Revista de Psicología Clínica con Niños y Adolescentes
Vol. 10 nº. 1- Enero 2023 - pp 20-"" en la página 30
doi: 10.21134/rpcna.2023.10.1.2

www.revistapcna.com - ISSN 2340-8340

Revista de Psicología Clínica con Niños y Adolescentes

The state of psychological treatments for social anxiety disorder in children and adolescents: An Umbrella Review

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Abstract

Social Anxiety Disorder (SAD) is a very common disorder in childhood and adolescence. Many studies have examined various types of Cognitive Behavioral Therapy (CBT), meaning there is a need for a study exploring the efficacy of CBT. The objectives of this study are to determine what treatments and factors can improve treatment outcomes for SAD. We performed an umbrella review of the effectiveness of psychological interventions in treating SAD in children and adolescents. Nine databases were searched using a combination of keywords. Risk of bias was assessed using AMSTAR-2. Six systematic reviews and meta-analysis were selected and reported. All of those studies assessed the efficacy of CBT in children and adolescents with SAD, demonstrating its short- and long-term effectiveness. The components that seem to be most effective are exposure in any modality and social skills training. Other considerations to take into account are addressed in the discussion.

Keywords: children; adolescents; therapy; social phobia; efficacy.

Resumen

Estado de los tratamientos psicológicos para el Trastorno de Ansiedad Social en población infanto-juvenil: Revisión de revisiones. El Trastorno de Ansiedad Social (TAS) es un trastorno muy común en la infancia y adolescencia. Muchos estudios han analizado los diferentes tipos de Terapia Cognitivo-Conductual (TCC) para dicho trastorno, pero ello hace necesario estudiar la eficacia de TCC. El objetivo de esta revisión de revisiones es determinar que tratamientos y que factores son más eficaces para el TAS en población infanto-juvenil. Se realizó una revisión de revisiones sobre la efectividad de las intervenciones psicológicas para tratar el TAS en niños y adolescentes. Para ello, se realizó una búsqueda en nueve bases de datos utilizando una combinación de palabras clave. El riesgo de sesgo se evaluó mediante la herramienta AMSTAR-2. Se seleccionaron y analizaron seis revisiones sistemáticas y meta-análisis. Todos los estudios seleccionados evaluaron la eficacia de la TCC en niños y adolescentes con SAD, demostrando su efectividad a corto y largo plazo. Los componentes que parecen ser más efectivos son la exposición en cualquier modalidad y el entrenamiento en habilidades sociales. Otras consideraciones a tener en cuenta se abordan en la discusión.

Palabras clave: niños, adolescentes, terapia, ansiedad social, eficacia.

Social Anxiety Disorder (SAD) has been defined as intense fear or anxiety in one or more social situations in which the person is exposed to possible scrutiny by other people (American Psychiatric Association, 2013). SAD is one of the most common anxiety disorders worldwide (Stein et al., 2017), with an estimated prevalence between 5-10% (Garcia-Lopez et al., 2014; Kessler et al., 2012; Olivares et al., 2005) and a lifetime prevalence of 1.8% in children and adolescents (Mohammadi et al., 2020). Moreover, prevalence increases during adolescence (Wright et al., 2020).

A variety of treatments have been developed for SAD. One of the most well-developed and widely-tested therapies in children and adolescents is Cognitive Behavioral Therapy (CBT) (Beidel et al., 2000; Turner & Morris, 2000; Kley et al., 2012, Spence et al., 2000, Donovan & Brechman-Toussaint, 2000). This type of intervention involves sessions with practical discussion, homework, and the therapist playing an active role. The efficacy of CBT has been shown in the child-juvenile population with SAD (Khalid-Khan et al., 2007), including long-term effects (Stein & Stein, 2008). The main components that have proven effective in CBT are exposure, relaxation, cognitive restructuring, and social skills training (Cuijpers et al., 2016; Evans et al., 2021).

Another type of component that is widely used with CBT is parent training. These types of sessions are included based on the hypothesis that if parents manage their own anxiety, they will improve certain types of skills such as communication or problem solving, which will lead to greater therapeutic progress for the children (Spence et al., 2000).

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There are also more recent types of programs such as Cognitive Bias Modification Training (CBMT). The aim of CBMT is for the patient to learn to divert attention from important information that could lead them to maintain negative interpretations of ambiguous social situations (Amir et al., 2010). This type of intervention has not been shown to be completely effective in children and adolescents with anxiety problems (Cristea et al., 2015). There are two main types of CBMT program: Cognitive Bias Modification Training to target attention biases (CBMT-A) and Cognitive Bias Modification Training to target interpretation biases (CBMT-I) or they may be used in combination. CMBT-A uses a dot-probe task to systematically redirect attention away from threatening stimuli, while CBMT-I consists of presenting participants with emotionally ambiguous scenarios that are resolved when a word fragment at the end is completed to convey meaning.

