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Benchmarked effectiveness of family and school involvement in group exposure therapy for adolescent anxiety disorder

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ABSTRACT

Although cognitive-behavioral therapy (CBT) is an effective treatment for adolescents with anxiety disorders, the majority remain impaired following treatment. We developed a group CBT program (*RISK*) with high degrees of exposure practice and family and school involvement delivered in a community-based setting and investigated its effectiveness. The treatment involved adolescents ($N = 90$), with a primary diagnosis of anxiety disorder (82%) or obsessive-compulsive disorder (18%), and their families who received 38 hours of group treatment over 10 weeks. Diagnostic status and symptom severity were assessed at pre- and post-treatment, and a 12-month follow-up and benchmarked against previous effectiveness studies. Our results showed that, at post-treatment, the *RISK*-treatment was comparably effective as benchmarks on measures of diagnostic status, parent-rated measures, adolescent-rated measures, and clinician-rated measures. At 12-month follow-up all outcomes were superior to benchmarks, including the proportion of participants in remission (79.5%, 95% Highest Posterior Density Interval [74.7, 84.2]), indicating that the *RISK*-treatment enhanced effectiveness over time. The combination of group format, a high degree of exposure practice, and school and family involvement is a promising format for real-world settings that may help sustain and increase treatment effectiveness. Trial registered at helseforskning.etikkom.no (reg. nr. 2017/1367).

1. Introduction

Anxiety disorders are common in the developmental stage of adolescence (12–18 years of age), with a prevalence rate of 4%-8% (Essau et al., 2018; Vizard et al., 2018). Anxiety disorders during adolescence inhibit the ability to seek autonomy and enter adulthood because they negatively affect social interaction, the development of independent living skills and educational outcomes (Swan et al., 2018). Furthermore, these impairments can continue into adulthood if left untreated (Swan & Kendall, 2016). Given the prevalence and negative impact of anxiety disorders in adolescents it is an important challenge to design interventions that provide short- and long-term effectiveness in routine-care clinical settings.

The best-established treatment for child and adolescent (2–19 years of age) anxiety disorders is cognitive-behavioral therapy (CBT), which has shown effect in specialized settings (i.e., efficacy) and in routine-care settings (i.e., effectiveness) in several meta-analyses (Whiteside et al., 2020; Wergeland et al., 2020; James et al., 2020). Regarding outcomes in routine-care settings, Wergeland et al. (2020) describe the outcomes of 29 studies on CBT for anxiety conducted in clinical routine-care or school healthcare settings. These outcomes were based on studies that primarily included children (Mean age = 9.9 years, SD = 1.7), with only 2 studies having a mean age above 12 years (Bodden et al., 2008, van Steensel & Bögels, 2015). The treatments were delivered individually or in groups, lasted 4–20 hours (M = 12.6, SD = 4.6) and included moderate to high degrees of family involvement. The

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results indicate that at post-treatment, half of the children and adolescents were not in remission (loss of all anxiety diagnoses), and at follow-up one-third were not in remission.

The importance of treatment outcome research focusing on adolescents specifically has been highlighted by a recent meta-analysis by Baker et al. (2021). This meta-analysis presented 15 studies on CBT for adolescent anxiety, with 4 studies with adolescents receiving treatment in routine clinical care. The treatments were delivered individually or in groups, lasted 4–24 hours and parents were included in 7 of the studies. The results indicated that at post-treatment, two-thirds of adolescents were not in remission. These discomforting results may be considered in light of the characteristics of adolescents in contrast to children, which include more severe symptoms, more difficulty attending school and higher rates of social anxiety disorder (SAD) (Waite & Creswell, 2014). Notably, SAD is associated with poorer treatment response (Hudson et al., 2015) and predicts a greater risk of relapse after treatment (Ginsburg et al., 2018). Based on the above-mentioned observations, it has been recommended that interventions should be designed specifically for adolescents to handle more severe symptoms, more difficulty attending school and higher rates of SAD (Waite & Creswell, 2014). When questioning adolescents themselves, they are interested in interventions that are effective, do not interfere with participation and attendance in school, are intensive (i.e., longer sessions) and interventions with varied activities (Persson et al., 2017).

To address severe symptoms and improve the effectiveness of treatments for child and adolescent anxiety, several approaches have been investigated. The majority of these approaches have focused on increasing exposure practice, which is consistently associated with improved treatment effects (Whiteside et al., 2020). Additionally, a substantial amount of research has investigated the effect of modifying the type and amount of family involvement (Manassis et al., 2014; Sigurvinsdottir et al., 2020). The importance of involving parents is that they may reduce treatment dropout, increase treatment adherence and enhance trust and communication between parents and adolescents, which are known are protective factors against anxiety in adolescents (Ebbert et al., 2019; de Haan et al., 2013; Lee et al., 2019). Despite the potential benefits of involving parents, results on effectiveness are inconsistent, with a Cochrane review suggesting no added benefit (James et al., 2020). However, several studies suggest that parental involvement increases treatment effectiveness insofar as the treatment focuses on increasing the overall exposure practice (Breinholst et al., 2012; Manassis et al., 2014; Whiteside et al., 2020). A promising format for exposure enhancing parental involvement is the multi-family group. Lau et al. (2010) employed such a format in an effectiveness study setting for children (age 6–11 years) and included in-session exposure practice in two-thirds of the treatment sessions, which is substantially more than the average one of five sessions (Wergeland et al., 2020). As a result, Lau et al. (2010) demonstrated effectiveness with a remission rate of 65% at post-treatment.

To avoid interfering with adolescents' school participation, and address any difficulties attending school, CBT for adolescent anxiety could potentially benefit from involving school personnel (e.g., teachers, school nurses) in treatment. In addition to practical help, school personnel could, similar to parent involvement, increase engagement in exposure practice. The school environment is also important because adolescents spend a large amount of time in this setting and often report that school is where their disability is most profound (Beidas et al., 2012). Involving school personnel in CBT for adolescents with anxiety symptoms offers potential benefits for challenging fears directly in the school environment (Werner-Seidler et al., 2017), thereby further enhancing the generalizability of CBT-related learning.

