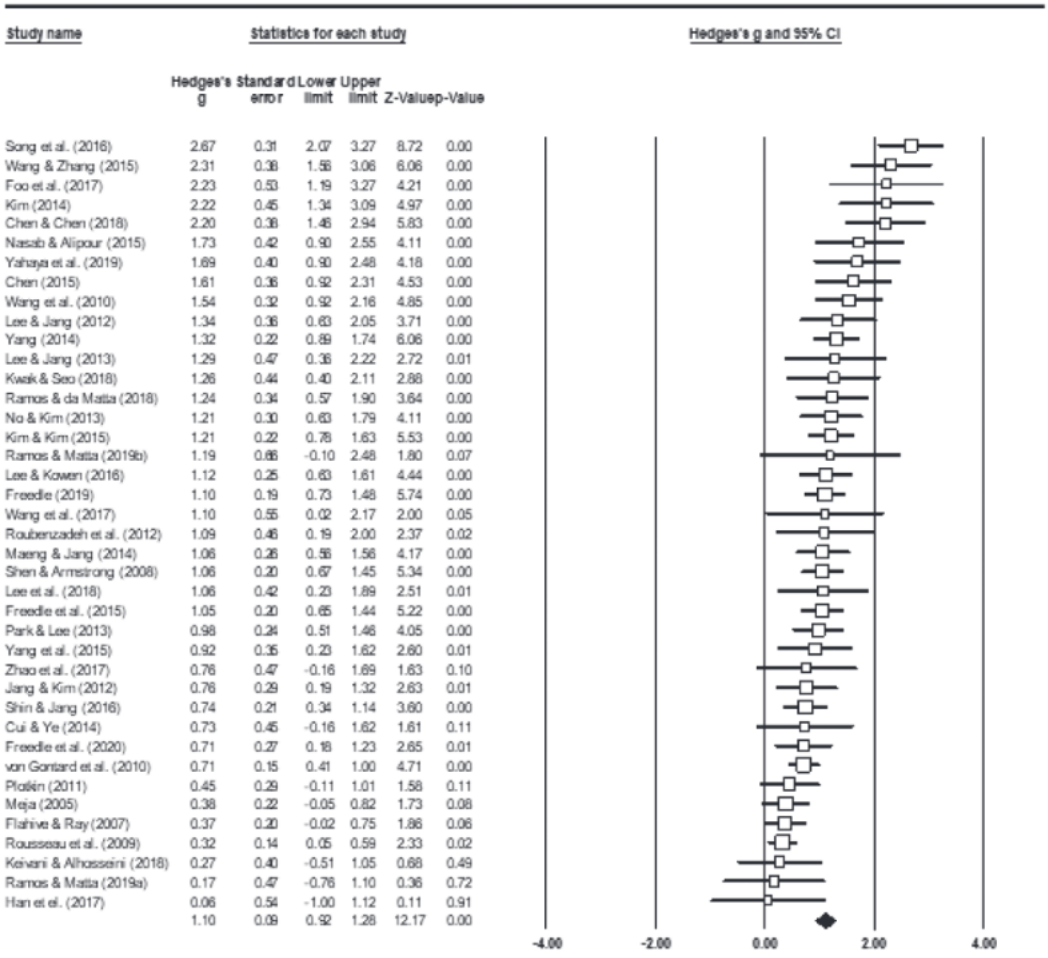
40 studies. (b) Separate meta-analyses were performed on the measures of internalizing, externalizing, and ADHD symptoms. (c) Separate meta-analyses were performed on the various levels of each of the moderator variables.

Primary Analysis

In order to examine the overall impact of sandplay therapy, a meta-analysis was conducted using a random effects model, where each of the 40 studies contributed a single effect size weighted by the sample size of the study. In this analysis, all measures reported in each individual study were combined into a single effect size for that study, so that each study contributed one value for the calculation of the overall effect size. The results are shown in Figure 2 in the form of a forest plot. Each effect size is reported with a 95% confidence interval. All studies showed a positive value of Hedges' *g*, and for all except the smallest, the confidence intervals did not cross a

Figure 2

Forest Plot Showing the Overall Effect Size (Hedges' g) and the Effect Sizes for Each Study Included in the Meta-Analysis



Note. Positive effect sizes favor sandplay over the comparison group.

value of zero, indicating that virtually all of the studies included in the meta-analysis showed statistically significant improvement for participants who received sandplay therapy.

The overall effect size for this analysis was $g = 1.10$ [CI .92–1.28]. This is a large effect size according to the widely accepted criteria proposed by Cohen (1988), and provides strong support for the efficacy of sandplay interventions. The overall meta-analysis showed statistically significant heterogeneity across studies, $Q(39) = 145.5$, $p < .001$, with approximately three fourths of the variance between the studies due to the studies themselves, not sampling error ($I^2 = 73.20$). These results support further analysis of subsets of measures (domains) and moderator variables.