Due to this variety, the question for our umbrella review was whether SAD treatments were effective and what treatment components or characteristics made for the most effective treatment for SAD in children and adolescents. To our knowledge, there are currently no systematic reviews of systematic reviews about the effectiveness of psychological interventions for SAD in children and adolescents. The objectives for this study are: 1) determine which treatments are the most effective for SAD in the child-juvenile population, 2) identify what factors can lead to SAD treatment being more effective.

Methods

Search procedures

This systematic review was conducted by following the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) statement (Moher et al., 2009). It was also registered in the Open Science Framework (doi:10.17605/OSF.IO/VTM32) in August 2022.

Prior to the literature search, we established inclusion and exclusion criteria, which were:

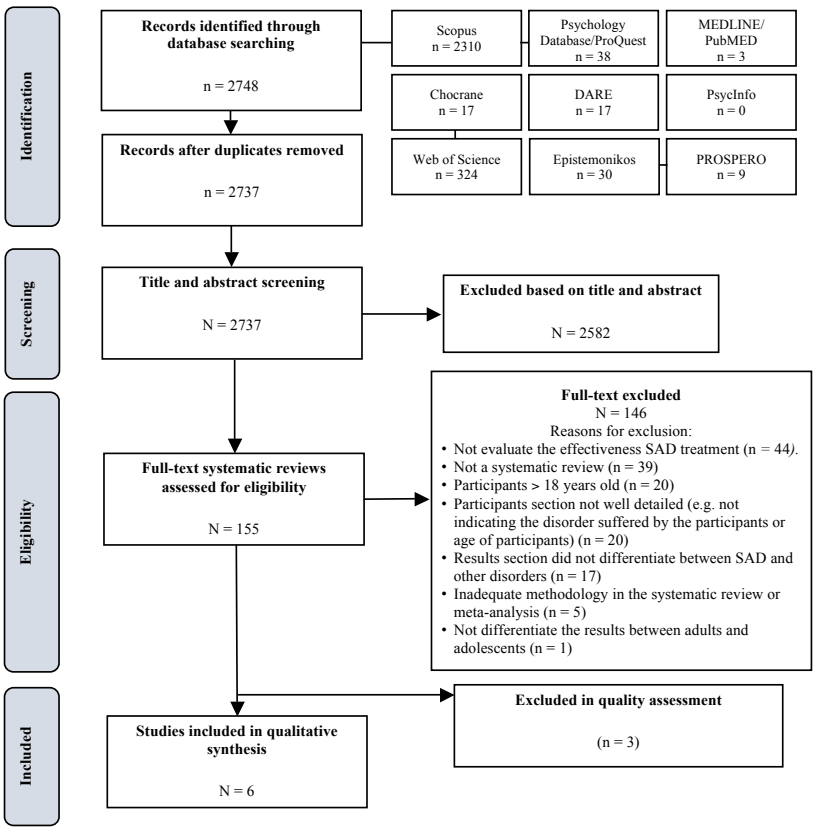
a. Population: the participants were children and adolescents (under 18 years old).
b. Intervention: psychological treatment with the aim of treating SAD.
c. Diagnosis: the diagnosis of the participants should have been made with diagnostic interviews or questionnaires previously validated for SAD.
d. Study design: systematic reviews with suitable methodology following the PRISMA criteria.

Systematic reviews or meta-analyses were excluded if they did not evaluate the efficacy of a treatment or evaluate a pharmacological treatment for SAD. They were also excluded if they did not show participant data. There were no language or date restrictions.

The database search was conducted independently by two of the authors (MMDC and JAM) during July 2022. Nine databases were used for the literature search: PsycInfo, Psychology Database/ProQuest, MEDLINE/PubMED, CHOCRANE, Database of Abstracts of Reviews of Effects (DARE), Scopus, Web of Science, Epistemonikos and Prospero. The databases were searched using Boolean operators to link the search terms and phrases, using the following terms: ("social anxiety*" OR "social phobia*") AND (""child*" OR "adolescent*" OR "youth*" OR "adolescence*" OR "young*") AND ("treatment*" OR "intervention*" OR "therapy*"). Once the search was complete, the same researchers each independently screened titles and abstracts to identify articles that met the inclusion criteria. The full texts were then independently assessed by three reviewers (MMDC, LEF and LJGL). Disagreements between reviewers were resolved by JAM (intercoder reliability: Cohen's Kappa coefficient = 0.75-0.88).

Subsequently, the same reviewers extracted the relevant information to be analyzed, producing a summary table in order for all reviewers in this phase (MMDC, LEF and LJGL) to have the same format.

Figure 1. PRISMA flow-chart diagram.



Quality assessment

The methodological quality of all of the selected studies was evaluated. Three authors (MMDC, LEF and JAM) independently rated the risk of bias using A Measurement Tool to Assess Systematic Reviews (AMSTAR-2). Disagreements were resolved through discussion.