Given the consequences of anxiety disorders in adolescents, there is a need for interventions that provide short- and long-term effectiveness in routine-care clinical settings. However, there are several limitations to the current literature. There is a paucity of research on effective treatments for adolescents in routine-care clinical settings (Wergeland et al., 2020; Baker et al., 2021). Particularly, it has been noted that there is a need for more knowledge on outcomes at follow-up and full remission (i.e., loss of all anxiety diagnoses) in adolescents receiving CBT for anxiety (Baker et al., 2021). Another limitation is that most effectiveness studies with parental involvement for adolescent anxiety disorders often contain little or no in-session exposure practice (Dekel et al., 2021, Haugland et al., 2020, Wergeland et al., 2014). Also, despite the potential benefits of involving school personnel as an adjunct to the treatment delivered in clinical settings, no studies of clinic-based treatment augmented by the involvement of school personnel exist. The lack of research on such exposure enhancing interventions may be due to cost-effectiveness considerations. There has been an increasing interest in finding effective and affordable interventions (Ollendick et al., 2018). Although developing low-cost interventions is important, it is equally important to investigate more resource-demanding interventions, which may be potentially more effective. Additionally, investigating more costly interventions may aid in understanding what treatments should be delivered to whom and when. More expensive interventions may still be cost-effective and could play an important role in stepped care approaches (Ollendick et al., 2018).

Thus, to extend the research on effective treatments for adolescents with anxiety disorders in routine-care settings, a treatment (named *RISK*, which refers to taking a chance) was developed to maximize the total exposure practice through parental involvement and involvement of school personnel. The treatment was developed to be delivered in a multi-family group format, include active involvement of school personnel, and allow the inclusion of adolescents with a broad range of anxiety disorders. Such transdiagnostic treatment is of particular importance in small routine-care clinics where it may not be feasible to conduct treatments targeting only one or two anxiety disorders.

This study examines the effectiveness of the multi-family group CBT (*RISK*) that includes three important enhancement approaches for adolescents: extensive and systematic family involvement, engagement of school personnel, and a high degree of self-conducted and therapist/family/peer-facilitated exposure practice. The study design was a single arm open trial and comparative effectiveness was assessed through benchmarking against a recent meta-analysis on the effectiveness of CBT for children and adolescents with anxiety disorders and symptoms (Wergeland et al., 2020). A meta-analysis that included children was preferred over one that only included adolescents because it allowed more comprehensive comparison, including outcomes at follow-up and assessing differences in adolescent-, parent- and clinician-rated outcome measures. Our primary aim was to investigate whether enhanced treatment would outperform the benchmark on measures of diagnostic status (i.e., loss of all anxiety disorder) at post-treatment and follow-up. Secondary aims were to compare clinician-, parent-, and adolescent-rated anxiety symptoms to benchmark at post-treatment and follow-up, as well as to assess loss of primary diagnosis and clinically significant change. Furthermore, disorder-specific outcomes were assessed.

2. Method

2.1. Participants

Participants were 90 adolescents, aged 12–18 (M = 15.29, SD = 1.32), and their parents, recruited from two community clinics for child and adolescent mental health between 2017 and 2019. Participants were informed about the study during routine intake procedures or after clinical evaluation suggesting the presence of an anxiety disorder. Parents and adolescents were invited to participate in the study if the adolescents met the Diagnostic and Statistical Manual of Mental Disorders 4th edition (American Psychiatric Association, 1994) criteria for a primary anxiety disorder (e.g., separation anxiety disorder, social anxiety disorder [SAD], specific phobia, panic disorder with or without agoraphobia, agoraphobia, generalized anxiety disorder, or

obsessive-compulsive disorder [OCD]) as assessed by the Anxiety Diagnostic Interview Schedule Child and Parent version (ADIS-C/P) (Silverman & Albano, 1996). The diagnostic criteria from DSM-IV were chosen because the ADIS-5 has not yet been translated to Norwegian. Exclusion criteria for the study were as follows: the presence of a developmental or psychotic disorder, current self-harm behavior or suicidal ideation, concurrent participation in psychological treatment, a psychopharmacological treatment that had not been stable for 6 months before study enrollment, receiving CBT within the past 12 months, or not attending school more than 50% of the time over the previous month. In the exclusion criteria, a developmental disorder was defined as meeting criteria for a diagnosis of mental retardation or pervasive developmental disorder. The exclusion based on developmental disorder, psychotic disorder, current self-harm or suicidal ideation was not part of the study design *per se* but due to procedures at the clinic, which dictated that such disorders should be treated before anxiety disorders. The school attendance exclusion criterion was due to practical concerns about the school personnel involvement in the treatment. Only one participant was receiving concurrent psychopharmological treatment (Methylphenidate). Recruitment and attrition are described in Fig. 1.

