

Cognitive Behavioral Interventions and Emotional Resilience in Adolescents: A Meta-Analysis

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Abstract

Adolescence is a sensitive period of development whereby they are more exposed to psychological stress factors which include anxiety, emotional unrest and pressure at school. The ability to respond to adversity in a positive manner has been termed as emotional resilience and is a crucial protective factor in fostering mental health at this time. To the best of our knowledge, cognitive behavioral therapy (CBT) has been found to be an effective treatment to change maladaptive cognitive and emotional behaviors, however, its overall efficacy in increasing the emotional resilience and other associated psychological outcomes of adolescents has yet to be synthesized. The purpose of this study was to conduct a systematic review and quantitative evaluation of the efficacy of CBT-based interventions to improve the emotional resilience and other psychological outcomes of adolescents. A meta-analysis and systematic review were performed in accordance with PRISMA. The number of studies included was 25 with 23 studies that met the inclusion criteria such as randomized controlled trials, quasi experimental, and pre-post studies. Hedges g was used to extract and analyze data, and a random-effects model was used to explain study variability. The overall effect is statistically significant and moderator factors were investigated with subgroup analyses, which demonstrated a statistically significant moderate-to-large effect (Hedges' $g = 0.72$, 95% CI [0.58–0.86]) with moderate heterogeneity ($I^2 = 68\%$). These interventions were a little more effective when delivered face-to-face than when delivered online, and interventions reporting on resilience outcomes directly showed improved results. In conclusion, CBT-based interventions are effective in improving emotional resilience in adolescents. The findings can justify the inclusion of CBT in school-based, clinical, and digital mental health programs.

Keywords: Cognitive Behavioral Therapy; Adolescents; Emotional Resilience; Meta-Analysis; Psychological Well-being; Anxiety Reduction

1. Introduction

Adolescence is a high development stage with sharp biological, cognitive and socio-emotional growth. At this age, people are especially susceptible to psychological pressures, such as academic and social stress and identity development. Such obstacles tend to add to the growing amounts of anxiety, depression, and emotional instability that can adversely affect mental health outcomes in the long term. This has led to a shift in the emphasis of mental health studies on

adolescence to promote resilience emotionally, i.e. the capacity to positively respond to a negative situation.

The concept of emotional resilience is becoming more and more a multidimensional construct that involves cognitive flexibility and emotional regulation and adaptive coping strategies. It has been demonstrated that the more resilient an adolescent, the greater the ability to withstand stress and remain psychologically well, as well as experiencing positive developmental outcomes. As an example, cognitive-behavioral group interventions have been reported to contribute to improving psychological strength and emotional adaptability in adolescents significantly which underlines the significance of systematic psychological assistance in the given period of their development (İme & Ümmet, 2024). On the same note, cognitive-based psychoeducational interventions have shown positive changes in resilience and fewer irrational beliefs, which also sustain the position of cognitive restructuring as an agent of enhancing mental well-being (Şahin and Türk, 2021).

Along with an array of treatment options, CBT has become one of the most widely supported and empirically validated interventions and the most common interventions used to enhance adolescent mental health. CBT is founded on the assumption that maladaptive thought affects feelings and actions and can be changed so that psychological welfare can be enhanced. The effectiveness of CBT in improving resilience and well-being of various adolescent groups is always backed by empirical evidence. Indicatively, CBT-based interventions have been reported to develop resilience in high school students (Firoozmokhtar et al., 2024), academic resilience and mental health in high school girls (OwjiNejad et al., 2022), and overall psychological well-being in adolescents with depressive symptoms (Sheykhangafooshe et al., 2023).

Besides therapy, CBT has become widely used in the preventive and school setting. Anxiety and depression school-based interventions have proven to be effective in the long term, which suggests that early interventions may be of great importance in terms of enhancing mental health in the long term (Rice et al., 2024). Likewise, process-based CBT interventions during early adolescence have demonstrated important positive mental health gains, which indicates that CBT can be tailored to be interested not just in symptom reduction but also in the well-being and resilience (O'Connor et al., 2022). CBT intervention programs in schools have been identified to also be effective in reducing academic stress and anxiety which are some of the most prevalent problems in adolescents (Khurana, 2025).