Results

Identification of articles

A total of 2748 records were initially identified, although 11 were removed because they were duplicates. Following the analysis of titles and abstracts (2737 records) to determine whether articles would be included or excluded and 155 full text was analyzed. After applied the inclusion/exclusion criteria, 9 systematic reviews were selected and assessed for risk of bias. Ultimately, 6 reviews remained for qualitative summary (see Fig.1 for more details).

Study characteristics

Table 1 gives more detail about the characteristics of the studies covered. The selected systematic reviews evaluated a total of 129 studies, of which 83 were randomized clinical trials, with a total of 6109 participants aged between 4 and 18 years old.

Characteristics of psychological interventions

All of the selected reviews aimed to evaluate the efficacy of some treatment for SAD in the child and adolescent population and all included some kind of CBT.

In terms of delivery format, two systematic reviews analyzed internet-based interventions (Biagianti et al., 2020; Cordier et al., 2021), five included individual and group interventions (Biagianti et al., 2020; Cordier et al., 2021; Olivares et al., 2003; Rosa-Alcazar et al., 2009; Silverman et al., 2008) and only one study included group intervention alone (Scaini et al., 2016). The number of sessions ranged from 1 to 40, with the mean number of sessions being 12.48. The mean treatment duration was 9.92 weeks, ranging between 1 and 24 weeks.

The main evaluation tool for SAD was ADIS (Silverman & Albano, 1996), in various versions, since it appeared in all the selected systematic reviews. Other questionnaires also appeared in all of the selected reviews, such as SPAI (Turner et al., 1988), SPAI-C (Beidel et al., 2000), and SAS-A (La Greca & Lopez, 1998). Other widely used tools included SCARED (Birmaher et al., 1997), BFNE-R (Leary, 1983), and RCMAS (Reynolds & Richmond, 1985).

Effectiveness of psychological interventions

Table 2 summarizes the main results regarding treatment effectiveness. All of the reviews reported the efficacy of CBT for SAD in children and adolescents. This type of intervention was even shown to be

Table 1. Characteristics of included systematic reviews.

First author (year of publication)	Aims	Search strategy: a) Databases searched; b) Search terms defined; c) Hand searching and reference checking.	Number of included studies and type	Participants' characteristics: a) Total number of participants; b) mean age of participants and range; c) country/ nationality.	Interventions characteristics: a) type (e.g., CBT); b) delivery format (e.g., group individual, online); c) range of number of sessions/ hours (mean); d) range of duration of treatments (mean); e) follow up	Intervention providers	Outcome measures	Funding sources
Biagianti et al., (2020)	Evaluate the effects of CBMT on cognitive biases and symptoms in adolescents with SAD.	a) PubMed. PsycINFO and EMBASE. b) social anxiety. attention bias modification. interpretation bias modification. cognitive bias modification. cognitive training. adolescent. child. c) Reference checking.	N= 9 Types not indicated	a) 866 adolescents b) 14,44 (12-18 years) c) Not indicated	a) CBMT-I (n= 3). CMBT-A (n=3) and Combination (n= 3) b) Individual. group. face-to-face. online c)1-20 sessions (9,33 sessions) d) 1-10 weeks (4,66) e) Not indicated	Not indicated	IBQ. MINI-KID. SCARED. ADIS-C/P. RCADS. SAS-A. SASC-R. SPAI. BFNE-R	Grants from the National Institute of Mental Health (1 R43 H121209-01) and partially supported by grants from the Italian Ministry of Health (GR-201602361283).

Cordier et al., (2021)	Provide an overview of the interventions for shy children, describe the characteristics of the interventions and determine their overall effectiveness.	a) CINAHL, Embase, Eric, PsycINFO and PubMed. b) social anxiety, inhibition, social isolation, effect size statistical, efficiency, intervention, program evaluation, treatment, evaluation. c) Not indicated.	N = 25 RCTs and quasi-experimental studies.	a) 1895 child and adolescents. b) 9,1 (4- 18 years). c) Australia (n = 4), Canada (n = 2), China (n = 3), England (n = 1), Ireland (n = 2), Nigeria (n = 1), South Korea (n = 1), Spain (n = 1), USA (n = 9).	a) SET-Asv, SET-C, IAFS, CBGT-A, Problem-solving and conversational skills training, Turtle Program, Play Skills for Shy Children, The Coping Bear Program, Cool Kids Program-For Parent, CBMT, UTalk-Interpersonal Psychotherapy Adolescent Skills Training, SST-FP, Counselling and Conditioning Approach, Cool Little Kids, Parent education Program, Cognitive-behavioural approach-based social skills training. b) Individual (child or parents), group (child and/or parents and teacher), online. c) 4-40 sessions (11,73)*. d) 1-24 weeks (8,95)*. e) Not indicated. * Not all studies indicated this information (n = 23).	Therapist (n = 20), parent (n = 3), mentor (n = 1), peer (n = 3), teacher (n = 1), not reported (n=1),	SPAI, SAS-A, SPAI-C, STAI-C, CBCL, ADIS-C, MASC, SAS, TRF, Intervention Rating Profile, SDQ, Spence Children's Anxiety Scale- Child Version, Revised Cheek, Buss Shyness and Sociability Scale, Social Competence Scale, BFNE-R, SCARED, RCADS-MDD	Internal grant by the University of Oslo, Department of Special Needs Education
Olivares et al., (2003)	Analyze the efficacy of psychological and pharmacological interventions used in the treatment of social phobia in children and/or adolescents.	a) PsycLIT, CSIC (ISOC), MEDLINE and Dissertation Abstracts Online. b) social anxiety, adolesc*, treatment, child*. c) Hand searching.	N = 25 RCTs (only report the data from the studies focused on psychological treatment)	a) N = 488 children and adolescents. b) 14,21 (8-17 years). c) USA (n = 12), Spain (n = 10) and Australia (N = 4).	a) IAFS, CBGT-A, SASS, SET-A, SET-C and CBT. b) Individual, group. c) 18-42 hours (21,06 hours) d) 8-16 weeks (12,42 weeks). e) 6-12 months.	Therapist	ADIS-IV, ADIS-IV-CP, SPAI, SPAI-C, SASA, STAIC, CDI, EA.	Séneca Fondation, proyect PI-54/ 00864/FS/01

