

Solution-focused brief therapy for behavior problems in children and adolescents: A meta-analysis of treatment effectiveness and family involvement

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ABSTRACT

Objective: Research evidence and clinical observation support the importance of family involvement in the treatment of childhood behavior problems, and strengths-based, solution-oriented treatment offers an alternative to a problem-focused treatment approach. The current study provides a systematic review of solution-focused brief therapy (SFBT) for behavior problems in children and adolescents, and conducts meta-analyses regarding the effectiveness of SFBT compared to control conditions, the moderating role of family involvement in SFBT, and the effects of SFBT for internalizing versus externalizing behaviors.

Methods: SFBT studies from January 1, 1990 to February 21, 2019 were retrieved from major databases and included published and unpublished studies and dissertations. Twenty studies with control or comparison groups (9 randomized, 11 non-randomized) met all inclusion criteria and were analyzed using robust variance estimation (RVE).

Results: The RVE meta-analysis found a small to medium positive effect size favoring SFBT over control conditions for child behavioral problems ($g = 0.43$, 95% CI [0.20, 0.67], $p = .001$). The study did not find evidence of a moderating effect from family involvement in SFBT interventions, and there was no statistically significant difference between the effect sizes of family-involved SFBT ($g = 0.37$, 95% CI [-0.46, 1.21]) and family non-involved SFBT ($g = 0.61$, 95% CI [-0.30, 1.52]) for child behavior problems. For externalizing behaviors, SFBT showed greater effectiveness than comparison groups with a small to medium effect size ($g = 0.43$, 95% CI [0.18, 0.68]), but the small effect size favoring SFBT for internalizing problems was not significant ($g = 0.18$, 95% CI [-0.01, 0.38]).

Conclusions: The evidence supports the overall effectiveness of SFBT for addressing behavior problems in children and adolescents, with evidence of greater effectiveness for externalizing rather than internalizing behaviors. Findings indicated no significant effect of including a family-involvement component in solution-focused interventions for child behavior problems, suggesting the need for further research on moderating factors that may enhance the effectiveness of SFBT with children and families.

Behavior problems in children and adolescents lead to significant consequences for individuals, families, and society as a whole (Rivenbark et al., 2018; Vaughn et al., 2015). Behavior problems include both externalizing behaviors (such as aggression, hostility, and disruptive conduct) and internalizing behaviors (such as anxiety, low self-esteem, and self-harm), which represent distinct constellations of problems (Achenbach et al., 2016). Among externalizing behaviors, conduct disorder and attention-deficit/hyperactivity disorder (ADHD)

represent global phenomena, with regional prevalence rates for both disorders around 3–5% for boys and 1–2% for girls (Erskine et al., 2013). The long-term consequences of externalizing behaviors can be significant; conduct problems continuing past adolescence are associated with high rates of criminal justice involvement and social service utilization (Rivenbark et al., 2018). Among internalizing problems, self-directed distress can result in deliberate acts of self-harm including cutting or burning (Gratz, 2001) and can even lead to suicide (Mars et al., 2014).

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Though varying widely among different countries, the prevalence of adolescent self-harm commonly exceeds 15% (Muehlenkamp et al., 2012), and adolescent self-harm is associated with future substance use problems and suicide risk (Hawton et al., 2015; Moran et al., 2015). Over the last twenty years, the use of medications for childhood behavior problems has increased significantly (Comer et al., 2010) despite significant concerns regarding impacts on brain development, long-term health effects, and ethical considerations (Drury & Gleason, 2012; Jerrell et al., 2011). To address behavior problems and reduce overmedication of vulnerable youth, effective therapeutic interventions are needed for children and their families.

1. Solution-focused brief therapy

Solution-focused brief therapy (SFBT) is a flexible intervention that focuses on the construction of solutions rather than assessing and solving problems (de Shazer et al., 1986). Based in social constructivism, systems theory, the strengths-perspective, and the power of language, SFBT uses a variety of specific strategies to build small, positive changes that then reverberate through the client's system to become amplified into larger and lasting change (De Jong & Berg, 2013; Walsh, 2010). Techniques such as the miracle question, exploring past successes and exceptions, and compliments all reflect the strengths-based and goal-oriented approach of SFBT, which may reduce client "resistance" and enhance motivation when working on sensitive issues such as children's behavior problems (De Jong & Berg, 2013). Due to its flexibility, SFBT has been incorporated into individual, group, couples, and family therapy (Bond et al., 2013; Kim, 2008).

Previous systematic reviews have shown generally promising results for the overall effectiveness of SFBT, though the methodological quality of studies and paucity of randomized controlled trials (RCTs) have limited the strength of the evidence (Bond et al., 2013; Kim, 2008). Kim (2008) reviewed 22 SFBT studies and found small but positive treatment effects that were statistically significant for internalizing behaviors but not for externalizing behaviors or family and relationship problems. A later study focusing on SFBT in school settings identified six controlled studies and found evidence suggesting that SFBT had positive effects on behavior problems comparable to or better than usual treatments (Kim & Franklin, 2009). SFBT with children and families has shown initial evidence of effectiveness—particularly for internalizing and externalizing child behavior problems—though the quality of studies has varied widely (Bond et al., 2013). SFBT studies regarding child behavior problems fit the broader school social work literature suggesting that treatments are generally more effective with internalizing rather than externalizing behaviors (Franklin et al., 2009).

1.1. Moderating effects of family involvement

The growing body of SFBT research allows further investigation of moderating factors that may influence the effectiveness of SFBT for childhood behavior problems. The general literature on child behavior problems suggests that moderating factors have an impact on treatment effectiveness, including the child's age (McCart et al., 2006), family economic status (Lundahl et al., 2006), and the method of intervention (Maughan et al., 2005). In particular, family involvement in a child's mental health treatment is associated with overall improvement in functioning (Richards et al., 2008). Family involvement is often considered a factor that the family contributes to the treatment process, but research suggests that the level of family involvement is related to the quality of the service system providing treatment (Mayberry & Heflinger, 2012). From the perspectives of clinicians, parents' unwillingness to participate and lack of support from the treatment system pose barriers to family-focused outpatient mental health treatment (Baker-Ericzén et al., 2013). In contrast, parent perspectives reveal the role of dissatisfaction with mental health systems and treatment, as well as the feeling that clinicians blame them or ignore their opinions (Baker-

Ericzén et al., 2013). Thus, the evidence indicates both the importance of family involvement, and the potential for the treatment providers to influence family involvement. Numerous approaches have explicitly incorporated parents and families in the treatment process for childhood behavior problems, including behavioral parent training (Maughan et al., 2005), multiple family groups (Gopalan et al., 2015), and integrative family and systems treatment (I-FAST; Fraser et al., 2014). Notably, the strengths-based techniques of SFBT offer an approach to engaging families that would likely counteract the barriers associated with parents feeling blamed or ignored. Based on the overall value of family involvement and the unique benefits of SFBT for engaging parents, the intentional use of family involvement may have moderating effects on the impact of SFBT for child behavior problems.