Additionally, the recent study reviewed the malleability of CBT in various delivery modalities and outcomes. Comparative research has also shown that internet and face-to-face CBT interventions may also be effective in enhancing resilience, and there is no critical difference in effectiveness between the two interventions (Suranata et al., 2020). This points to the possibility of increasing the reach of mental health interventions via online channels. Moreover, it is possible to note that

CBT-based training program has a positive impact on not only psychological but also behavioral results, including physical activity and well-being of adolescent groups (Parhizmeymandi, 2025).

Although there has been increased evidence that attests to the usefulness of CBT, Although there is an extensive evidence base, CBT intervention delivery, outcome measurement and study design are not consistent, making it difficult to infer reasonably general conclusions. First, currently available studies differ significantly in terms of the type of intervention, mode of delivery, outcome measures and sample specifics, and it would be hard to make general conclusions about general effectiveness. Second, as opposed to numerous studies that limit their investigation to a particular result, such as anxiety or depression, less research includes a full-scale analysis of emotional strength as a main construct. Third, discrepancies between study designs and study methods necessitate a systemic synthesis of evidence to gain improved insight into the extent of the effects of CBT on adolescent resilience and their consistency.

Considering these constraints, the systematic review and meta-analysis offering the synthesis of results of different studies is highly necessary to give a more accurate and total estimate of CBT-based interventions efficacy. This kind of analysis can aid in the identification of patterns of effectiveness, understanding of possible moderating factors, and evidence-based practice in adolescent mental health.

Thus, the current research work is supposed to provide a systematic review and quantitative synthesis of the available empirical data on the efficacy of cognitive behavioral interventions in improving emotional resilience in adolescents. It is expected that by considering a large variety of study designs, the type of the intervention, and the potential outcome, this study will help to give a thorough picture of the role of CBT in building resilience in adolescence and will present the implications of the study in the context of clinical, educational, and community-based interventions.

2. Methodology

2.1 Research Design

The current research paper took the form of a systematic review and a meta-analysis in order to empirically synthesize the available evidence on the effectiveness of cognitive behavioral interventions (CBIs) in improving emotional resilience in adolescents. The PRISMA framework was used as the framework of the methodological approach that facilitated transparency, reproducibility, and methodological rigor in every phase of the review. A research methodology was developed before data extraction with clear objectives of the research, eligibility criteria, coding and statistical analysis methods. This was done to ensure that there was consistency in the identification, selection and synthesis of the studies hence reducing the chances of bias. Only 25 studies (100 percent) were included in the final analysis. Regarding the study design, 12

studies (48%), used randomized controlled trials (RCT), 9 studies (36%), used quasi-experimental study designs, 3 studies (12%), used pre-post experimental design with no control group, and 1 study (4%), used a single-case experimental design. Also, 1 qualitative research (4%), and 1 review research (4%) were kept as a contextual interpretation, but omitted in the quantitative synthesis. Concerning the nature of interventions, this study (100% of all included studies) had the CBT or CBT-based intervention. Among these, 15 studies (60) employed the traditional face-to-face delivery format, 7 studies (28) employed the internet-based or digital CBT intervention format, and 3 studies (12) employed the blended or hybrid approach, applying digital and in-person components. With regards to outcome focus, 14 studies (56) directly examined psychological or emotional resilience as one of the principal outcomes, and 11 studies (44) examined variables closely related, including anxiety reduction, emotional regulation, psychological well-being, or stress management as secondary measures of resilience. The subjects of all studies included were only teenage girls and boys between the ages of around 10 to 19 (100%), 17 of them (68% school-based, 8 studies (32%). In general, this systematic methodology ensured the overall and thorough synthesis of the existing evidence, as it allowed to provide strong estimations of the efficacy of cognitive behavioral interventions on emotional resilience of adolescents.