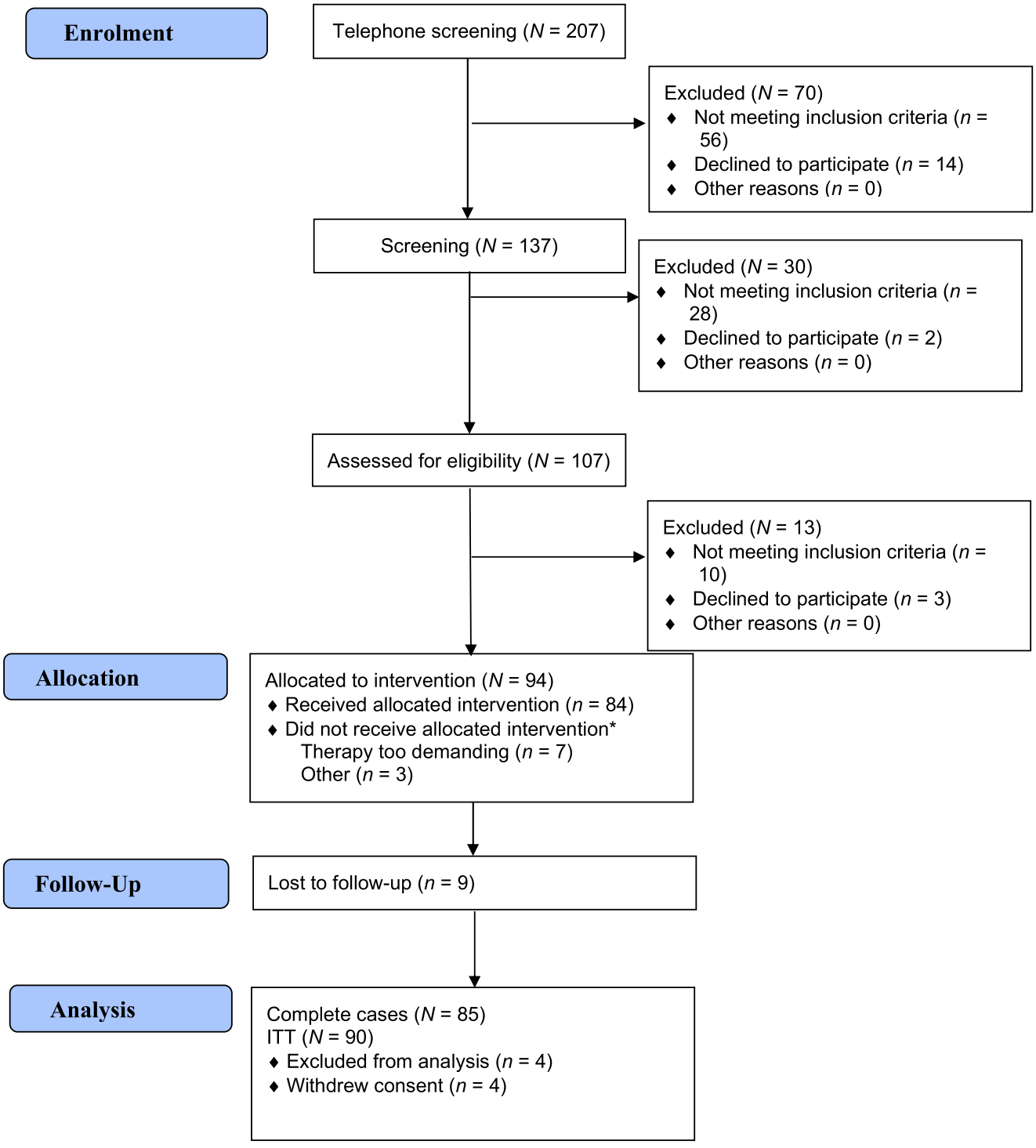

Fig. 1. Consolidated Standards of Reporting Trials (CONSORT) flow diagram.

2.2. Measures

2.2.1. Primary outcome measure

The ADIS-IV-C/P (Silverman & Albano, 1996) was employed to determine the adolescents' diagnostic status. The ADIS-IV-C/P is a semi-structured interview administered separately to the adolescent and parents and has excellent reliability (Silverman et al., 2001). Diagnoses and clinical severity ratings (CSR) were assigned as per the ADIS-IV-C/P manual. A CSR of four or higher (0–8 scale) indicates the presence of a diagnosis. Remission was defined as being free from all anxiety diagnoses. The diagnostic interviews were conducted and rated by participating clinicians. Efforts were made to ensure that assessments after treatment were not completed by clinicians who had delivered treatment within a group. Despite these efforts, 20% of participants were assessed by a clinician from the group they participated in. All interviews were videotaped, and a random selection of 20% of the interviews at pre- and post-treatment, and at the 12-month follow-up were re-rated by trained independent expert raters (one clinical psychologist, one child psychiatrist, and one clinical social worker) masked to the original assessors' rating. The inter-rater reliability on CSR, using Cronbach's α was 0.91, 0.94, and 0.97 for primary, secondary, and tertiary diagnoses, respectively.

2.2.2. Secondary outcome measures

The child and parent version of the Spence Children's Anxiety Scale (SCAS-C/P) (Spence, 1998) was used to assess adolescents anxiety symptoms. The SCAS includes 38 items rated on 4-point Likert scales, yielding a maximum score of 114. Spence (1998) reported a six-month test-retest reliability of 0.71 and significant correlations with other anxiety measures. In the current sample, the SCAS-C showed excellent reliability (Cronbach's $\alpha = 0.90$), and the SCAS-P showed good reliability (Cronbach's $\alpha = 0.87$).

The severity measure of the Clinical Global Impression (CGI-S) (Guy, 1976) scale was used to assess clinician-rated global impairment and functioning as rated by clinicians delivering the treatment. The CGI-S evaluates the severity of the patient's illness and comprises seven items ranging from 1 (*normal*) to 7 (*extremely ill*). The CGI-S is significantly correlated with self-reported measures of anxiety, depression, everyday functioning, and quality of life (Zaider et al., 2003). In this study, the CGI-S showed excellent reliability (split-half coefficient = .92).

2.3. Procedure

Participants were recruited from two community-based clinics for child and adolescent mental health that are part of the general national health services in Norway. Potential participants were contacted if there was an indication of a primary anxiety disorder in the referral letter or after a clinical evaluation suggesting the presence of a primary diagnosis of anxiety disorder. Eligibility was ascertained in three steps: (a) participants were contacted by phone by a study coordinator and screened for self-injurious behavior, suicidal ideation, and school attendance. Potentially eligible participants were (b) informed about the research project and asked to participate. Those who agreed met with a clinician (*RISK*-therapist) for initial screening and received information about the *RISK*-treatment. Finally, (c) participants met for an assessment with a participating clinician where ADIS-C/P and other study measures (SCAS-C/P, CGI-S) were completed. After treatment and at 12-month follow-up adolescents met a participating clinician to complete ADIS-C/P, SCAS-C/P, and CGI-S. Assessments after treatment completion were planned in an effort to avoid adolescents being assessed by clinicians who had delivered therapy within their group.

Treatment completion was defined as having participated >50% of the intervention. This low threshold to be categorized as a completer was set based on considerations of the intensive nature of the treatment and what we considered essential aspects of treatment. Out of 38 hours of treatment 24 hours are spent in 4 intensive exposure days, which are considered essential. Therefore a limit was set such that completers must have attended at least one of these. Written informed consent was obtained for the entire sample, and the study was approved by the Regional Ethics Committee for research with human subjects (reg. nr. 2017/1367).

2.4. Treatment

The multi-family group CBT for anxiety disorders was based on general CBT principles and developed specifically for the study. The treatment was conducted in groups of five to eight families (mean group size: 7 families). In total, 14 groups received treatment during the study period. The treatment consisted of 12 sessions, lasting 38 hours over 10 weeks (including two 1.5-hour sessions with school personnel). Participating families were invited to attend 2-hour follow-up booster sessions at 3-, 6-, and 12-months post-treatment.