Analysis of Domains of Behavior

Outcome measures utilized in the studies included in the meta-analysis were categorized into three domains: internalizing behaviors, externalizing behaviors, and attentional/hyperactivity concerns. For this analysis, individual studies were included in each of the domains for which they reported an outcome measure. This means that if, for example, a given study included measures of both internalizing and of externalizing behavior, the study was used in the calculation of both effect sizes. The results of this analysis are shown in Table 2. With values of approximately $g = 1.0$, the effect sizes for internalizing and externalizing behaviors were virtually identical both to each other and to the overall effect size for individual studies reported previously. The effect size for attentional concerns was somewhat higher, but the homogeneity test failed to show a significant difference between the three domains, $Q(2) = .999$, $p = .607$. This result is consistent with the high degree of overlap of the confidence intervals (Cumming & Finch, 2005). These data suggest that the effectiveness of sandplay therapy is consistently high across these three different domains of functioning.

Analysis of Moderator Variables

Individual meta-analyses were conducted on the seven moderator variables listed in Table 1. The analysis of moderator variables did not consider the various domains assessed in the previous analysis. Rather, each study contributed a single effect size based on the weighted composite of all measures used in that study for the various levels of each moderator variable. The results of these analyses are shown in Table 3. The analysis of moderator variables involved multiple comparisons, the analysis was exploratory in nature, and some subgroups compared involved only a small number of studies. Given these concerns, caution should be made about the interpretation of statistically significant findings given the elevated risk of Type I errors.

In a comparison of different research designs, studies were classified as either RCT, quasi-experimental, or pre–post only designs. The effect sizes for these designs were very similar to the overall effect size for the entire study reported earlier, with considerable overlap in the confidence intervals of all three designs. These data suggest that the type of research design did not differentially impact outcome. An analysis comparing studies with control groups, which did not receive treatment with those utilizing a treatment as usual (TAU) control, was not statistically significant.

In a comparison of different ages, the effect sizes for children and youth were virtually identical. Although the effect size for the small number of studies with adult participants appeared to be larger, these differences were not statistically significant. Sandplay format and number of sessions were also examined. Participants who

Table 2
Effect Sizes for Three Domains of Measurement

Measure	Number of studies	Hedges' *g*	Standard error	95% Confidence Interval	
				Lower Limit	Upper Limit
Internalizing	35	1.02	0.09	0.83	1.20
Externalizing	22	1.07	0.19	0.69	1.44
Attention-Deficit/Hyperactivity symptoms	11	1.31	0.29	0.76	1.87

Table 3
Analysis of Moderator Variables

Moderator variable	*N* of studies	Hedges' *g*	Standard error	95% Confidence Interval		Homogeneity statistic ($Q_{between}$)
				Lower Limit	Upper Limit	
Sandplay format						$Qb(1) = 4.87, p = .027$
Individual	31	1.20	0.11	0.97	1.41	
Group	7	0.77	0.16	0.46	1.08	
Age						$Qb(2) = 1.50\ p = .465$
Child (3–12 years)	22	1.01	0.12	0.76	1.25	
Youth (13–24 years)	12	1.05	0.08	0.89	1.21	
Adult (25 and older)	6	1.52	0.39	0.74	2.29	
Number of sessions						$Qb(2) = 2.32, p = .313$
4–9	8	0.90	0.13	0.65	1.16	
10–19	25	1.13	0.12	0.89	1.36	
20 or more	7	1.28	0.30	0.70	1.86	
Setting						$Qb(2) = 3.36, p = .186$
School (grade pre–12)	14	0.89	0.13	0.63	1.47	
Clinic/Community/Univ	22	1.17	0.12	0.94	1.40	
Inpatient/Residential	4	1.48	0.47	0.55	2.41	
Publication venue						$Qb(2) = 4.91, p = .086$
Sandplay journal	17	1.08	0.09	0.90	1.26	
Other journal	18	1.23	0.18	0.88	1.59	
Unpublished	5	0.65	0.21	0.24	1.05	
Study design						$Qb(2) = 1.47, p = .480$
Randomized Controlled Trial	25	1.17	0.149	.878	1.46	
Quasi-experimental	9	0.980	0.129	.728	1.23	
Pre–post assessment	6	0.960	0.100	.767	1.15	
Control group						$Qb(1) = 1.91, p = .167$
No. treatment	28	1.01	.101	.816	1.21	
Treatment as usual	6	1.58	.098	.856	1.24	

participated in sandplay in a group setting showed a smaller effect size than participants who participated as individuals. This difference was statistically significant, suggesting that sandplay may be more effective when conducted in an individual format. There was some evidence that participants who received 10 or more sessions showed greater improvement than those who only received four to nine sessions, although this finding did not reach statistical significance.