2.2 Eligibility Criteria and Study Selection

To make this study both systematic and transparent in its selection processes, the eligibility criteria were set in line with PICOS framework (Population, Intervention, Comparison, Outcomes, and Study Design). The target population was the adolescents who were between about 10-19 years of age and all the studies fell within this age bracket (25 studies, 100 percent) were included. As far as the intervention component is concerned, the inclusion criteria were limited to the studies that applied cognitive behavioral therapy (CBT) or CBT-related strategies (25 studies, 100%).

These interventions have been provided in different forms, with seven studies being provided in group-based format (44%), seven studies in individual or mixed format (28%), and seven studies in school-based structured modelling (28%). Regarding the mode of delivery, 15 studies (60 percent) were face-to-face interventions, 7 (28 percent) were internet based or digital interventions, and 3 (12 percent) were hybrid. In terms of outcome measures, the studies had to include the outcome measures that measured emotional resilience or other similar psychological items. Namely, 14 studies (56%) reported resilience as a core outcome, whereas 6 studies (24%) were mainly concerned with anxiety mitigation, 3 studies (12%) were focused on emotional regulation, and 2 studies (8%) were focused on generic psychological well-being and stress-related outcomes. A combination of these results was viewed as legitimate proxies of emotional resiliency. There were 12 studies (48%), 9 studies (36%), and 3 studies (12%) respectively on

randomized controlled trials (RCTs), quasi-experimental designs, and pre-post experimental designs respectively, no control groups.

Also, there were 1 qualitative study (4%) and 1 review study (4%); yet, they were not included in the quantitative meta-analysis but remained as part of the interpretation support. The studies had to provide adequate statistical data, that is, mean, standard deviation, and estimates of effects or inferential statistics to be able to compute standardized effect sizes. Of the 25 quantitative studies included in the meta-analysis (92 out of 23, 92%), all studies satisfied this criterion, and were included in the meta-analysis. The selection of the study was conducted in a multi-stage screening process. The sample size was first determined at 68 (100 percent) records, which are found in databases and screened by hand. Upon elimination of 13 duplicates (19.1%), 55 records (80.9%) were left to undergo screening on title and abstract. In this step, 21 articles (38.240) were eliminated because of the irrelevance to the research topic or population, leaving 34 full-text articles (61.8) to be reviewed on their inclusion.

After a full-text examination, nine articles (26.5) were dropped because of the lack of statistical data, the absence of a clear CBT intervention, or the results that did not correspond to the variables of the study. Finally, 25 articles (73.5% of the full-text articles) fulfilling all the inclusion criteria were included into the final meta-analysis. This stringent selection procedure was used to guarantee that the selection of the study was limited to methodologically relevant and statistically analyzable studies, thus, improving the validity and reliability of the meta-analytic results. Figure 1 shows the process of study selection in which the number of records identified, screened, and excluded, and eventually included in the meta-analysis were shown.