Rosa-Alzácar et al., (2009)	Analyze the efficacy of treatment psychological in SAD, with special interest in variables most influential in efficacy and efficiency in treatment.	a) PsycLIT, cSIC (ISOC), MEDLINE and PSICODOC. b) social phobia, adolesc*, child*, treatment. c) Hand searching	N = 25 Single case (n =5), RCTs (n = 20) (only report the data from the studies focused on child or adolescents)	a) 689 child and adolescents. b) 14,7 (7-18) c) EE UU (n = 10), Spain (n = 15) and Australia (n = 1).	a) CBT, CBGT-A, IAFS, SASS, SET-C, CBI, School-based behavioral treatment for social anxiety disorder. b) individual, group. c) 3-29 sessions (14,86) d) 3-19 weeks (12) e) 6 months – 5 years.	Not indicated	ADIS-IV-CP, SPAI, SPAI-C, SAS-A, STAIC, CDI, EA.	Grant SEJ2004-01471/PSIC by Ministry of Education and Science.
Scaini et al., (2016)	Analyze the effectiveness of the CBT approach for SAD taking into account the similarities and differences between programs.	a) Medline and PsycINFO. b) social anxiety, cognitive/behavioral treatment, therapy, intervention, children, adolescents. c) Hand searching.	N = 13 RCTs	a) 640 children and adolescents. b) 13,8 (8-18 years). c) USA (n = 9), Spain (n = 3), Norway (n = 2), Germany (n = 2), Australia (n = 2).	a) CBT, CBGT, CBGT-A, IAFSG, SET-A, SET-C, SASS b) group. c) 4-29 sessions (15,05) d) Not indicated. e) 6-12 months.	Not indicated.	ADIS-C, BSI, CBCL, CDI, CGAS, FNE, LSAS-CA, MASC, PRCS, RCMAS, SAS-A, SAS-AP, SAS-C, SASC-R, SCARED, SCQ-C, SPAI, SPAI-C, SPAI-K, STAI-C, SWQ-PU, SSQ-P.	Supported in part by the CARIPLO Foundation 'Human Talents' Grant for Academic Centres Of Excellence in Post-Graduate Teaching
Silverman et al., (2008)	Reviews psychosocial treatments for anxiety disorders in youth.	a) PsycINFO. b) Phobia, anxiety, child, adolescent, treatment, intervention. c) Hand searching.	N = 32 Not indicated.	a) 1531 children and adolescents. b) – (6-18 years). c) Not indicated.	a) ICBT, GCBT, SET-C. b) Individual, group. c) 1-24 sessions (11,46). d) 3-18 weeks (11,60). e) 6 months – 3 years.	Doctoral students, psychologists and psychiatrists	RCMAS, CDI, FSSC-R, STAIC, CQ-C, SPAI-C, SASC-R MASC, CBCL, TRF, ADIS-C/P,	NIMH RO1 # 63997