2. Objective

Despite the increasing number of intervention studies on the effectiveness of SFBT, there are few systematic reviews that have applied meta-analytic techniques to synthesize the effectiveness literature for specific problem areas (see Kim, 2008). Additionally, there are still gaps in the literature regarding the particular aspects of SFBT that have the greatest influence on treatment effect. A systematic review of SFBT process research identified numerous positive themes related to the strengths- and future-orientation of SFBT, as well as the linguistic techniques used for the co-construction of meaning (Franklin et al., 2017). However, systematic reviews of quantitative outcome studies have had limited ability to investigate moderating factors due to the lack of high quality studies in a defined topic area (Bond et al., 2013; Kim & Franklin, 2009). A previous systematic review of SFBT with children and families examined the effectiveness of SFBT by problem area and found the strongest evidence of effectiveness for internalizing and externalizing behavior problems in children (Bond et al., 2013). No known systematic review to date has specifically investigated the moderating effects of intentional family involvement in the effectiveness of SFBT for childhood behavior problems. The purpose of the current study was to (1) systematically review all outcome studies with a control or comparison group regarding the effectiveness of SFBT for child behavior problems, (2) investigate the moderating role of intentional family involvement on treatment effectiveness, and (3) assess the evidence of treatment effectiveness of SFBT for both internalizing and externalizing sub-types of behavior problems.

3. Method

This is a systematic review that adopts meta-analytic techniques to examine the effectiveness of SFBT for child behavior problems and the moderating role of family involvement on treatment effectiveness. The following selection criteria were adopted for this systematic review:

3.1. Research design

The inclusion criteria of this systematic review were: (1) randomized or non-randomized controlled studies that employed experimental or quasi-experimental designs comparing SFBT to other treatments or no-treatment control groups; (2) studies that collected pretest-posttest outcome data on children's behavior; (3) studies that provided pretest and posttest information about sample size, means, and standard deviations; and (4) studies that included at least one objective measure related to child behavioral problems—internalizing behaviors, externalizing behaviors, and/or a total behavior problem score.

This systematic review included both randomized and non-randomized controlled studies because even though randomized controlled trials (RCTs) are considered the gold standard for testing intervention effectiveness, ethical and practical considerations can limit their use in generalizable, real-world practice settings (Cumming, 2014; Littell et al., 2008; Seligman, 1995). As a result, RCTs represent a small

minority of SFBT outcome studies, with the majority of studies employing quasi-experimental or single group pretest-posttest designs. An increasing body of meta-analysis research has embraced data from non-randomized studies, though it is important for reviews to clearly specify the types of non-randomized studies included to help account for confounding factors (Faber et al., 2016). In particular, single-group pre-post studies have a high risk of biased estimates related to the natural change process for behavior problems (Hoyt & Del Re, 2018), and within-group effect sizes should be avoided in meta-analysis due to concerns of systematic bias and missing data on pre-post correlation in many studies that is needed to correctly calculate these effect sizes (Cuijpers et al., 2017). As a result, this review excluded studies with a single-group pre-test and post-test design, and included only controlled studies with experimental and quasi-experimental designs that reported pre-post data for SFBT and comparison conditions or no-treatment control groups. Non-randomized controlled studies that include pretest scores for both groups can help account for pretest differences in the absence of randomization, and lessens the risk of biased estimates through the use of standardized mean difference (SMD) effect sizes (Durlak, 2009; Hoyt & Del Re, 2018). For the purposes of the review, the data from included studies were extracted and effect sizes were calculated using the same formula for both research designs.

3.2. Client population

This review included studies whose participants were children (ages below 18) with behavior concerns. Among included studies, these participants were identified as having oppositional behavior, behavior problems, or by a variety of diagnoses for disruptive behavior disorders. Formal DSM diagnoses were not required as an inclusion criteria. Some but not all children also had accompanying emotional difficulties. For the purposes of this review, addiction problems including substance misuse and internet addiction were considered separate problem areas and were excluded from the review.

3.3. Treatment condition

This review defined SFBT based on the suggestions of Gingerich and Eisengart (2000) as it is followed by most of the SFBT systematic reviews. Included studies needed to specifically identify the intervention as solution-focused and contain at least one of the following core elements: searching for pre-session change, goal setting, miracle questions, scaling questions, searching for exceptions, relationship questions, a consulting break, compliments, homework assignments, and focusing on what is better (Gingerich & Peterson, 2013).

3.4. Search process

Studies were identified through electronic databases including EBSCOhost (SocINDEX with Full Text, Social Work Abstracts, Criminal Justice Abstracts with Full Text, MEDLINE, PsycINFO), Scopus, PubMed, Web of Science, Cochrane Systematic Reviews, Campbell Systematic Reviews, and ProQuest Dissertations & Theses using the search term “solution focused” and the period from January 1, 1990 to February 21, 2019. Prior experience suggested that indexing among different databases would not be consistent and reliable. Therefore, we decided to use only the search term “solution focused” and manually review results for population, problem area, modality, and study design. Retrieved studies were compared with reference lists from existing systematic reviews and consultation with experts in SFBT to identify missing and unpublished studies fitting inclusion criteria. Two authors independently reviewed studies for inclusion and extracted data for the meta-analysis. Search results went through title, abstract, and then full-text review as needed to evaluate for study inclusion. The two coders also assessed the modality (family involved or non-family involved) and treatment effects (externalizing versus internalizing behaviors) targeted in this review.

Authors then extracted information from included studies, including information about participants, sample size, setting, intervention approach, research designs, and outcome measures. The included studies represented 0.68% of all non-duplicate retrieved SFBT studies with 95% agreement between the two coders. Discrepancies in inclusion and coding were discussed and disagreements were resolved after discussion with a third author.