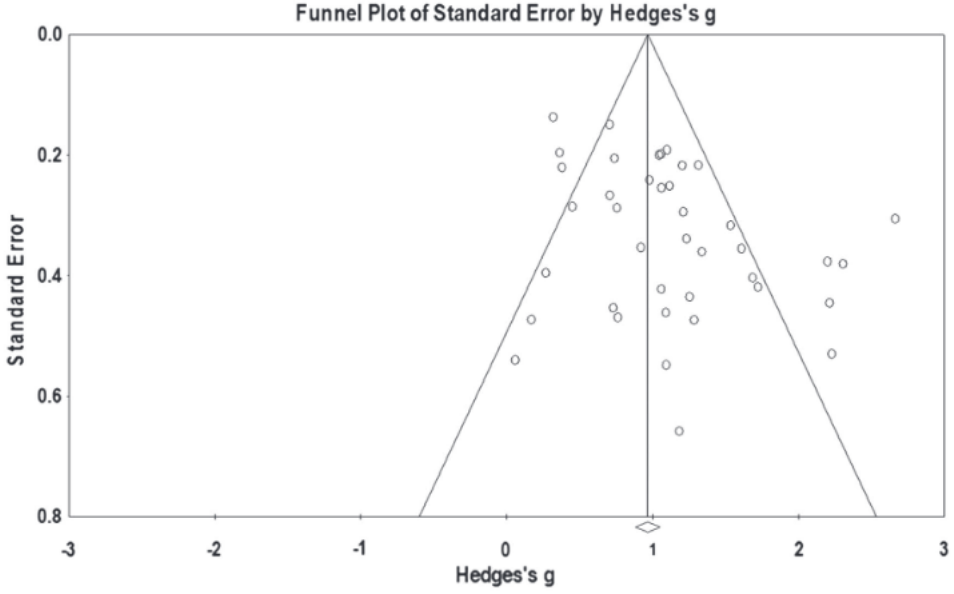
The setting in which the intervention was conducted and the journal in which the study was published were also examined. Although the small number of studies conducted in an inpatient setting showed a larger effect size than educational or clinical settings, this difference was not statistically significant. There was little difference in the effect size for studies published in journals devoted to sandplay and other journals. However, the small number of unpublished studies appeared to have a smaller effect size than the published studies. This difference approached statistical significance and is consistent with the common assumption that studies with smaller effect sizes are less likely to be published.

Publication Bias

The classic fail-safe *N* (Borenstein et al., 2009) was calculated as 5,276, which indicates the number of studies with zero effect size that would need to be added to the present study to render its overall effect size nonsignificant. A funnel plot was also used to examine the data for the possibility of publication bias due to the possibility that studies with low sample sizes and nonsignificant results are less likely to be accepted for publication and hence were not found in the search process (Sterne et al., 2011). The funnel plot was created using the trim and fill procedure and did not impute additional data points to correct for publication bias. The results of this analysis are shown in Figure 3. Although

Figure 3

Funnel Plot Showing the Relationship Between Hedges' g for Each Study and the Standard Error



displaying considerable heterogeneity, the effect sizes in the funnel plot were considered to be symmetrical and did not suggest the presence of publication bias.

Discussion

The overall results of this study show a large composite effect size of $g = 1.10$, favoring sandplay therapy treatment over controls. These results are consistent with the meta-analysis of South Korean sandplay therapy studies (Lee & Jang, 2015) that found a composite effect size of Hedges' $g = 1.089$. The robust effect size of sandplay therapy was similar to the effect sizes found in meta-analyses of other psychodynamic therapies (Abbass et al., 2013, 2014; Driessen et al., 2010; Shedler, 2010), and slightly larger than the effect sizes of therapies with other shared elements with sandplay, such as mindfulness-based therapies (Khoury et al., 2013) and child-centered play therapy alone (Lin & Bratton, 2015; Ray et al., 2015).

One of the most important findings of this study was that sandplay therapy was equally effective across the domains of internalizing behaviors, externalizing behaviors, and the behavioral symptoms of attention deficit hyperactivity disorder. Prior research suggests that, in general, psychotherapy may be more effective with internalizing disorders than with externalizing disorders (Eckshtain et al., 2020). Some meta-analytic studies of cognitive behavioral therapy also report large effect sizes for internalizing measures of affect (Butler et al., 2006; Cuijpers et al., 2007) with smaller, moderate effect sizes for externalizing symptoms (Butler et al., 2006; Öst, 2008).

The consistent effectiveness of sandplay therapy across domains in the present analysis might lie in its multisensory, symbolic, less verbal, and actively experiential approach. There are several advantages that sandplay may have over traditional talk therapy to effectively treat more diverse populations. Sandplay appears to lower the threshold for the initiation of psychotherapy and provides people that have barriers to verbal expression with a safe, direct, and contained means to access and work through difficulties (Freedle et al., 2020; Kalff, 2020; Roesler, 2019).