The *RISK*-treatment included standard CBT-based interventions for child and adolescent anxiety. Further, the treatment included a high degree of self-conducted and therapist/family/peer-facilitated exposure practice, parental participation, and adolescents' school personnel involvement (see Table 1 for treatment description). A distinctive aspect of the *RISK*-treatment was in sessions 5, 6, 9, and 10. During these sessions, four hours were dedicated to exposure practice by the adolescents in locations outside the clinic (e.g., at school, in the shopping center, on a bus). In these sessions, adolescents were paired with parents other than their own and a group clinician. Clinicians would manage smaller groups of 1–3 adolescents and their accompanying parents as they went outside the clinic. The mixing of families allowed the adolescents and parents to practice the techniques learned in earlier sessions without being affected by existing family dynamics. This process aimed to maximize the time spent by the adolescents performing exposure practice and, to an equal degree, help parents become more confident in their ability to assist in conducting exposure practice. Another distinctive feature of the *RISK*-treatment was the involvement of school personnel. The amount and type of school personnel involvement varied as per the needs of individual adolescents. For some adolescents, their anxiety symptoms were not visible in the school setting, and school personnel mainly aided in the logistics of planning day-to-day schoolwork around the treatment, given that sessions took place during school hours. For other adolescents, their anxiety symptoms were primarily experienced in the school setting; thus, school personnel played a much more active role in planning, facilitating, and conducting exposure practice with the adolescents.

2.5. Clinicians, clinics, and assessors

Participating clinicians ($N = 20$) were employed at one of two community-based clinics. The clinics service a population of 76,000 children and adolescents between the ages of 0 and 18 in rural and urban areas of southern Norway. Due to changing employment or taking leave from work, eight of the initial cohort of 12 study clinicians were replaced during the study period, leaving a total of 20 clinicians (70% female) who served as *RISK*-therapists during the trial. Each group session included four clinicians. The clinicians had 11.8 years of experience, on average, in child and adolescent mental health care ($SD = 7.9$, range = 2–30). The clinicians comprised different professional backgrounds, including six clinical psychologists, six social workers, four nurses specialized in psychiatry, two child psychiatrists, one pediatrician, and one schoolteacher. They volunteered for the study and conducted treatments as part of their ordinary workload.

Training of clinicians was conducted through participation in workshops and supervision. Eleven of the clinicians had formal education in CBT but received the same amount of training and supervision as those with no formal education. In preparation for delivering the study intervention, clinicians took part in three training workshops, each

Table 1
Treatment description.

	Time (hours)			Intervention	% of time within session
	Together	Adolescent only group	Parent only group		
Session 1	0	0	1.5	Psychoeducation for parents and school personnel	50%
				Planning collaboration between parents and school personnel	50%
Session 2	1.5	1	1	Psychoeducation for adolescents and parents, with emphasis on exposure practice and accommodation	33%
				Cognitive restructuring, targeting beliefs about exposure practice and accommodation	33%
				Exposure practice performed collectively	23%
				Homework planning	10%
Session 3	1.5	1	1	Cognitive restructuring focusing on thought distortions	45%
				Exposure practice performed collectively	45%
				Homework planning	10%
Session 4	1.5	1	1	Psychoeducation about performing behavioral experiments and troubleshooting exposure practice	20%
				Exposure practice performed as behavioral experiments	70%
				Homework planning	10%
Session 5	4	1	1	Preparation	10%
				Exposure practice with adolescents paired with a parent to other participating adolescents under clinician supervision	80%
				Homework planning	10%
Session 6	4	1	1	See session 5	
Session 7	1.5	1	1	Psychoeducation for adolescents, parents, and guests	33%
				Cognitive restructuring	33%
				Exposure practice	23%
				Homework planning	10%
Session 8	1.5	1	1	Cognitive restructuring	
				Exposure practice	45%
				Homework planning	10%
Session 9	4	1	1	See session 5	
Session 10	4	1	1	See session 5	
Session 11	1.5	1	1	Exposure practice	80%
				Planning and acknowledging progress	20%
Session 12	0	0	1.5	Planning collaboration between parents and teachers	100%
Total	25	10	13		

Note. Sessions 5, 6, 9, and 10 follow the same format. In these sessions, the adolescents perform exposure practice with parents other than their own. This process is conducted to allow parents and adolescents to practice learned skills without getting disrupted by pre-existing interpersonal dynamics. In session 7, the adolescents are encouraged to invite guests who are important to them to the therapy. These guests receive psychoeducation similar to that received by parents and the adolescents in session 2.

lasting two days. Supervision was conducted by the program developer, who either took part in a treatment group or provided monthly supervision based on videotaped sessions. Fidelity to treatment was achieved through the training of clinicians, ongoing supervision, and the use of a treatment manual.

Six clinicians were trained in the administration of the ADIS-C/P interview. These were 2 clinical psychologists, 2 nurses specialized in psychiatry, 1 child psychiatrist and 1 social worker. The training was achieved through a two-day workshop seminar that included training in scoring and administration. The workshop was delivered by a licensed ADIS-C/P rater. All but one of the clinicians selected to conduct the ADIS interview had extensive prior experience with its use.

2.6. Data analysis

To compare findings to benchmarks a Bayesian analysis of informative hypotheses was performed (Gu et al., 2018). This approach was chosen because it would allow information on which alternative hypotheses (i.e., inferiority, equivalence) were most probable if the hypothesis of superiority was not supported (Gu et al., 2018). The planned sample size was 102 based on the estimation method by Schönbrodt et al. (2017). The estimation was based on a power of 0.80, with a minimal effect of 50% remission at post-treatment in expectation of a 20% treatment dropout.

The overall amount of missing information was 10%, with 56% of cases containing missing information. Missing data was primarily due to treatment dropouts and, to a lesser degree, an incomplete response at the item-level by treatment completers. There was no indication of any pattern of missingness in the data, and Little's test of missing completely at random (MCAR) indicated that the data were not different from MCAR ($p = .23$). Missing data for all variables were accommodated using multiple imputations, with 50 imputed datasets. All analyses were performed using the intent-to-treat principle unless otherwise specified.

Bayesian sensitivity analyses were performed to investigate the effect of assumptions about nesting of variables (i.e., by group, site, clinician),

normality, inclusion of outliers and differences between assessors (same-group clinician vs. not same-group). These indicated that the analyses were consistent across different assumptions of nesting, normality, and inclusion of outliers and that there was no difference in outcome between assessors. Thus, all participants were included in the analysis, and the simpler model of no clustering effect was employed for analyses. As recommended for Bayesian procedures (Depaoli & van de Schoot, 2017), we also assessed how robust results were to different priors, and found that results were similar across different priors.

For all outcomes, the posterior distribution simulation was performed using Metropolis-Hastings Monte Carlo (Hastings, 1970), applying three chains, 12,500 burn-ins, and 50,000 iterations. Every fifth iteration was used to avoid autocorrelation on measures with few observed instances. Convergence and stability of simulations were checked using the Gelman-Rubin statistic. Inferential statistics were the posterior probability, the Bayes factor for the alternative over the null (BF_{10}), and the highest posterior density interval (HPD). The posterior probability describes the probability of a certain hypothesis. The BF_{10} describes the weight of evidence for one hypothesis over another and allows for a three-logic interpretation, indicating the following: (a) there is evidence for the alternative hypothesis, (b) there is evidence for the null, or (c) there is not much evidence for one over the other hypothesis (Dienes & McLatchie, 2018). A BF_{10} above 3/1 or below 1/3 was considered evidence for one hypothesis over another. The HPD describes the interval where the true parameter has a 95% probability, with values closer to the center being more probable.