ADIS-IV: Anxiety Disorders Interview Schedule, ADIS-IV-CP: Anxiety Disorders Interview Schedule-for DSM-IV: Child and Parent Interview Schedule, AIBQ: Adolescents' Interpretation and Belief Questionnaire, BFNE-R: Brief Fear of Negative Evaluation- Revised, BSI: The Brief Symptom Inventory, BT: behavioral Therapy, CBCL: Child Behavior Checklist, CBI: Cognitive Behavior Therapy, CBT: Cognitive Behaviour Therapy, CBGT-A: Cognitive Behavioral Group Therapy for Adolescents, CBMT: Cognitive Bias Modification Training, CBMT-I: Cognitive Bias Modification Training to target interpretation biases, CMBT-A: Cognitive Bias Modification Training to target attention biases, CDI: Children´s Depresión Inventory, CGAS: Children's Global Assessment Scale, CQ-C: Coping Questionnaire for Children, EA: Society and Adolescent Self Image, FNE: Fear of Negative Evaluation, FSSC-R: Fear Survey Schedule for Children – Revised, IAFS: Therapy for Adolescents with Social Phobia, IAFSG: Therapy for Adolescents with Generalised Social Phobia, IBQ: The Infant Behavior Questionnaire, ICBT: Individual Cognitive Behavior Therapy, GCBT: Group cognitive-behavioral therapy, GMBCT: group mindfulness-based cognitive therapy, LSAS-CA: Liebowitz Social Anxiety Scale for Children and Adolescents, MASC: Multidimensional Anxiety Scale for Children, MINI-KID: Mini-International Neuropsychiatric Interview for Children and Adolescents, PRCS: Personal Report of Confidence as a Speaker, RCADS: Revised Child Anxiety and Depressión Scale, RCADS-MDD: Revised Child Anxiety and Depression Scale–Major Depressive Disorder, RCMAS: Revised Children's Manifest Anxiety Scale, RCTs: randomized controlled clinical trials, SAS: School Anxiety Scale, SASA: The Social Anxiety Scale for Adolescents, SASC-R: The Social Anxiety Scale for Children-Revised, SASS: Skills for Academic and Social Success, SCARED: Screen for Child Anxiety Related Emotional Disorders, SCQ: The Social Communication Questionnaire, SDQ: Strengths and Difficulties Questionnaire, SET-Asv: Social Effectiveness Therapy for Adolescents-Spanish version, SET-C: Social Effectiveness Therapy for Children, SPAI: Social Phobia and Anxiety Inventory, SPAI-C: Social Phobia and Anxiety Inventory for Children, SPAIK: Social Phobia and Anxiety Inventory for Children, STAIC: State-Trait Anxiety Inventory for Children, SSQ: Social Skills Questionnaire, SSQ-P: Social Skills Questionnaire-Parents, SST: Social Skills Training sessions, SST-FP: Social Skills Training Facilitated Play, SWQ-PU: Social Worries Questionnaire – Pupil, TRF: Teacher Report Form, UST: Unstructured Social Time sessions, WL: waiting list.

Table 2. Summary of results.

First author (year of publication)	Risk of bias	Main findings	Effect estimates (if meta-analysis was performed)
Biagianti et al., (2020)	Not detailed	CBMT-A treatment currently does not appear to be a very beneficial tool for the treatment of SAD in adolescents. The CBMT-I appears to be slightly more effective, but further study is needed to determine whether improvements in interpretation bias can serve as a switch mechanism to reduce SAD symptoms in adolescents.	Not meta-analysis.
Cordier et al., (2021)	17 articles were rated as "strong methodological quality", with all others rated to have "good" methodological quality.	The interventions studied are effective in treating shyness and social anxiety. But it is more effective to work in the school environment, since it is where situations conducive to developing more shyness/SAD occur. Treatment with children/adolescents that is only applied to parents or to a combination of both is more effective. There are no significant differences in the size of the effect in the application of a group or individual intervention.	*Effect of shyness interventions:* Of the 20 studies included 75% (n = 15) produced a large effect size and 15% (n = 3) produced a moderate effect. An effect size of < 0.2 was measured in 10% (n = 2) of the studies. The overall intervention effect was large and statistically significant (z(20) = 7.03, p < .001, Hedge's g = 1.21, 95% CI = 0.87–1.54). Effect size as a function of intervention characteristics: *Interventions delivered clinic:* z(9) = 10.50, p < .001, Hedge's g = 1.38, 95% CI = 1.12–1.63 *Interventions delivered online:* z(1) = 4.36, p < .001, Hedge's g = 1.21, 95% CI = 0.67–1.76 *Interventions delivered in schools:* z(9) = 3.91, p < .001, Hedge's g = 1.03, 95% CI = 0.51–1.55 *Interventions focused on the children alone:* z(13) = 5.93, p < .001, Hedge's g = 1.33, 95% CI = 0.89–1.78 *Interventions that focused on both parents and children:* z(3) = 1.67, p = 0.1, Hedge's g = 0.73, 95% CI = -0.13–1.59 *Combination of both individual and group sessions:* z(6) = 5.29, p < .001 Hedge's g = 1.6, 95% CI = 0.88–1.5
Olivares et al., (2003)	The methodological quality of the studies was medium-high.	It shows the overall efficacy of SAD treatments and their consequent improvement in follow-up, as well as in social skills, depression and self-esteem, although with differentiated effects. It was observed that the combination of audiovisual and live presentation techniques was more effective when both group and individual sessions were carried out in educational contexts. The treatment is more effective when a distributed practice is applied or the therapist is experienced. The most effective treatment for generalized SAD is IAFS followed by SASS.	Efficacy of treatment for SAD: Intervention group: Postest: d_+ = 1.52; 95% CI = 1.34-1.71 Follow up: d_+ = 1.68; 95% CI = 1.41-1.95 *Control group:* Postest: d_+ = 0.25; 95% CI = -0.02-0.53 Follow up: d_+ = 0.57; 95% CI = -0.10-1.24 Depending on the treatment: IAFS: d_+ = 1.90; 95% CI = 1.58-2.21 CBGT-A: d_+ = 1.12; 95% CI = -0.05-2.29 SASS: d_+ = 1.78; 95% CI = -2.78-6.35 CBT (with or without parents): d_+ = 1.10; 95% CI = -1.86-4.07 SET-Asv: d_+ = 2.13; 95% CI = 1.04-3.22 SET-C: d_+ = 1.07; 95% CI = 0.85-1.28