3.5. Data analysis strategy

To make meaningful comparisons across studies, all effect sizes must be (1) estimating the same treatment effect and (2) scaled in the same metric (Morris & DeShon, 2002). Following Schmidt and Hunter's (2014) suggestion, we chose to focus on pre-post change scores between treatment and comparison conditions rather than posttest only differences to help account for potential bias in non-randomized studies. Prior to data extraction, we classified studies as randomized experiments with a pretest-posttest control group (PPCG) design or quasi-experimental with a non-equivalent comparison group (NECG) design. To calculate SMD effect sizes capturing differences in the pre-post change scores between the treatment and comparison group, all the included studies needed to report the number of participants, mean scores, and standard deviations at both pretest and posttest. The effect sizes of both designs were calculated as follows:

$$d = \frac{(M_{Tpost-pre} - M_{Cpost-pre})}{SD_{pooled-pre}}$$

For studies [12, 20] with multiple treatment groups or comparison groups, we aggregated multiple groups in the same arm (treatment vs. comparison) before calculating the effect size. The weighted mean (by group size) and the pooled standard deviation were used to compute the combined effect size (Hoyt & Del Re, 2018). For studies with multiple endpoints, we used the posttest score only to ensure equivalent comparisons across studies. For studies with multiple outcomes, treatment effects from different measurements are not independent, and further statistical processes are necessary as discussed below.

Included studies variously reported outcome measures with a total behavior problem score, scores for an internalizing dimension of behavior problems, and/or scores for an externalizing dimension of behavior problems. For the primary analysis of SFBT effectiveness for child behavior problems, the meta-analysis sought to estimate an effect size for SFBT compared to control conditions for child behavior problems overall. For this analysis, we used the total behavior problem score when it was reported, or internalizing and externalizing dimension scores if a total score was not reported. Following the initial analysis, we conducted a follow-up analysis excluding studies that reported only one dimension of behavior problems. For the secondary analysis of SFBT effectiveness for internalizing and externalizing behavior problems, we included any studies with scores for an internalizing or externalizing dimension, and excluded studies with only a total behavior problem score that did not include scale scores for sub-types of behavior problems. For studies that used more than one scale measuring the same dimension of behavior problem (internalizing or externalizing), we used all of the scales in the RVE model.

3.6. Statistical methods

After calculating all included studies' data into individual effect sizes, this review used Hedges' *g* to correct for the bias of small sample sizes (see Hedges & Olkin, 1985 for formulas). However, these studies often included multiple outcome measures that should not be aggregated directly because it violates the assumption of independent observations of traditional meta-analysis (Fisher & Tipton, 2015). Thus, the relationships among outcomes from different scales in the same study needs to be addressed, but is rarely reported in primary studies.

Hedges et al. (2010) provided a new approach, robust variance estimation (RVE), for handling non-independent effect sizes without information on the covariance structure. Tipton (2015) further improved the RVE with a small sample adjustment that provides better estimation when the sample size is small. RVE uses inverse variance weights to increase statistical efficiency, and uses a model to approximate the unknown covariance structure (Fisher & Tipton, 2015). Although the correlation of within-study effect sizes (ρ) needs to be specified in advance by the researcher, results from simulations show that the between-study variance (τ^2) and meta-regression coefficients are relatively insensitive to changes in ρ . A sensitivity analysis can be conducted later for assessing the effect of ρ to τ^2 (Fisher & Tipton, 2015).

The RVE analysis provided the heterogeneity of effect sizes across studies (τ^2), but RVE does not provide Q -tests regarding the significance of heterogeneity since it is a method of adjusting standard errors rather than modeling variation (Tanner-Smith & Tipton, 2014). The I^2 statistic indicates the proportion of the observed variance that reflects real differences in effect size (Borenstein et al., 2009). The authors used statistical packages in R to facilitate the meta-analysis calculations, specifically “compute.es” for calculating effect sizes, “robumeta” for computing aggregated effect sizes and “metafor” for producing graphics (Del Re, 2015b; Fisher, Tipton, & Hou, 2017; Viechtbauer, 2019).

3.7. Potential sources of bias

To address potential bias in the results, we investigated possible publication bias and also assessed the methodological quality of included studies. Publication bias can arise when studies with statistically significant findings are more likely to be published. Since RVE estimates the overall effect size without calculating effect sizes of individual studies, it does not provide methods for assessing publication bias (Zelinsky & Shadish, 2018). Therefore, the conventional approach is to calculate an average effect size for each study and use these independent effect sizes for publication bias analyses (cf. Klingbeil & Renshaw, 2018; MacCann et al., 2020; Zelinsky & Shadish, 2018), preliminary analysis, and forest plots. Specifically, we used the univariate procedure recommended by Borenstein et al. (2009) to account for the correlation among within study effect sizes and we selected an estimate of $r = 0.5$ to provide a conservative estimation (Del Re, 2015a). We used visual inspection of the funnel plot and the Trim and Fill method to assess for potentially biased estimates (Duval & Tweedie, 2000a, 2000b) as well as the Egger’s regression test for funnel plot asymmetry (Egger, Smith, Schneider, & Minder, 1997). We also calculated the Fail-safe N of the number of studies that would be needed to nullify the effect based on Rosenberg’s file drawer analysis (Rosenberg, 2005). Finally, the search process included grey literature and unpublished studies, dissertations, and theses to help minimize publication bias.

Additional heterogeneity or bias could be introduced by including studies with diverse research designs, comparison conditions, and intervention modalities. We assessed each study’s research design and features for qualitative indicators of methodological quality, and used the risk of bias in non-randomised studies of interventions (ROBINS-I; Sterne et al., 2016) framework to guide quality assessment. ROBINS-I was developed specially for non-randomized studies of the effects of interventions (NRSI) using a risk of bias framework to assesses bias at pre-intervention (confounding bias, selection bias), at intervention (classification bias), and at post-intervention (deviations from intended interventions, missing data, measurement of outcomes, and selection of the reported result). Since our review included both randomized and non-randomized studies of interventions, we adapted the ROBINS-I tool to provide a framework of potential sources of bias that we then used to assess both types of studies in our review.

4. Results

The preliminary database search for all “solution focused” entries

identified 5,224 results. Fig. 1 shows the flow diagram of the search and screening process. A total of 3,069 non-duplicate records proceeded to title and abstract review. We excluded 339 records that were not related to SFBT and a further 2,451 records that were not studies related to children and adolescents under the age of 18. Of the remaining 280 articles, 234 were not empirical studies related to child behavior problems. The final 60 articles continued to full text review. Twenty-five articles were relevant but were excluded for the following reasons: study design or measurement did not meet inclusion criteria (i.e. not related to internalizing or externalizing behavior problems, no objective measurement related to child behavioral problems, addiction studies, and insufficient information to calculate an effect size), retrospective studies, and utilized the same dataset as an included study. In addition to the previous database search, the reference list of a meta-analysis found through database searching yielded fourteen studies from the parents plus program. Following a final round of expert consultation regarding possible missing studies, one additional study was identified from the SFBT Evaluation List (Macdonald, 2017). A final study (Lu, Wang, & Dong, 2017) was excluded during data analysis when it was found that the sample had an average age of 22 years old despite the study mentioning “adolescents.”