For dichotomous outcomes, Bayesian logistic regression was employed. Prior distributions for regression coefficients were diffuse normal with a mean of 0.5. For continuous outcomes, Bayesian linear regression was used with diffuse normal priors with a mean of 0 for coefficients.

Secondary analyses were conducted to examine the effect of the primary anxiety disorder type on treatment outcomes. Bayesian multinomial logistic regression was used for dichotomous outcomes, and Bayesian repeated-measures ANOVA for continuous outcomes. Both the direct and interaction effects were assessed.

2.7. Benchmarking and reliable change

Tests against benchmarks were performed using Bayesian equivalence tests (Klugkist et al., 2005) and Bayesian analysis of informative hypotheses (Gu et al., 2018). Three hypotheses were tested: (a) the observed value is bigger than the benchmark (H_{Bigger}), (b) the observed value is equal to the benchmark (H_{Equal}), and (c) the observed value is smaller than the benchmark ($H_{Smaller}$). Results were reported as the posterior probability of each hypothesis. Benchmarks were selected to assess the clinical comparable effectiveness of the intervention and normative equivalence.

Benchmarks for clinical equivalence were based on a meta-analysis of the effectiveness of CBT for child and adolescent anxiety disorders in routine-care settings (Wergeland et al., 2020). It is important to note that this benchmark included children (age < 12), and thus differs from the current study sample. However, few effectiveness studies in routine clinical care have been conducted with only adolescents (Baker et al., 2021), and those studies that include adolescents generally having lower levels of remission from all anxiety disorders than observed in the benchmark meta-analysis. Thus, the benchmark meta-analysis was chosen because of its comprehensiveness and that it allowed a conservative estimate of the current studies' relative effectiveness.

In the benchmark meta-analysis, the proportion of children and adolescents in remission from all anxiety disorders was estimated at post-treatment (k = 27, 50.7% CI 95% 45.3-56.2) and follow-up (mean length = 10.7 months, k = 22, 69.4%, CI 95%: 64.1-74.3). Benchmarks for other outcomes were based on studies included in the meta-analysis by Wergeland et al. (2020). In raw change scores the benchmarks at post-treatment were for SCAS-P 4.2-11.9, for SCAS-C 6.7-13.0, for CGI-S 0.9-2.2 and for CSR of primary diagnosis 0.5-3.2. At follow-up benchmarks were for SCAS-P 10.8-16.1, for SCAS-C 6.7-16.6 and for CSR of primary diagnosis 1.1-3.8. No benchmark was available for CGI at follow-up. Normative equivalence was defined as scores corresponding to T-scores of less than 60 on the SCAS-C/P and the CGI-S score of 2 *SD* below pre-treatment mean.

Reliable change index (RCI) and clinically significant change were used to assess clinically significant change on the SCAS-C/P and CGI-S (Jacobson & Truax, 1991). Reliable change was defined as RCI > 1.96. No participants experienced a reliable change in a negative direction. Thus, reliable change is only described as present or not. When RCI scores indicated reliable improvement, and the score on the outcome measure was within the normative equivalence the adolescent was considered to have a clinically significant change.

3. Results

3.1. Sample characteristics

The participants were 90 adolescents (77% female) and their parents. Social anxiety disorder (SAD) was the most prevalent primary anxiety disorder (52.4%). Comorbidity was high, with 72.9% of the participants having one and 35.3% having two or more comorbid disorders. The total proportion of adolescents who met diagnostic criteria for anxiety diagnoses was as follows: SAD (67.7%), separation anxiety disorder (10%), generalized anxiety disorder (22.2%), panic anxiety and/or agoraphobia (27.7%), specific anxiety disorder (11.1%), obsessive-compulsive disorder (27.8%). There were no significant differences in the severity of outcome measures (CSR, CGI-S, SCAS-C/P) between sexes at pre-treatment (all comparisons between sex, $p > .05$). There were no significant differences between groups on outcomes after treatment and follow-up (all comparisons of group as predictor of outcome, $p > .05$) and nesting individuals within groups or clinics did not change the results of analysis. At post-treatment adolescents rated on a scale from 1–10 how sure (1 = not sure, 10 = very sure) they would be in recommending the *RISK*-treatment to a friend struggling with anxiety. This measure indicated the treatment to be acceptable by adolescents ($M = 7.1$, $SD = 2.0$, Median = 8). All adolescents had at least one adult from school partake in psychoeducation. Among the school personnel, 76.5% were actively involved in the treatment. On parent-rated measures of school personnel's ability to follow through on treatment aims, the majority were rated as *very good* (24.9%) or *good* (45.3%). Only 4.8% of parents rated school personnel as *poorly* or *very poorly* (see Table 2 for further description of participant characteristics).

3.1.1. Treatment non-completion

Ten participants (11.1%) were defined as treatment non-completers. Reasons for treatment discontinuation were as follows: (a) finding therapy too demanding ($n = 7$), (b) personal disagreement involving another participant ($n = 1$), (c) finding distance to treatment too far ($n = 1$), and (d) receiving an offer for individual therapy with a private practitioner ($n = 1$). See Fig. 1 for the participant flowchart. Post hoc comparisons of completers and non-completers showed no pre-treatment differences ($BF_{10} < 1$) for participants' age, sex, amount of previous therapy, number and severity of anxiety disorders, comorbid disorder, or symptom severity (SCAS-C/P, CGI-S).

3.2. Primary outcome

At post-treatment 42.3% (95% HPD [37.6, 47.0]) no longer met criteria for any anxiety disorder. Benchmarking comparisons indicated inferiority of treatment (Posterior probability; H_{Equal} =.02, H_{Bigger} = .0, $H_{Smaller}$ = .98). At the 12-month follow-up, 79.5% (95% HPD [74.7, 84.2]) no longer met the criteria for any anxiety diagnosis. Benchmarking comparisons indicated superiority over the benchmark (Posterior probability; H_{Bigger}: ~ 1.00). The results were similar for

Table 2
Demographic and clinical characteristics of participants at baseline.