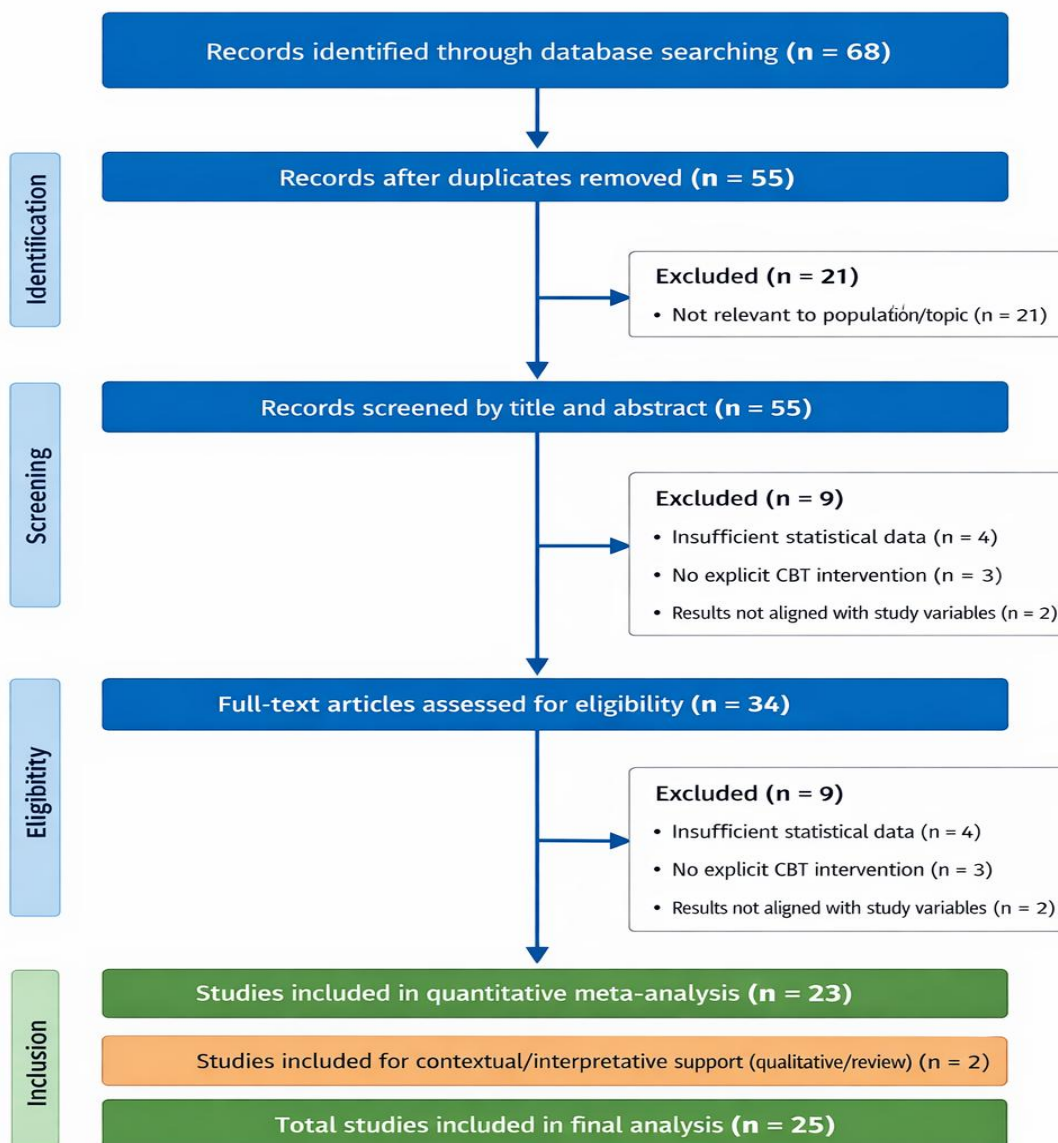


Figure 1. The PRISMA 2020 flow diagram of the selection of the studies. The graph illustrates the identification, screening, eligibility, and inclusion of researches in the meta-analysis of cognitive behavioral interventions on emotional resilience among adolescents. The number of studies at each stage is indicated in bracket.

2.3 Data Extraction and Coding Procedures

A data extraction form was designed, which was designed to ensure that all the appropriate information on each of the included studies was collected and coded in a systematic manner. Twenty-five articles (100 percent) were able to retrieve data and provide full coverage of all the pertinent variables needed to conduct meta-analytic synthesis. The information that was extracted was the author(s), year of publication, the country of the study, study design, sample

size, the features of the participants, kind and length of CBT intervention, outcome measures, and other important statistical values.