4.1. Included studies

The review and screening process resulted in 20 included studies, of which 13 were assessed to include family involvement and 7 had no family involvement. Tables 1 and 2 show the research design and characteristics of the included studies, grouped by family involved and family non-involved studies. Of the 20 included studies, 9 studies used random assignment to treatment conditions and 11 studies used non-random assignment. Sample sizes of SFBT treatments ranged from 6 to 82 with dosage ranging from 1 to 12 sessions. Youth in the included studies presented with a variety of emotional and behavioral difficulties, behavior problems, and development disabilities, and treatment settings included residential, outpatient, home-based, school-based, and juvenile justice environments.

Quality assessment using the adapted ROBINS-I framework shows low to moderate risk of bias in most of the studies, except for measurement and missing data (see Fig. 2). Two coders evaluated all studies twice using the ROBINS-I framework to reduce errors in rating. The two coding sheets were then compared and the two-way model for the intra-class correlation (ICC) was used to assess the inter-rater reliability (Hallgren, 2012). For two domains with low assessed risk of bias, there was complete agreement between the two raters. The ICCs of the other five domains of bias risk ranged from 0.657 to 0.861, indicating good to excellent agreement, with an average ICC across all five domains of 0.77 (excellent agreement). Discrepancies were discussed between the raters and resolved by consensus. Detailed assessment and explanation of the coding can be found in the online supplement.

4.2. Preliminary analysis

Prior to conducting the RVE synthesis, we used the restricted maximum likelihood (REML) approach to check for heterogeneity and found $Q = 92$ ($p < .0001$) and $I^2 = 81.10\%$, which indicates large heterogeneity in the dataset. The visual assessment of the funnel plot shows that the effect size from one study [1] was noticeably larger than other studies, suggesting that the study is a potential outlier in the dataset (see Fig. 3). We further conducted influential case diagnostics and the values of DFBETA, DEFITS, Cook’s distance, τ^2 delete, QE delete, and other indicators all suggest the study exerts large influence on the results (see figures in the online supplement). To account for these effects, we ran a full analysis including all studies and then a “leave-one-out” analysis excluding this study from the analysis.

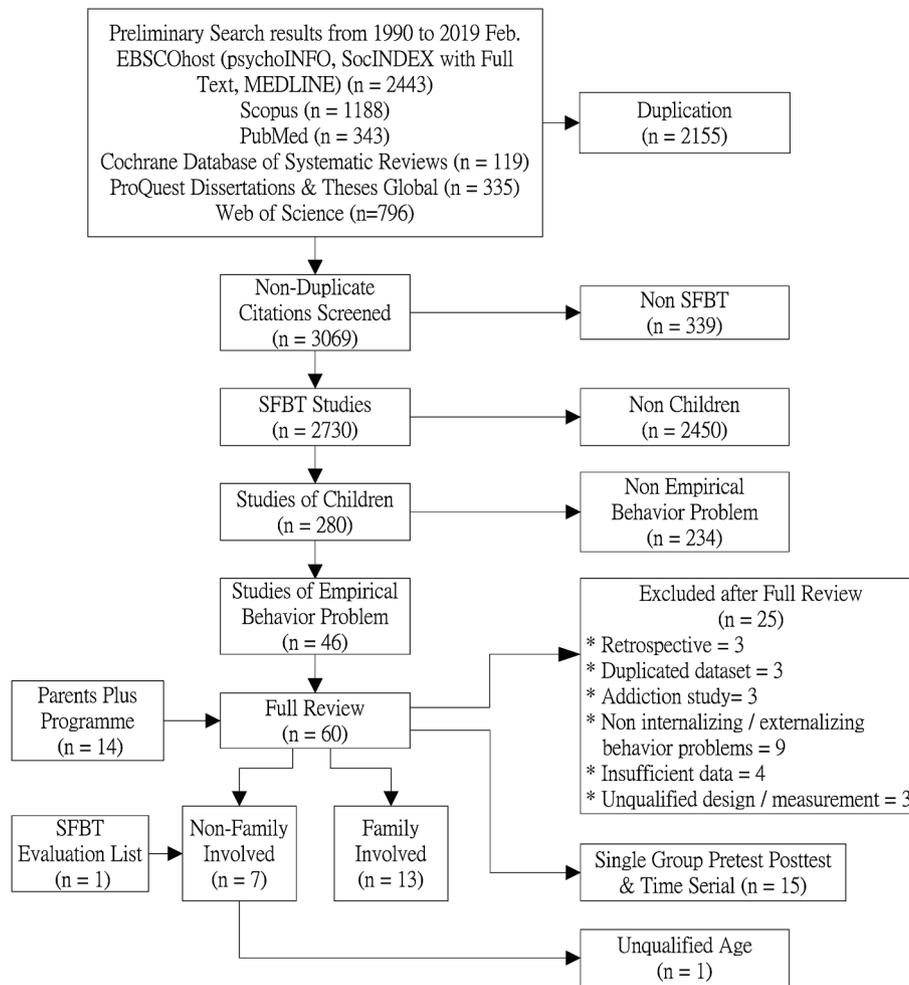


Fig. 1. Search and Screening Process.

4.3. Publication bias

In this review, the Egger’s regression test revealed asymmetry ($p < .0001$) and the distribution of SFBT treatment effectiveness appears fairly asymmetrical by visual inspection of the funnel plot (see Fig. 3), with some studies falling outside of the pseudo-confidence region. The contour-enhanced funnel plot (Peters, Sutton, Jones, Abrams, & Rush-ton, 2008) reveals that while the moderately-sized studies are partly significant and non-significant, the asymmetry appears more pronounced in smaller studies, especially when we omit the smallest two studies [6, 10]. Although publication bias may be a concern from visual examination, the trim and fill method (Duval & Tweedie, 2000a, 2000b) did not suggest that additional studies should be imputed, which means the best estimate of the unbiased effect size remains the same. Therefore, alternative explanations of funnel plot asymmetry should be considered, such as heterogeneity among studies that warrants further investigation.

We further examined the study characteristics and found that three studies [6, 10, 17], along with the study [1] with the largest studentized residual, used only internalizing or externalizing behavior measures in their study, compared to the majority of studies that included a total behavior problem score of both internalizing and externalizing behaviors. Therefore, it appears that using measurements for an overall construct of child behavior problems may diminish the variance. Thus, for the primary research question of SFBT’s effectiveness for child behavior problems, we ran a full analysis including all studies and then a follow up analysis excluding these studies. Finally, the calculation of the Fail-safe Number suggests that there would need to be 133 studies to nullify the effect to not statistically significant based on Rosenberg’s file

drawer analysis (Rosenberg, 2005).