Variable	% (*n*)
Age	15.29 years (*SD* 1.32)
Female	76.50% (69)
Living with	
Single parent	20.50% (19)
Both parents	43.80% (39)
Divorced, shared custody	35.60% (32)
Primary anxiety disorder	
Social Phobia	52.40% (47)
Separation anxiety disorder	4.80% (4)
Generalized Anxiety Disorder	13.10% (12)
Panic Anxiety and/or Agoraphobia	8.40% (8)
Specific Anxiety Disorder	2.40% (2)
Obsessive-Compulsive Disorder	19% (17)
Co-morbid Disorders	
Social Phobia	15.29% (14)
Separation anxiety disorder	5.88% (5)
Generalized Anxiety Disorder	9.41% (8)
Panic Anxiety and/or Agoraphobia	18.82% (17)
Specific Anxiety Disorder	9.41% (8)
Obsessive-Compulsive Disorder	9.41% (8)
Major Depressive Disorder	7.05% (6)
ADHD	1.11% (1)
Tourette's Syndrome	3.52% (3)
Parent's highest education	
Primary school	1.70% (2)
Trade school	28.70% (25)
Secondary school	28.70% (25)
College	41.90% (38)
Parent occupational status	
Full time	74.00% (67)
Part-time	4.10% (4)
Subsidized	19.20% (17)
Stay at home or under education	2.70% (2)
Previous treatment[a]	
0 sessions	27.77% (25)
0-5 sessions	25.55% (23)
6-10 sessions	27.77% (25)
11-20 sessions	13.33% (12)
>20 sessions	5.58% (5)

Note. Description of sample characteristics. Attention-Deficit Hyperactivity Disorder (ADHD). For adolescents with two parents, parental education and occupational status are based on the highest level of parenting.
[a] Number of previous billed sessions registered in public mental health services.

completer analyses (see Table 3).

3.3. Secondary Analyses

3.3.1. Symptom measures

Decrease in adolescent-rated anxiety symptoms (SCAS-C) was equivalent to benchmark at post-treatment (Posterior probability; H_{Equal} = .62, H_{Bigger} = .37) and superiority to benchmark at follow-up (Posterior probability; H_{Equal} = .01, H_{Bigger} = .99). Decrease in parent-rated anxiety symptoms (SCAS-P) was equivalent to benchmark at post-treatment (Posterior probability; H_{Equal} = .48, $H_{Smaller}$ = .51) and at follow-up (Posterior probability; H_{Equal} = .92, H_{Bigger} = .05). Decrease in severity of primary anxiety disorder and clinician-rated symptom severity was superior to benchmarks at post-treatment (posterior probability; $H_{Bigger} \sim 1.00$). Benchmarks were not available for clinician-rated symptom severity, but decrease in severity of primary anxiety disorder continued to be superior to benchmark at follow-up (posterior probability; $H_{Bigger} \sim 1.00$) (see Table 4 for further description).

3.3.2. Clinical significance

Only the adolescents in the clinical range at pre-treatment were included in the analyses of clinically significant change. The proportions of adolescents in the clinical range pre-treatment were SCAS-C (71.8%), SCAS-P (76.1%), and CGI-S (100%). At post-treatment the sample showed equivalence to the normative benchmark on SCAS-C and CGI ($BF_{10} > 150$), thus indicating that there was >150 times more support for the hypothesis that the sample was equal to the normative benchmark than there was support for the hypothesis that it was not equal. At post-treatment there was a slight tendency toward normative equivalence on SCAS-P (BF_{10} = 2.02). At 12-month follow-up the sample showed normative equivalence on SCAS-C, SCAS-P, and CGI ($BF_{10} >$ 150). Further details on reliable change and clinical significance can be found in table 5.

3.3.3. Exploratory analyses

A diagnosis of social phobia negatively predicted remission relative to other diagnoses (*OR* = 0.91, 95% HPD [0.80, 0.99], BF_{10} = 4.61) and loss of primary diagnosis (*OR* = 0.90, HPD 95% [0.81, 0.99], BF_{10} = 5.04). There were no other direct or interaction effects of diagnosis on the CSR, SCAS-P, SCAS-C, and CGI-S (highest BF_{10} = 0.18) outcome measures (Table 6 describes the full remission by primary anxiety disorder).

Exploratory validity checks were performed to assess the impact of the amount of therapy given in addition to *RISK*-treatment. Information was gathered from public health records on the number of therapy sessions attended before beginning the *RISK*-treatment and between post-treatment and the follow-up. The number of treatment sessions given before *RISK* was not associated with change in the probability of remission at post-treatment (*OR* = 1.01, 95% HPD [0.98, 1.03]) or follow-up (*OR* = 0.99, 95% HPD [0.97,1.02]). The study was conducted at a public health community clinic, and thus participants could not be denied treatment between post-treatment and follow-up. Additional therapy sessions between post-treatment and follow-up were offered if the participating adolescents expressed a need for further help. There was a substantial difference in the number of additional sessions between those who were in remission at the 12-month follow-up and those who were not ($t(90)$ = 7.9, BF_{10} = 1.55e+11), indicating that each additional therapy session predicted a lower probability of remission (*OR* = 0.90, 95% HPD [0.87,0.93]).

Among those who achieved remission by the follow-up, 87.5% (*n* =

Table 3
Remission and loss of diagnoses.

	Post-treatment					12-month follow-up				
			Benchmarking[b]					Benchmarking[b]		
	%	95% HPD[a]	H_{Equal}	H_{Bigger}	$H_{Smaller}$	%	95% HPD[a]	H_{Equal}	H_{Bigger}	$H_{Smaller}$
Free of all anxiety disorder (ITT)	42.30	37.63, 47.04	2%	0%	98%	79.52	74.71, 84.16	0	100%	0
Free of all anxiety disorder (complete case)	41.60	30.50, 52.60	59%	3%	38%	85.90	78.10, 93.70	0	100%	0
Free of primary anxiety disorder (ITT)	43.10	38.80, 47.30	-	-	-	81.60	78.30, 84.90	-	-	-
Free of primary anxiety disorder (complete case)	40.50	29.60, 51.40	-	-	-	85.90	78.10, 93.70	-	-	-

Note. Intention to Treat (ITT). Benchmarks were not performed on the loss of primary disorder as these were not available. ITT (*N* = 90), complete case (*N* = 85).
[a] The Highest Posterior Density (HPD) describes the interval with a 95% probability of the true parameter value.
[b] Benchmarking describes the probability that the observed measure is equal to (H_{Equal}), larger than (H_{Bigger}), and smaller than ($H_{Smaller}$) results described in (Wergeland et al., 2020).