Rosa-Alcázar et al., (2009)	Not detailed	Treatment for SAD effective even after follow-up and less effective for other problems such as social skills, self-esteem and depression. Exposure is the component that most shows its effectiveness in any of its modalities.	Not meta-analysis.
Scaini et al., (2016)	The methodological quality of the studies was medium-high.	The efficacy of CBT in reducing SAD symptoms is shown even after follow-up. The interventions are effective both in clinical and school settings, although the latter appear to be more effective. Also support the claim that the addition of SST but there is no support for the UST component. Others results: Higher efficiency from treatments that extend over time instead of long-term treatment based on long sessions. - No beneficial effects of parental participation in CBT. - Not significant results depending on the age of children and adolescents	Efficacy treatment pre-post design: ES of 0.99 (SE:0.15, p< 0.001, Test of Null (2-Tail): zvalue = 6.40, 95% CI=0.68-1.29) Active treatment vs. waiting-list control condition: ES of 0.71(SE:0.14, p< 0.001, Test of Null (2-Tail): z-value 5.20, 95% CI=0.45–0.98) Follow-up from 6 to 12 months: ES of 1.18 (SE:0.18, p < 0.001, Test of Null (2-Tail): z-value 6.43, 95% CI=0.82–1.54,) Sample mean age: b point estimate= 0.10, SE= 0.07, p = 0.17, z-value= 1.37, 95% CI=−0.04–0.24 Number of parental involvement sessions: b point estimate = −0.02, SE= 0.05, p = 0.71, z-value= −0.37, 95% CI=−0.13–0.09 Total minutes of parental involvement: b point estimate= 0.00, SE= 0.00, p = 0.87, z-value= −0.16, 95% CI=−0.00–0.00 Studies with SST: ES: g = 1.02, p < 0.001, 95% CI=0.67–1.37 Studies without SST: ES: g = 0.87, p = 0.006, 95% CI=0.24–1.49 Studies with UST: ES: g = 1.01, p < 0.001, 95% CI=0.64–1.38 Studies without UST: ES: g = 0.98, p < 0.001, 95% CI=0.52–1.43 Clinical treatments: g = 0.67, p < 0.001, 95% CI=0.41–0.92 School interventions: g = 1.55, p < 0.001, 95% CI=1.04–2.06
Silverman et al., (2008)	Metodological robust (n = 22) and metodological fairly rigorous (n = 10).	CBT is effective for the treatment of SAD even for other symptoms such as depression and internalizing and externalizing behavior problems. Individual and group treatment seem to have similar results. Involving parents in treatment does not seem to be effective in both individual and group treatment for SAD but it seems to be effective in reducing other symptoms such as depression and internalizing and externalizing behavior problems.	Efficacy treatment pre-post design anxiety symptoms: *CBT general:* d = 0.44, SDd = 0.2346, SESD = 0.1184, Res Sd = 0.2025, %VarSE = 25.46, 95% CI=0.04-0.83 *CBT with individual sessions:* d = 0.46, SDd = 0.2579, SESD = 0.1306, Res Sd = 0.2224, %VarSE = 25.65, 95% CI=0.03-0.90 *CBT with group sessions:* d = 0.41, SDd = 0.1642, SESD = 0.0938, Res Sd = 0.1347, %VarSE = 32.63, 95% CI=0.15-0.68 *CBT with individual sessions + parents sessions:* d = 0.31, SDd = 0.1429, SESD = 0.1034, Res Sd = 0.0986, %VarSE = 52.35, 95% CI=0.11-0.50 *CBT with group sessions + parents sessions:* d = 0.38, SDd = 0.1691, SESD = 0.0816, Res Sd = 0.1428, %VarSE = 23.25, 95% CI=0.09-0.68

Table 3. Risk of bias of included systematic reviews.