5. Findings

The final process included 79 effect sizes gathered from 20 independent study samples representing 1,404 participants. The overall sample of participants included 54.63% in treatment groups and 45.37% in comparison groups, with 8.69% of participants from 2 pre-school studies [8, 15], 13.39% from 5 child studies [5, 6, 7, 9, 10], 31.55% from 6 adolescent studies [3, 13, 16, 17, 18, 20], 16.52% from 3 pre-school to child studies [2, 4, 20], 6.55% from 2 child to adolescent studies [1, 13], and 23.29% from pre-school to adolescent studies [11, 14]. Among studies that reported participants’ ages, child participants averaged 10.33 years old. Among studies that reported gender, child participants were 62.5% male and 37.5% female, with treatment groups comprised of 60.9% male and 39.1% female children and adolescents, and comparison groups comprised of 64.6% male and 35.4% female participants. On average, studies reported a mean treatment length of 7.09 sessions.

5.1. Effectiveness of SFBT for child behavior problems

The study’s first aim was to assess the overall effectiveness of SFBT for treating child and adolescent behavior problems. We ran a correlated effects model with small-sample adjustments (RVE) of all studies that reported at least one score representing child behavior problems. Fig. 4 shows the forest plot of the overall meta-analysis and follow-up analyses excluding an outlier and studies with an effect size only representing one

Table 1
Study Characteristics of Family Involved Studies.

Author	Target Population ^a	Setting	SFBT Techniques ^b	Duration and Modality ^c	Sample Size	Study Quality ^d ROBINS-I ^e	Instrument ^f	Research Design ^g
Boyer et al., 2015	Adolescents with BP	Mental health care institute	P,G,F	8 sessions (C), 2 sessions (P), 45–60 min.	PML = 83 SF = 76	R,S,L,F,A,O, U L,L,L,L,M, M,L	CDI SCARED DBD CBCL	PPCG w ET
Keating, Sharry, Murphy, Rooney, & Carr, 2016	Children with BP	Mental care center	N/A	6 weeks, 2 h	SF = 82 C = 79	R,S,L,F,E,O L,L,L,M,M, S,L	SDQ	PPCG w WL
Nitsch et al., 2015	Adolescents with BP	School	N/A	8 sessions	SF = 70 C = 39	R,S,L,F,E,O, U L,L,L,L,M,S, L	SDQ	PPCG w WL
Hand et al., 2012	Children with DD	School	N/A	8 sessions, 2.5 h	SF = 16 C = 13	R,O L,L,L,M,M, S,L	SDQ	PPCG w N
Griffin et al., 2010	Children with BP & DD	Hospital & community setting	N/A	12 weeks, 2 h	SF = 46 C = 35	L,F,A,E,O,U M,M,L,M,M, S,L	SDQ	NECG w TAU
Coughlin et al., 2009	Children with BP & DD	Clinic	N/A	8 weeks, 2 h	SF = 42 C = 32	L,F,A,E,O,U M,M,L,M,S, S,L	SDQ	NECG w TAU
Quinn et al., 2007	Pre-schoolers with BP & DD	Clinic	N/A	6 sessions	SF = 22 C = 19	S,L,F,O,U M,M,L,M,S, S,L	SDQ CBCL	NECG w WL
Corcoran, 2006	Children with BP	Clinic	G,M,S,E,R,F	4–6 sessions	SF = 56 C = 27	L,O M,M,L,M,S, M,L	CPRS FAB-C	NECG w TAU
Perkins, 2006	Children & adolescents with EBD	Clinic	P,G,E,B,C,F	single session, 2 h	SF = 78 C = 88	R,M,S,L,F,A, E, O,U L,L,L,M,S, M,L	DSMD	PPCG w WL
Vostanis et al., 2006	Children with BP	Home	G,M,E,F	8 sessions	SF ₁ = 33 SF ₂ = 45 C = 31	S,F,O,U M,M,L,M,L, S,L	SDQ	NECG w TAU
Triantafyllou, 2002	Foster youth with EBD	Mental health agency	G,M,S,E,R,B, C,H,F	6 sessions, 1.5 h	SF = 18 C = 12	S,F,E,O,U M,M,L,M,S, M,L	DSMD	NECG w N
Behan et al., 2001	Children with EBD	Teaching hospital	N/A	8 sessions, 2 h	SF = 26 C = 14	R,L,F,E,O,U L,L,L,M,S, M,L	CBCL SDQ	PPCG w WL
Marinaccio, 2001	Students with EBD	Family support center	G,M,S,E,R,B, C,H,F	2–7 sessions	SF = 30 C = 30	S,L,F,E,O,U S,S,L,S,L,M, L	BASC-PRS BASC-TRS	NECG w N

Note.
^a EBD = emotional and behavioral disorders; BP = behavioral problems; AF = academic failure; DD = developmental disabilities; PB = prosocial behavior, SCD = somatic and cognitive difficulties.
^b P = pre-session change, G = goals, M = miracle question, S = scaling question, E = exceptions, R = relationship questions, B = consulting break, C = compliments, H = homework, F = focus on what is better.
^c P = parent, C = child, A = adolescent.
^d R = randomized, M = matching, S = selection criteria, L = large sample (20 + per group), F = fidelity assessment, A = alternative treatment, E = experienced therapists, O = objective measures, U = follow-up.
^e L = Low risk, M = Moderate risk, S = Serious risk, C = Critical risk; Seven domains of bias, in order: confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, selection of the reported result.
^f BASC = The Behavior Assessment System for Children; SDQ = Strengths and Difficulties Questionnaire; CBCL = Child Behavior Checklist; BYI-II = The Beck Youth Inventories; DSMD = Devereux Scales of Mental Disorders; CPRS = Conners' Parent Rating Scale; FAB-C = Feelings, Attitudes, and Behaviors Scale for Children; DBD = DSM-III-R symptoms ODD/CD & VvGK; SCARED = Screen for Child Anxiety Related Emotional Disorders; CDI = Child Depression Inventory.
^g Research design (coded on the basis of Campbell & Stanley, 1963). Pretest-Posttest Control Group Design = PPCG or Nonequivalent Control Group Design = NECG; compared with Waitlist = WL, No treatment = N, Treatment as Usual = TAU, or Effective Treatment = ET.