This study showed a significant difference between treatment formats, favoring individual over group. Although both formats evidenced large effect sizes, the benefits of sandplay conducted when one client receives the full attention of one therapist exceeded the results shown when sandplay is conducted in a group setting. These results are consistent with meta-analytic studies in sandplay and psychodynamic therapies

(Driessen et al., 2010; Lee & Jang, 2015) and reinforce the significance of the therapeutic relationship in sandplay therapy practice (Kalff, 2020).

The remaining moderator variables showed no statistically significant differences. Although sandplay is often associated with study children, differences between age groups were not statistically significant. Moreover, there was not a significant difference in findings across settings or research designs, and results were equivalent whether published in a sandplay journal or a publication of more general or academic interest that might be more critical of the findings.

Consistent with other reviews of sandplay therapy (Lee & Jang, 2015; Roesler, 2019), the present study found clinical improvement in fewer than 10 treatment sessions. The effect size continued to increase with the number of sessions, although without reaching statistical significance. The measures represented in this meta-analysis focused primarily on symptoms and did not address deeper meaning and life-purpose goals. It is a key assumption of sandplay therapy that further sessions invite increased access to the unconscious, thereby stimulating the individuation process as defined by C. G. Jung (Bradway & McCoard, 1997; Kalff, 2020; Weinrib, 2004). With additional measures that better capture the depth of the human experience, further understanding of what occurs in the sandplay therapy process beyond symptom management might be possible.

It is also noteworthy that the six studies that measured the additive value of sandplay therapy using "treatment-as-usual" as the control condition were not significantly different from the studies that used a "no treatment" control group. This suggests that sandplay may be effective as either a primary or supplemental treatment.

Limitations and Suggestions for Further Research

Most of the limitations in this study were due to the heterogeneity of the effect sizes. This is likely due to factors such as the wide range of target populations, the international nature of the investigation, and the diverse research methodologies and outcome measures utilized in the studies. Additionally, there may have been translation issues related to different research assumptions and methodologies across cultures. Finally, some of the studies in this meta-analysis did not describe procedures or targeted populations thoroughly. Therefore, we suggest some restraint in generalizing the findings of this study.

Despite these limitations, the strength of this study lies in its initial efforts to provide an overview of the quantitative evidence base for sandplay therapy. Future research might focus on particular populations or diagnoses and include more homogeneous and clearly defined research methods and research questions. It would also be important to see whether sandplay therapy's effects are maintained or continue to increase beyond termination of treatment. The quality of future research might also be improved by more comprehensive reporting of the study's method with special attention to the quality of the study, using quality assessments similar to the one developed for this study, along with a description of random assignment of participants to experimental and control groups and whether single or double blinding criteria were used.

This meta-analysis did not study the cognitive dimensions of treatment outcomes. Several studies assessed in the process of this meta-analysis indicated that research subjects also demonstrated improvements in cognition, academic achievement, and/or brain functioning after sandplay therapy treatment (Foo et al., 2020; Foo & Pratiwi, 2021; Lee & Jang, 2013; Lee et al., 2018; Lee & Jang, 2015; Unnsteinsdóttir, 2012). Cognitive and related dimensions might be addressed in further research.

The prevalence of trauma among subjects in the studies reviewed was also notable. It has been reported that sandplay was most effective with severely distressed and traumatized clients (Freedle et al., 2020; Rousseau et al., 2009). However, most of the studies included in the meta-analysis did not specify how many of the participants experienced symptoms of trauma and/or did not report the effects of trauma by subgroup. Consequently, we were unable to include trauma history as a moderator variable in the current analysis. We recommend that further research examine the unique and possibly heightened effects of sandplay therapy in the treatment of trauma.

Another open question is that of the relative effectiveness of sandplay therapy administered as a group project. This meta-analysis included only in which each subject worked in their own sandtray. With the growing popularity of sandplay

therapy, group formats have evolved with several participants in a team effort making one sandplay production in one sandtray (Wang et al., 2017). These evolving treatment formats deserve investigation, as do emerging sandplay practices with couples and with families. Finally, in order to capture the depth of the sandplay method, to expand its theoretical base, and to inform future research, we recommend continued qualitative inquiry, including exploration of the lived experiences of clients who engage in sandplay therapy.

Conclusion

As the first meta-analysis of its kind, this international study provides a foundational survey of the status of quantitative research in sandplay therapy. This meta-analysis included 40 studies from eight countries representing 1,284 participants, demonstrating uniformly positive findings for sandplay treatment with many different populations and across diverse practice settings. The strong positive findings of this study contribute to the already rich body of qualitative and quantitative research on sandplay, further establishing sandplay therapy as an evidence-based treatment.

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