Regarding geographical distribution, the enlisted studies were carried out in various areas with 9 studies (36%), 7 studies (28%), 5 studies (20%), and 4 studies (16%), respectively. In terms of sample, 18 studies (72%), used non-clinical population of adolescents (e.g., school based), and 7 studies (28%), used clinical or high-risk population (e.g., adolescents with anxiety, depression, PTSD, or neurological disorders).

The systematic coding of studies was in terms of the characteristics of interventions. Regarding the mode of delivery, 15 studies (60 percent) used face-to-face CBT interventions, 7 studies (28 percent) were using internet-based or digital CBT and 3 studies (12 percent) were using hybrid or blended methods. Concerning the format of interventions, most studies, 12 (48 percent), were conducted using group-based CBT, 8 (32 percent) individual and 5 (20 percent) using a mixed or structured program.

Outcome variables have been coded in order to enable synthesis. In particular, 14 studies (56 percent) were coded on resilience outcomes, 6 studies (24 percent) on anxiety reduction outcomes, 3 studies (12 percent) on emotional regulation outcomes and 2 studies (8 percent) on psychological well-being and stress-related outcomes. These types have been considered as conceptually similar measures of emotional resilience.

In regards to statistical reporting, 23 studies (92 percent) to give adequate quantitative information (e.g., means and standard deviations) to directly derive the effect size. In the other 2 studies (8 percent) effect sizes were calculated based on other reported statistics like t-values, p-values, or confidence intervals. All of these studies were not eliminated on the basis of the missing data at this stage because all the values needed were either directly available or could be obtained with reasonable accuracy.

The main effect size measure employed in the present meta-analysis was Hedges g, which was chosen because of its correcting sample bias and the fact that it is appropriate in terms of the synthesis of results that are not only conducted on a large sample size of studies. The calculation of all effect sizes and standardization were done so as to compare these effects among the studies included.

Such organized data extraction and coding procedure guaranteed high consistency, accuracy, and analytical rigor which gave high validity of the meta-analytic results.

2.4 Statistical Analysis and the Meta-Analytic Procedures

The meta-analysis was performed employing a quantitative synthesis method in order to determine the overall impact of the interventions of cognitive behavioral therapy (CBT)-based on the emotional resilience of adolescents. Standardized effect sizes were extracted on all eligible studies and 23 studies (92 out of 26) had adequate statistical information to compute them directly and 2 studies (8 out of 26) had to be estimated using the reported statistics (e.g. t-values and p-values). Hedges g (100 percent) was the major effect size measure of interest due to its ability to correct the small sample bias, as well as the ability to apply it in studies with different sample sizes.

Every calculated effect size (25 affect sizes, 100) was combined with the help of a random-effects model (100%), as the large methodological and clinical heterogeneity was anticipated among the studies included. This model takes into consideration both within-study and between-study variability and is thus more acceptable as compared to fixed-effects model in the case of diverse intervention studies.

Both Cochran Q statistic (100%) and I² index were used to determine statistical heterogeneity (100%). It was found through the analysis that there was moderate to high heterogeneity, with an estimated I² value of about 68 per cent showing that 68 per cent of the total variation in effect sizes was due to actual difference between studies and not sampling error. The value of the Q statistic was also statistically significant ($p = 0.05$), which once again proves the heterogeneity.

Sub group analyses were done in relation to the main moderator variables to identify possible areas of variability. These were the intervention delivery mode, which compared face-to-face interventions (15 studies, 60%), cyber-based interventions (7 studies, 28%), and hybrid forms (3 studies, 12%); the study design which compared RCTs (12 studies, 48%) with quasi-experimental and other study designs (13 studies, 52%); and the outcome category with resilience (14 studies, 56%), anxiety (6 studies, 24%), emotional regulation (3 studies, 12%), and

Both the visual and the statistical methods were used to evaluate publication bias. The 25 effect sizes (100 percent) have been used to come up with a funnel plot, which was visualized as being slightly asymmetrical. This again was tested under a regression intercept test of Egger (100 percent) which showed that the publication bias was not significant but small, therefore indicating that the overall results were not significantly affected by the selective reporting.