Table 4
Parent, adolescent, and clinician-rated outcomes.

	Pre-Treatment		Post-Treatment		Follow-up		Effect size Pre-Post	Effect size Pre-Follow-up	Regression		
	M	*SD*	*M*	*SD*	*M*	*SD*	ES (95% HPD)[a]	ES (95% HPD)[a]	β[b]	*SE*	BF_{10}
SCAS-C	41.99	15.03	30.70	14.65	24.58	15.19	0.36 (0.26;0.46)	0.56 (0.47;0.67)	8.56	1.26	1.1e+8
SCAS-P	33.06	12.81	26.02	10.55	18.47	9.22	0.29 (0.19;0.39)	0.49 (0.39;0.59)	7.12	0.92	3.2e+10
CGI	5.27	0.79	3.40	1.19	2.35	1.21	1.28 (1.15;1.40)	1.70 (1.5;1.9)	1.46	0.09	8.4e+37
CSR1	6.58	1.06	3.91	1.82	2.65	1.62	1.42 (1.29;1.55)	2.37 (2.19;2.55)	1.97	0.05	3.2e+231

Note. Analyses performed on the intent-to-treat sample ($N = 90$). Effect size (ES) is Cohen's d. Spencer Child Anxiety Scale (SCAS): child (C) and parent (P) versions. Clinical global impression (CGI). Clinical severity rating of the primary anxiety disorder (CSR1), as assessed by the ADIS-IV-C/P.
[a] The Highest Posterior Density (HPD) describes the interval with a 95% probability of the true parameter value.
[b] Coefficients are reversed for readability. Higher values indicate the decreasing magnitude of the intervention target.

Table 5
Reliable change.

Time	Measure	SCAS-C	SCAS-P	CGI
Pre-treatment	% in clinical range	71.8	76.1	100
Post-treatment	% Reliable Change	45.1	17.2	77.3
	% Clinically significant change	32.2	10.0	45.2
	[a]*BF* Normative equivalence	> 150	2.02	> 150
12-months follow-up	% Reliable Change	57.6	35.1	85.6
	% Clinically significant change	50.3	32.5	74.0
	[a]*BF* Normative equivalence	> 150	> 150	> 150

Note. Analyses performed on the intent-to-treat sample ($N = 90$). Spencer Child Anxiety Scale (SCAS): child (C) and parent (P) versions. Clinical global impression (CGI). Reliable change was conducted following (Jacobson & Truax, 1991). Adolescents had clinical significant change if they had reliable chance and were within normative equivalence.
[a] The Bayes Factor (BF_{10}) describes the weight of evidence in favor of the hypothesis that results are equivalent to normative samples. Higher values indicate that the sample is equivalent.

Table 6
Remission by primary anxiety disorder at post-treatment and follow-ups.

	Post-treatment			12-month follow-up		
	Remission % (*n*)	*OR*	95% HPD[a]	Remission % (*n*)	*OR*	95% HPD[a]
Separation	75 (3/4)	3	1.19, 7.56	100 (4/4)	10.1	8.43, 11.23
Social Anxiety	29.63 (15/51)	0.44	0.37, 0.51	74.16 (38/51)	4.01	3.91, 4.21
Specific Phobia	50 (1/2)	0.79	0.38, 1.20	100 (2/2)	7.27	6.86, 8.07
Panic Disorder and/or Agoraphobia	42.85 (3/8)	0.77	0.47, 1.07	79.16 (6/8)	4.62	4.47, 4.92
GAD	50 (5/10)	0.7	0.51, 0.89	91.48 (9/10)	6.36	6.15, 6.77
OCD	57.78 (9/15)	0.8	0.48, 1.11	95.45 (14/15)	7.29	6.98, 7.61

Note. Generalized Anxiety Disorder (GAD), Obsessive-Compulsive Disorder (OCD). Results based on intention-to-treat analyses ($N = 90$). Remission is defined as not meeting criteria for any anxiety diagnoses as assessed by the ADIS-IV-C/P.
[a] The Highest Posterior Density (HPD) describes the interval with a 95% probability of the true parameter value.

63) had received no additional therapy, 8.0% ($n = 6$) had received one to five additional therapy sessions, and 4.5% ($n = 3$) had received more than five additional therapy sessions. The additional treatment received by those in remission was primarily CBT and exposure-oriented booster sessions. The additional treatment received by those not in remission was highly varied and included the following: trauma-informed supportive therapy approach without known trauma ($n = 7$), eclectic supportive therapy and collaboration with school ($n = 5$), systemic family therapy and collaboration with schools ($n = 5$), CBT-oriented booster sessions ($n = 1$).

4. Discussion

This study evaluated the effectiveness of an enhanced group CBT treatment (*RISK*) for adolescent anxiety disorders, including intensive therapist/family/peer-assisted exposure therapy with family member and school personnel involvement. At post-treatment and at the 12-month follow-up, 41.6% and 85.9%, respectively, of those who completed treatment were free of all anxiety diagnoses. This substantial increase in effectiveness, from post-treatment to the 12-month follow-up, was not due to receiving additional therapy. Only 12.5% of those who achieved remission at the follow-up received *any* additional therapy, with the majority (8%) receiving five or fewer additional sessions. Benchmarking against a meta-analysis of CBT for child and adolescent anxiety disorder (Wergeland et al., 2020) indicated equivalence on symptom measures (SCAS-C: Posterior probability; $H_{\text{Equal}} = .62$, SCAS-C: Posterior probability; $H_{\text{Equal}} = .48$) but inferiority on measures of remission at post-treatment (Posterior probability; $H_{\text{Smaller}} = .98$). However, at the 12-month follow-up, there was a 99.99% probability that the treatment was superior to the benchmark on remission measures. Similarly, parent- and adolescent-reported anxiety outcomes and the clinical global impression showed the same trend of increased effectiveness over time. In addition to the effectiveness of treatment it was found that treatment attrition rate (11.1%) was lower than the benchmark (Anxiety = 12.6%, OCD = 13.4%, Wergeland et al., 2020), and may be understood in light of the high degree of parental involvement (de Haan et al., 2013). In line with the low attrition rate, adolescents indicated at post-treatment that they would recommend *RISK* to a friend struggling with anxiety. Overall, the results indicate that the treatment was effective and acceptable for adolescents with a range of anxiety disorders and OCD.