Study	AMSTAR-2 items																Quality rating
	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	
Biagianti et al., (2020)	+	-	-	+/-	+	+	+	-	+/-	-	NM	NM	+	+	NM	+	Low
Cordier et al., (2021)	+	-	+	+/-	+	+	+	+/-	+	+	+	+	+	+	+/-	+	Low
Olivares et al., (2003)	+	-	-	+	-	-	+	+	+	+	+	+	+	+	+	-	Moderate
Rosa-Alzácar et al., (2009)	+	-	+	+	-	-	+	+	+	+	NM	NM	+	+	NM	-	Low
Scaini et al., (2016)	+	-	-	+/-	+	+	+	+	+	+	+	-	+	+	+/-	+	Low
Silverman et al., (2008)	+	+/-	+	+/-	+	+	+/-	+	+	+	+	-	+	-	-	-	Low

Note. Yes: +; Partial Yes: +/-; No: -; Not meta-analysis: NM.

effective in follow-ups after 6 months and up to 5 years. Specific treatments for SAD have also been shown to be effective in reducing other types of symptoms related to the disorder such as poor self-esteem, social skills (Olivares et al., 2003, Rosa-Alcazar et al., 2009 and Silverman et al., 2008), and internalizing and externalizing problems (Silverman et al., 2008). Two reviews found that the most commonly-used and most effective component was exposure in any of its modalities (Olivares et al., 2003 and Rosa-Alcazar et al., 2009). Another review showed that social skills training was also effective (Scaini et al., 2016).

The most effective intervention program appeared to be IAFS (Garcia-Lopez, 2000), followed by SASS (Masia et al., 2001), according to Olivares et al. (2003). Moreover, it seems that in terms of intervention programs focused on cognitive bias, CBMT-I is useful, whereas CBMT-A does not seem to be very beneficial (Biagianti et al., 2020).

Among other important results, three reviews indicated that applying CBT was more beneficial in the school setting (Cordier et al., 2021; Olivares et al., 2003; Scaini et al., 2016). Three other reviews concluded that interventions for SAD were more effective if they did not include the parental component (Cordier et al., 2021; Scaini et al., 2016; Silverman et al., 2008). Three reviews reported no differences in terms of efficacy between individual or group session (Cordier et al., 2021; Olivares et al., 2003; Silverman et al., 2008), although a combination of these two types seems to be more effective (Cordier et al., 2021; Olivares et al., 2003). Finally, two reviews indicated that sessions spread over a longer period time were more effective than longer sessions delivered over a shorter period of time (Olivares et al., 2003; Scaini et al., 2016).

Risk of bias

Table 3 shows the methodological quality and risk of bias. Of the 9 studies selected initially, 3 were eliminated (Caletti et al., 2022; Davis III et al., 2011; Segool & Carlson (2008) following the quality analysis because they were assessed as having critically low levels of reliability.

Discussion

Through this umbrella review, we examined and summarized systematic reviews and meta-analyses about the efficacy of psychological treatments for SAD in children and adolescents. We found that CBT is one of the most widely-used treatments in this type of population, which is in line with data from the National Institute for Health and Care Excellence (NICE, 2013). This is clearly so, since all of the reviews we analyzed included CBT as a treatment program and attempted to determine its efficacy for treating SAD in adolescents and children. Perhaps one of the reasons why CBT is so widely used is that it teaches cognitive and behavioral competences that are useful in everyday life (Caletti et al., 2022) or because it works on the disorder's etiology and maintenance factors.

What almost all the selected systematic reviews have in common is that CBT is a generally effective type of intervention for addressing SAD in the child-adolescent population (Cordier et al., 2021; Olivares et al., 2003; Rosa-Alcazar et al., 2009; Scaini et al., 2016 & Silverman et al., 2008) even at follow-up (Olivares et al., 2003; Rosa-Alcazar et al., 2009; Scaini et al., 2016). Furthermore, the data indicate that not only are SAD symptoms reduced but there are also improvements in other symptoms such as social skills, depression (Olivares et al., 2003, Rosa-Alcazar et al., 2009; Silverman et al., 2008), and internalizing and externalizing problems (Silverman et al., 2008), although all the studies show that there are smaller reductions in these symptoms, unsurprisingly since the programs are specific for SAD. However, Scaini et al., (2016) found no reduction in symptoms of depression, showing that more studies are needed on the effects of SAD interventions on secondary symptoms. Olivares et al., (2003) indicates that the most effective of the treatment programs analyzed is IAFS (Garcia-Lopez, 2000), followed by SASS (Masia et al., 2001). The efficacy of SAD treatments can be explained in part by the program components, since it seems that one very effective component for SAD treatment is exposure, either in audiovisual or live formats (Olivares et al., 2003; Rosa-Alcazar et al., 2009), something that is supported by other studies (Antona & Garcia-Lopez, 2008; Ballesteros & Labrador, 2018).