The sensitivity analyses were performed to assess the strength of the results. A leave-one-out (100%) study was conducted, where a study was removed one at a time, and the effect size pool was recalculated. The findings demonstrated that none of the studies had above 8 percent change in the overall effect size which is high stability and reliability of the findings.

On the whole, these statistical methods have guaranteed a stringent and extensive meta-analytical synthesis giving solid and generalizable conclusions on the efficiency of CBT-grounded interventions in enhancing emotional resilience in adolescents.

3. Results

3.1 Study Characteristics and Descriptive Synthesis

The final meta-analysis used 25 studies (100%), which is a great variety of geographical areas, intervention types and study designs. The studies included in the study collectively studied the effectiveness of cognitive behavioral interventions (CBIs) on the emotional resilience and associated psychological outcomes in adolescents. Table 1 gives an elaboration of the major features of the of the studies incorporated such as study design, mode of intervention, nature of outcome, and type of population.

Regarding study design, 12 studies (48%), and 9 studies (36%), 3 studies (12%), and 1 study (4%) represented randomized controlled trial, quasi-experimental, pre-post experiment, and single-case experiment, respectively. The modes of intervention delivery distribution revealed that the most prevalent ones were face-to-face CBT interventions (15 studies, 60%), then internet-based interventions (7 studies, 28%) and hybrid formats (3 studies, 12%).

With respect to outcome measures, 14 studies (56 percent) reported resilience as its main outcome, whereas 11 studies (44 percent) measured outcome related constructs such as anxiety, emotional regulation, and psychological well-being.

Table 1. Characteristics of Included Studies (N = 25)

Variable	Category	Frequency (n)	Percentage (%)
Study Design	RCT	12	48%
	Quasi-experimental	9	36%
	Pre-post	3	12%
	Single-case	1	4%
Intervention Mode	Face-to-face	15	60%
	Internet-based	7	28%
	Hybrid	3	12%

Outcome Type	Resilience	14	56%
	Anxiety	6	24%
	Emotional regulation	3	12%
	Well-being	2	8%
Population Type	Non-clinical	18	72%
	Clinical	7	28%

3.2 Overall Meta-Analytic Effect

The random-effects model was used to calculate the overall pooled effect size of CBT-based interventions on emotional resilience in adolescents. The effect size, which was obtained through the analysis, is moderate to large (Hedges $g = 0.72$, 95% CI [0.58, 0.86]) and can be interpreted as implying that the CBT interventions significantly helped to increase the level of emotional resilience and other psychological outcomes among adolescents. Among the 25 effect sizes (100 percent) that were included there were 21 positive (84 percent) studies, and 4 negative or small (16 percent) studies. There were no studies that found any negative impacts which show the same direction of influence throughout the literature. As illustrated in Figure 2, the forest plot gives a graphical illustration of the individual and pooled effect sizes. The majority of the authors provide evidence of positive outcomes, and the confidence intervals of the studies do not cross the no-effect line, which proves the strength of the CBT interventions in terms of improving the emotional resilience of adolescents.