In line with expectations and previous research, the current sample had a higher average age and had higher rates of SAD as primary diagnosis (52.4%) than the benchmark that included children (proportion with SAD in benchmark: 17%-39%). Thus, it is not unexpected that treatment did not outperform benchmark at post-treatment, given that higher age and SAD are associated with poorer outcomes (Ginsburg et al., 2018, Hudson et al., 2015, Manassis et al., 2002). However, outcomes on remission were better than those expected from studies that only included adolescents (Baker et al., 2021). Thus, it is promising that the current sample of adolescents achieved results comparable to other effectiveness studies that targeted a younger population with SAD (7–13 years of age; Martinsen et al., 2009; Villabo et al., 2018). Despite the comparability, age and diagnostic composition may explain why the treatment did not show an enhanced effect relative to the benchmark at post-treatment.

The enhanced treatment effect was visible at the 12-month follow-up. Results at this time demonstrated a substantial improvement

across diagnoses relative to post-treatment. At the 12-month follow-up, the effectiveness was superior to the benchmark on diagnostic measures and adolescent-rated anxiety measures. Additionally, only one adolescent relapsed between post-treatment and the follow-up. The treatment effect sustainability is particularly promising given that many adolescents relapse in the long-term after treatment completion, with age and SAD predicting a greater risk of relapse (Ginsburg et al., 2018).

To understand the observed sustainability of remission and the delayed increase in the treatment effect at the follow-up, it may be useful to consider how family and school support affected treatment adherence. Treatment adherence is an important predictor of treatment outcome for anxious adolescents and is promoted through adult support (Lee et al., 2019). However, when treatment ends, an important aspect of adult support to adherence, namely the clinician, is removed. The partial *transfer of control* to parents and school personnel performed in the treatment may have helped sustain the adult support system, thus maintaining treatment adherence. In addition to maintaining treatment adherence, parental involvement may also have improved trust and communication within families, which is a protective factor against anxiety in adolescents (Ebbert et al., 2019).

An important implication of the findings relates to the transdiagnostic group format. Such a format is advantageous in routine-care settings, where there may not be enough patient flow or resources to offer disorder-specific treatments for all types of anxiety disorders. Additionally, the group format allows multiple adolescents to gain access to therapists qualified in exposure therapy. Moreover, it also allows for longer sessions. This implication is important since time-constraints and limited therapist qualifications are primary reasons why exposure interventions are not performed in routine-care settings (Pittig et al., 2019). Notwithstanding the advantages of transdiagnostic group CBT, previous studies have found disorder-specific CBT to yield superior outcomes (Reynolds et al., 2012). This finding has led some to argue that disorder-specific CBT should be the preferred format, especially for SAD (Spence & Rapee, 2016) and OCD (Freeman et al., 2018). This study serves as a counterargument to such notions, showing effectiveness across a range of disorders, including SAD and OCD.

Some limitations of the current study should be noted. One such limitation is the study design, which did not include any control condition or randomization. Due to the lack of a control condition, it is not possible to conclude to what extent improvements can be attributed to the *RISK*-treatment. However, it is possible to conclude that improvements cannot be attributed to treatment other than *RISK* since assessments of previous therapy and additional therapy received during the follow-up were obtained from patient records. These assessments indicated that improvement in outcomes was not related to previous therapy or receiving extra therapy between post-treatment and the 12-month follow-up. Another limitation was the lack of formal assessment of clinician fidelity to treatment. This limitation also restricts the extent to which improvements can be attributed to the *RISK*-treatment. Although no formal assessment of clinician fidelity was performed, several measures were taken to ensure clinician fidelity. These measures included training before beginning intervention, using a detailed therapist manual, and constant supervision during the study period. A third limitation is that clinicians assessing diagnostic status post-treatment also participated as treatment providers. Therefore, the assessors may have been biased in their rating. However, 20% of diagnostic interviews were re-assessed by independent raters and excellent reliability was observed.

In addition to the above-mentioned limitations, another caveat of the *RISK*-treatment is the number of hours and clinician resources required for this treatment. On one hand the 38 hours of *RISK* seems much more costly than the 4–24 hours observed in other treatments for adolescents (Baker et al., 2021), and it may not be possible to conduct *RISK* in all settings. On the other hand, the intervention elements that require extra time and clinicians (i.e., longer sessions, intensive treatment, extensive parental and school involvement) were those that aimed at enhancing treatment effects for adolescents specifically. The enhanced effect was achieved and the additional time and resources allowed for transdiagnostic groups that are beneficial in routine-care settings. Additionally, the treatment format allowed for 9 clinicians with no prior education and training in CBT to deliver effective treatments, which is important given the limited access to CBT clinicians. Given the costs of adolescent anxiety, *RISK* may be a viable treatment, particularly in cases with SAD or when previous treatment has not been beneficial.

Considering the above-mentioned, future research is needed to investigate the cost-effectiveness of *RISK*, and how to implement such interventions in different settings with the aim of maintaining effectiveness while reducing resources needed. In relation to this, it will be important to investigate the potential for *RISK* to be offered as a first-line treatment for SAD. Currently, work has begun on modifying the *RISK*-treatment to a digital self-help platform, and modifying *RISK* to be delivered by school personnel in a shorter format. In Norway, 31 schools have received training in this shorter format, and are offering the intervention. At this time, *RISK* is still implemented as standard care in the community clinic where the study was conducted. These preliminary results suggest that *RISK* has the potential to be implemented across different settings. However, questions remain regarding the effectiveness of variations of *RISK* and important moderators such as adolescents' motivation that may vary under different circumstances. Thus, further research into variations of *RISK* is needed in the development of stepped care and tailoring interventions to target specific needs.

In conclusion, this trial provides support for the use of multi-family, multi-disorder group CBT for adolescent anxiety disorder that includes high exposure to feared situations and high levels of parental and school involvement. A particularly promising result was that only one of the participating adolescents who achieved remission at post-treatment relapsed during the follow-up period, and many participants who had not achieved remission at post-treatment achieved remission during the follow-up period. Furthermore, it provides proof-of-concept that this approach is feasible within routine-care clinics and effective across a range of included diagnoses. Further research should evaluate the described approach in a randomized controlled design to further investigate its potential in a stepped care approach.

CRediT authorship contribution statement

Thomas B. Bertelsen: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft. **Gro Janne Wergeland:** Writing – review & editing, Supervision. **Tine Nordgreen:** Writing – review & editing, Supervision. **Joseph A. Himle:** Writing – review & editing, Supervision. **Åshild Tellefsen Håland:** Writing – original draft, Writing – review & editing, Supervision, Conceptualization, Resources, Supervision, Project administration, Funding acquisition.

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.

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