sub-type of behavior problem (i.e. only internalizing or externalizing behaviors). The estimated average effect size based on this model was $g = 0.43$ (95% CI [0.20, 0.67]) when including all studies, $g = 0.37$ (95% CI [0.17, 0.58]) when excluding the outlier study, and $g = 0.33$ (95% CI [0.12, 0.53]) when excluding studies reporting only one dimension of behavior problems (internalizing or externalizing). These results indicate a small to medium treatment effect favoring SFBT over comparison conditions and no-treatment control groups that did achieve statistical significance ($p = 0.001, 0.001, 0.003$ respectively). The results suggest that the SFBT groups' improvement in behavior problems was approximately one third of a standard deviation greater than the improvement

in comparison groups. Moreover, two of the studies [3, 20] with the lowest estimates for SFBT effectiveness—small, nonsignificant effect sizes slightly favoring the comparison condition—compared SFBT to an existing effective treatment rather than control or comparison groups providing no-treatment, waiting list measurement, or treatment-as-usual (TAU). Thus, the aggregate effect size estimate for SFBT's effectiveness compared to all comparison conditions is likely lower than SFBT's effectiveness when compared to "inactive" comparison treatments (waitlists, no treatment, or TAU). Overall, the findings indicate statistically significant evidence of the effectiveness of SFBT for child behavior problems—with a small-to-medium effect size—over and

Table 2
Study Characteristics of Family Non-Involved Studies.

Author	Target Population ^a	Setting	SFBT Techniques ^b	Duration and Modality ^c	Sample Size	Study Quality ^d ROBINS-I ^e	Instrument ^f	Research Design ^g
Bakshipoor & Ramazanzadeh, 2016	Children & adolescents w BP	School	G,M,S,E,B,C,H, F	8 sessions, 60 min (C) 90 min (A)	SF = 16 C = 16	R,S,E,O M,M,L,M,L, M,L	BPAQ	NECG w N
Daki & Savage, 2010	Children with AF & BP	Learning center	G,M,S,E,C,H,F	5 sessions, 40 min	SF = 7 C = 7	R,M,F,O, L,L,L,M,L,S,L	BASC	PPCG w N
Hong & Kim, 2010	Children with BP	Social service center	G,M,E,R,C,F	10 sessions 1 h	SF = 6 C = 6	R,M,S,L,A,E, O,F L,L,L,M,L,S,L	KCBC	PPCG w N
Shin, 2009	Youth probationers with BP	Probation setting	G,M,S,E,R,F	6 sessions 2 h	SF = 20 C = 20	R,S,E,O,F L,L,L,M,L,S,L	BDHI YOQ-SR	PPCG w N
Franklin et al., 2008	Students with BP	School	G,M,S,E,R,B,C, H,F	5-7 sessions	SF = 30 C = 29	S,L,F,E,O,F M,M,L,M,S, M,L	CBCL-TRF CBCL-YSR	NECG w TAU
Wilmshurst, 2002	Youths with EBD	Residential placement	G,M,C,S,R,H,F	3 months (5 day in residence)	SF = 27 C = 38	R, S, L, F, A, O, F S,S,L,C,S,S,L	SCIS	NECG w ET
Seagram, 1997	Young offenders with BP	Secure custody facility	P,G,M,S,E,R,C, F	10 sessions 40-60 min	SF = 21 C = 19	M,L,F,E,O,F M,M,L,M,C, M,L	YSR	NECG w TAU

Note.
^a EBD = emotional and behavioral disorders; BP = behavioral problems; AF = academic failure; DD = developmental disabilities; PB = prosocial behavior, SCD = somatic and cognitive difficulties.
^b P = pre-session change, G = goals, M = miracle question, S = scaling question, E = exceptions, R = relationship questions, B = consulting break, C = compliments, H = homework, F = focus on what is better.
^c C = child, A = adolescent.
^d R = randomized, M = matching, S = selection criteria, L = large sample (20 + per group), F = fidelity assessment, A = alternative treatment, E = experienced therapists, O = objective measures, F = follow-up.
^e L = Low risk, M = Moderate risk, S = Serious risk, C = Critical risk; Seven domains of bias, in order: confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, selection of the reported result.
^f CBCL = Child Behavior Checklist; SAS = Self-Rating Anxiety Scale; SDS = Self Rating Depression Scale; BASC = Behavior Assessment System for Children; KCBC = Korean-Child Behavior Checklist; BDHI = Buss-Durkee Hostility Inventory; YOQ-SR = Youth Outcome Questionnaire-Self Report; YSR = Youth Self Report; BPAQ = Buss Perry Aggression Questionnaire; SCIS = Standardized Client Information System.
^g Research design. Pretest-Posttest Control Group Design = PPCG or Nonequivalent Control Group Design = NECG; compared with No treatment = N, Treatment as Usual = TAU, or Effective Treatment = ET.

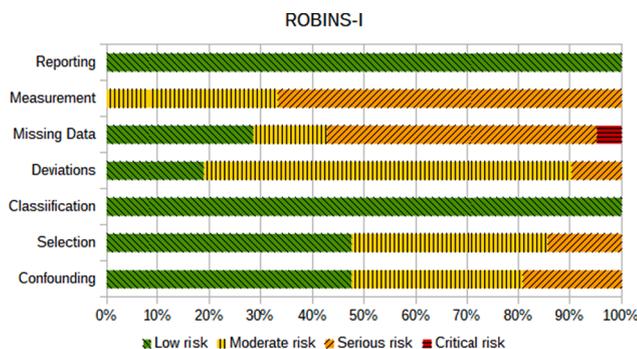


Fig. 2. Quality Assessment Using Adapted ROBINS-I Framework.

above improvements seen in the comparison groups.

5.2. Moderating effects of family involvement in SFBT

For the studies reporting overall behavior scores for child behavior problems, the amount of heterogeneity in SFBT effectiveness was estimated to be $\tau^2 = 0.19$ and $I^2 = 76.25\%$ in all studies, $\tau^2 = 0.12$ and $I^2 = 67.39\%$ when excluding the outlier study, and $\tau^2 = 0.10$ and $I^2 = 67.01\%$ when excluding studies with only one sub-type of behavior problem (internalizing or externalizing), indicating a substantial degree of between-study heterogeneity. Therefore, it is important to examine study characteristics that may contribute to this heterogeneity. Based on our literature review, we hypothesized that SFBT interventions that incorporated a family involvement component in their intervention design would outperform SFBT with no family involvement for