Another widely-studied component is Social Skills Training (SST). This was examined in detail in Scaini et al., (2016), indicating that this type of session could improve the efficacy of treatment for SAD in children and adolescents, and suggesting that the social skills component rather than exposure to the social group is what should be included in CBT for SAD due to its effectiveness in this population. This is consistent with another finding from the analysis of reviews, since there seem to be no significant differences in terms of efficacy between treatment programs with individual sessions or programs with group sessions (Cordier et al., 2021; Olivares et al., 2003; Silverman et al., 2008). Cordier et al., (2021) and Olivares et al., (2003) found that combinations of group and individual sessions were more effective. Those authors explained this result by indicating that group sessions cause subjects to be exposed to stimuli that cause fear, so they are exposed to the stimulus and have to face it directly. This means they will put what they have learned into practice, there will be habituation, and therefore reduction in SAD. However, in individual sessions, the therapist focuses on the subject's needs, working specifically on their weak areas, and there would be more patient involvement. This means that a combination of both types of sessions will be more beneficial.

Parental sessions do not seem to be effective in terms of reducing symptoms for SAD in children and adolescents (Cordier et al., 2021; Scaini et al., 2016; Silverman et al., 2008). This is supported by previous studies (Barret et al., 1996), especially when working with

older children (Kendall et al., 2008). However, Silverman et al., (2008) found that although these types of sessions were not beneficial for SAD, they did seem to be effective in reducing other types of symptoms associated with SAD, such as depression, and internalizing and externalizing problems. This is in contrast to the recommendations from Mychailszyn et al., (2010) and the study by Garcia-Lopez et al. (2014), who found that reducing Expressed Emotion (EE) by parents of adolescents with SAD produced greater benefits for those children. This may mean that other components that could affect children's SAD, such as EE, must be worked on with parents. Hence, there is a need to study the family component in interventions for SAD in children and adolescents.

The studies we examined suggest that the best setting for interventions is in schools (Cordier et al., 2021; Olivares et al., 2003; Scaini et al., 2016), which other authors also recommend (Crozier, 2014; Mychailszyn et al., 2010). There are a number of advantages to this setting, such as reducing the fear of being "labeled" and even children and adolescents being able to practice the skills they learn, promoting generalization (Garcia-Lopez et al., 2006), or these positive results could be due to the better environment. The review suggests that it is better for sessions to be spread over time (Olivares et al., 2003; Scaini et al., 2016), and that interventions should be carried out by experienced therapists (Olivares et al., 2003).

Finally, it is important to highlight the results from Biagianti et al. (2020), which focused on working on CBMT. They found that CBMT-A was not an effective tool but that CBMT-I was effective. Those authors indicate that CBMT is useful when the objective for the treatment of SAD is interpretation biases that people with this disorder may have, hypothesizing that these biases are an etiological and maintaining factor for this disorder (Biagianti et al., 2020) since people with SAD are especially sensitive to stimuli that suggest the possibility of a negative evaluation by other people (Bublatzky & Alpers, 2017).

Limitations

The first limitation of the study is the small number of articles selected and this warrants caution in interpreting the results. The limitation is because we found many studies in which the objective was to determine the efficacy of treatment for anxiety, implying that children and adolescents were treated collectively without taking into account the disorder they presented. This led to those articles being excluded, examples include Baker et al., (2021) and Carlucci et al., (2021). Due in part to the small number of studies, another limitation was that the present study only covers CBT-type interventions for SAD. It was not possible to include any studies on "third wave" therapies.

Finally, another limitation of the study was in evaluating risk of bias. We used the AMSTAR-2 tool, which had to be modified in certain items, since it is a medicine-focused tool, and in certain aspects it is not suited to psychology. To address this, the authors made a series of agreements to be able to correctly assess risk of bias.

Future directions

Protective factors are fundamental for children to overcome shyness in adolescence and early adulthood, this means that research needs to continue into the effectiveness of interventions and the components that work best. It is also essential to determine the long-term effectiveness of SAD interventions for example, into adulthood. In addition there need to be systematic reviews of treatment format (face-to-face or virtual), the benefits of "third wave" therapies, and other non-CBT interventions. Finally, it is essential to establish whether including parents in treatment for SAD in children and adolescents is effective, or at least determine exactly what work should be done with parents so that their children get the most benefit from treatment.

Conclusions

Existing CBT treatments for SAD in the infant-juvenile population are effective in the short and long term, with the data indicating that the most effective treatments are IAFS (Garcia-Lopez, 2000) and SASS (Masia et al., 2001). The components that seem to be most effective are exposure—in any modality—and social skills training. As for more specific interventions, CBMT-I is useful when the aim of the intervention is patient interpretation bias. Other considerations to take into account for effective treatment of SAD in children and adolescents include the sessions being spread over time, and being carried out in the school setting, by an experienced therapist, in a combination of group and individual sessions.

Author statement

Database research was done independently by MMDC and JAM, who also carried out the screening of titles and abstracts for eligibility. Full texts were independently assessed by MMDC, LEF and LJGL, who also extracted the relevant information from systematic reviews or meta-analysis. Methodological quality was assessed by MMDC, LEF and JAM. All parts of the umbrella review were written by MMDC. All authors discussed the results and contributed to the final manuscript.

Funding source

No financial support was received for the research, authoring and/or publication of this umbrella review.

Conflict of interest

The authors declare that there are no conflicts of interest.

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