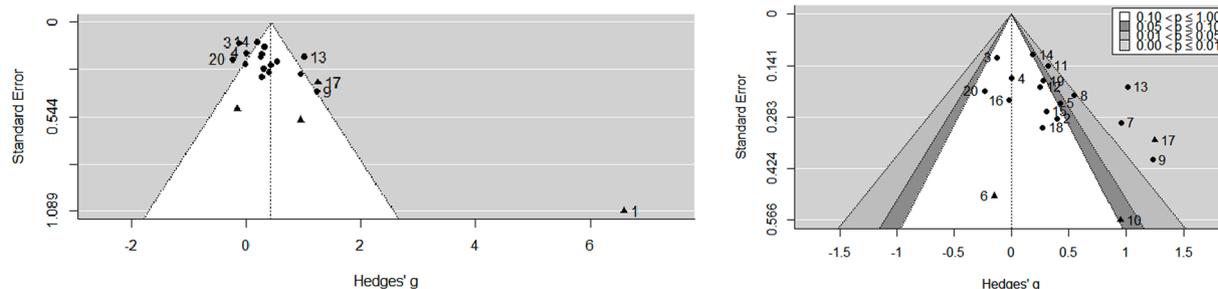


Fig. 3. A funnel plot (left) and a contour-enhanced funnel plot (right) of included SFBT studies. Note: The circles denote the reviewed studies with a total behavior problem score and triangles denote studies with only internalizing or externalizing scores.

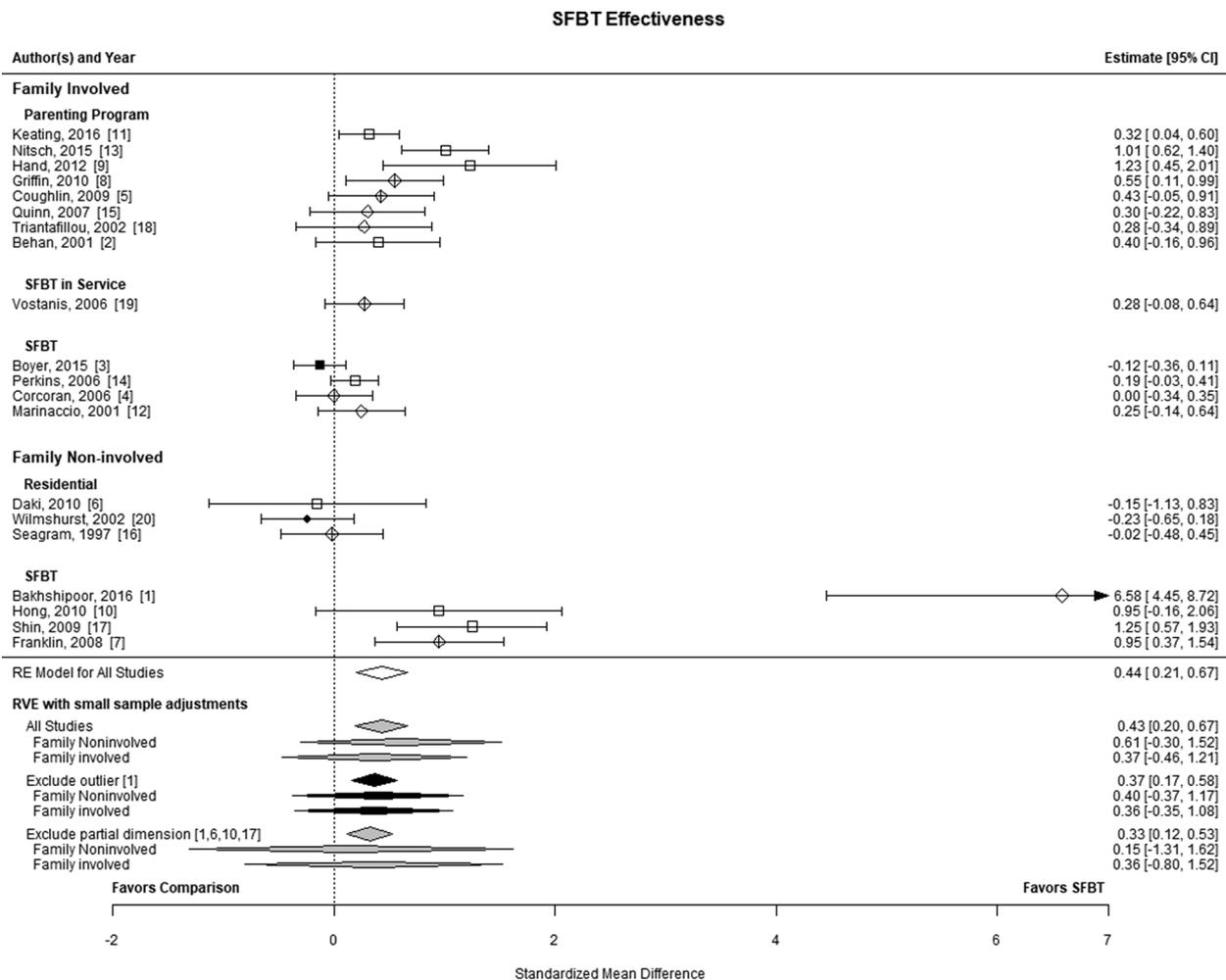


Fig. 4. Forest plot of SFBT effectiveness for child behavior problems. Note: The filled squares denote randomized studies compared with effective treatment; blank squares denote randomized studies compared with no-treatment or wait list control groups; filled diamonds denote non-randomized studies compared with effective treatment; diamonds with plus signs denote non-randomized studies compared with TAU; and, blank diamonds denote non-randomized studies compared with no-treatment or wait list control groups. Partial dimension denotes studies with only one dimension of child behavior problems (internalizing or externalizing).

improvements in child behavior problems. The estimated average effect size for SFBT over comparison groups for family non-involved SFBT was $g = 0.61$ (95% CI [-0.30, 1.52]) in all studies, $g = 0.40$ (95% CI [-0.37, 1.17]) when excluding the outlier study, and $g = 0.15$ (95% CI [-1.31, 1.62]) when excluding studies with only one sub-type of behavior problem. In comparison, family-involved SFBT showed an overall effect size of $g = 0.37$ (95% CI [-0.46, 1.21]) for all studies, $g = 0.36$ (95% CI [-0.35, 1.08]) when excluding the outlier, and $g = 0.36$ (95% CI [-0.80, 1.52]) when excluding studies with only one sub-type of behavior problem. The difference between the two groups was not statistically significant in the primary or follow-up analyses ($p = 0.530, 0.909, 0.595$ respectively) due to large standard errors in both groups (0.36, 0.37 for all studies; 0.29, 0.31 excluding the outlier; 0.33, 0.34 excluding single-dimension studies). Further, the effect size point estimate for SFBT with family involvement was lower than SFBT without family involvement when including all studies, higher when excluding studies with only one dimension of behavior problems, and nearly equal ($p = .909$) when excluding only the outlier study. Thus, our hypothesis was not supported regarding the moderating effects of family involvement on SFBT effectiveness for child behavior problems.

We also ran an analysis to check if the research design—experimental or quasi-experimental—accounted for the heterogeneity of the variance. The estimated average effect size of NECG studies was $g = 0.37$ (95% CI [0.04, 0.69]) for all studies, $g = 0.26$ (95% CI [0.04, 0.48]) when excluding an outlier, and $g = 0.32$ (95% CI [0.12, 0.52])

when excluding studies with only one dimension of behavior problems. For PPCG studies, the effect size was $g = 0.52$ (95% CI [0.03, 1.01]), $g = 0.50$ (95% CI [0.07, 0.94]), and $g = 0.34$ (95% CI [-0.10, 0.78]) respectively. The difference between the two research designs was not statistically significant ($p = 0.515, 0.261, 0.935$ respectively).

5.3. SFBT for internalizing versus externalizing child behavior problems

Based on our literature review, we decided to separate internalizing and externalizing behaviors as different dimensions of child behavior problems, and for our third research question we examined the effectiveness of SFBT over comparison conditions for improvements in both sub-types of child behavior problems (see Fig. 5). For internalizing behavior problems only, the estimated average effect size was $g = 0.18$ (95% CI [-0.01, 0.38]) for all studies, and this was not affected by the outlier study as it included only externalizing behaviors. Even though the effect size estimate favored SFBT with a small effect size, this effect did not achieve statistical significance at an alpha of 0.05. The estimated average effect size for externalizing behaviors was $g = 0.43$ (95% CI [0.18, 0.68]) for all studies and $g = 0.35$ (95% CI [0.14, 0.57]) when excluding the outlier, indicating a small to medium effect size favoring SFBT for externalizing behavior problems that did achieve statistical significance. We found that SFBT significantly outperformed comparison groups for externalizing but not internalizing behavior problems.

did not find statistically significant evidence of family involvement as a moderating factor for SFBT for child behavior problems. Though this did not fit our hypothesis based on family treatment literature, the theory behind SFBT offers a potential explanation for why it may not be necessary to intentionally add a family involvement component to SFBT. SFBT draws from a systems perspective and assumes that all parts of a family system are interrelated, so that change in one part of a system leads to change in other parts of the system (Bateson, 1972; Becvar & Becvar, 2003). As such, solutions to a problem can happen through multiple pathways and do not necessarily need to involve the entire family or specific family members, such as parents. For example, techniques such as relationship questions may enable SFBT to engage the existing family system even if only one member of the family is present in therapy (De Jong & Berg, 2013; SFBTA, 2013). Thus, based on its underlying theory, SFBT may already promote change in the broader family system even without the intentional addition of a family component.

6.3. SFBT for internalizing and externalizing behaviors

Finally, the review compared SFBT with comparison conditions for internalizing and externalizing child behavior problems. Prior research has suggested that interventions with school-aged youth tend to have greater effects for internalizing rather than externalizing behaviors (Franklin et al., 2009). In contrast, our review found stronger evidence for the effectiveness of SFBT for externalizing behavior problems when compared to the control and comparison groups in the included studies. For externalizing behaviors, SFBT outperformed comparison conditions with a small to medium effect size that did achieve statistical significance, whereas the small effect size favoring SFBT for internalizing behaviors was not significant. Since the review included comparison groups with existing effective treatments, the non-significant finding for internalizing behaviors could result in part from the effectiveness of the comparison treatments rather than the ineffectiveness of SFBT. In contrast, SFBT outperformed control groups and comparison conditions for externalizing behavior problems, which suggests that SFBT may not have the same issues with externalizing behaviors that are faced by other interventions. Since SFBT uses a unique treatment approach that emphasizes collaboration (De Jong & Berg, 2013), it is possible that SFBT avoids power struggles with youth with externalizing behaviors that may impact other interventions.

6.4. Limitations

There are a number of limitations of this meta-analysis that should be noted. First, we attempted to gather all available controlled outcome studies to synthesize the most data possible regarding SFBT effectiveness for child behavior problems, but our selection criteria included studies with differing characteristics that could affect the findings. To increase the number of studies and to promote external validity, we included quasi-experimental studies that lacked randomization. This may have increased the likelihood of biased effect sizes compared to a review of only randomized experiments. Our review also included studies with varying comparison conditions (both no-treatment controls and active treatment comparison groups) and with different measurement tools related to child behavior problems, so additional variance may have been introduced due to the differences among included studies. In particular, including active comparison treatments in our effect size estimates may have reduced the effect size of SFBT compared to a review including only no-treatment or TAU control groups. Finally, the confidence of our findings is limited by the methodological quality of the included studies. Only 9 of the included studies used randomized PPGC designs, and the studies varied in their fidelity to SFBT techniques and study quality indicators. To account for study quality, we assessed the included studies using the adapted ROBINS-I framework. We found that more than half of the included studies exhibited moderate to serious risk

of bias in terms of confounding and selection issues and deviation from intended interventions. Missing data posed a moderate to serious risk of bias in most studies and critical risk in one study. Finally, all studies included moderate to serious risk of measurement bias, largely due to the lack of blind raters. Though attrition is common in psychotherapeutic intervention studies and randomization is not always feasible, these concerns could still affect the internal validity of the SFBT effectiveness findings. We chose to assess and report the risk of bias rather than exclude studies based on their risk profile, so the confidence of our findings is limited by potential bias in these areas. Future research with high methodological quality should be conducted to strengthen the evidence for SFBT for child behavior problems.

7. Conclusion

This study adds to a growing body of systematic reviews supporting the use of SFBT as an evidence-supported treatment. Specifically, the review found that SFBT produced small to medium effect sizes over comparison conditions for child behavior problems that were statistically significant. This finding held true for externalizing sub-types of behavior problems with a small to medium and significant effect size, but the difference was not significant for internalizing behavior problems. This was also the first systematic review of SFBT to investigate family involvement as a potential moderating factor in the effectiveness of SFBT for child behavior problems. Though the findings did not support our hypothesis that family involvement has a moderating influence on SFBT effectiveness, we did find significant heterogeneity in effect sizes warranting further exploration of potential moderating factors. Future research should continue to investigate moderating components in the effectiveness of SFBT interventions, and studies should use larger sample sizes, rigorous designs, and strong intervention fidelity procedures to strengthen the quality of evidence for SFBT for child behavior problems.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chilyouth.2020.105620>.

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