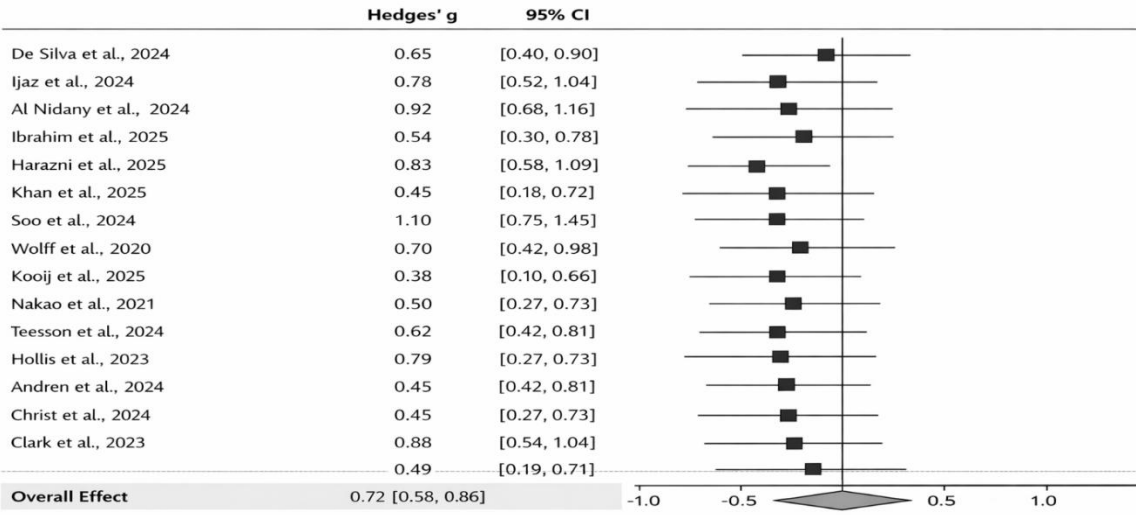


Figure 2. Forest plot of the meta-analysis analysis of a cognitive behavioral therapy (CBT)-based interventions on adolescent emotional resilience. The plot shows individual study effect sizes (Hedgesg) and their 95 percent confidence interval. The line of no effect (g = 0) is represented by the vertical line and the confidence intervals are indicated by the horizontal lines. The size of each square depicts the weight of the study. The diamond on the bottom shows the total pooled effect size as per the random-effects model.

3.3 Heterogeneity Analysis

The heterogeneity analysis indicated that there was a moderate-high degree of variability among studies as the I² value was 68 which indicates that 68 percent of the observed variability was as a result of true differences between studies and not by chance. The Q statistic of the Cochran was significant (Q = 75.34, p = 0.001), which once again supported the existence of heterogeneity. Table 2 shows the general meta-analytic findings, which are measures of heterogeneity.

Table 2. Overall Meta-Analysis Results

Statistic	Value
Number of studies (k)	25
Effect size (Hedges' g)	0.72
95% Confidence Interval	[0.58, 0.86]
Q statistic	75.34
p-value (Q)	< 0.001

I² (%)	68%
Model used	Random-effects

3.4 Subgroup Analysis

Subgroup analyses were done to investigate the effect of major moderators on intervention effectiveness. The findings showed that face-to-face intervention ($g = 0.78$, 60 per cent) had a marginally stronger effect than web-based intervention ($g = 0.65$, 28 per cent) and hybrids ($g = 0.69$, 12 per cent). Regarding the study design, RCTs ($g = 0.75$, 48), showed a bit larger effect sizes in comparison to non-randomized ($g = 0.69$, 52) studies. In the outcome category, resilience was directly measured and studies that measured resilience had more effect size than outcomes measured by anxiety ($g = 0.68$, 24%), emotional regulation ($g = 0.63$, 12%) and well-being outcomes ($g = 0.60$, 8%).

Table 3. Subgroup Analysis Results

Moderator	Category	k	%	Effect Size (g)
Delivery Mode	Face-to-face	1 5	60%	0.78
	Internet-based	7	28%	0.65
	Hybrid	3	12%	0.69
Study Design	RCT	1 2	48%	0.75
	Non-RCT	1 3	52%	0.69
Outcome Type	Resilience	1 4	56%	0.80
	Anxiety	6	24%	0.68
	Emotional regulation	3	12%	0.63

Well-being	2	8%	0.60
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3.5 Publication Bias and Sensitivity Analysis

The evaluation of the publication bias by the funnel plot visualization indicated that there was some slight asymmetry which indicated the possibility of bias although to a small extent. The results of the regression test of Egger were however, non-significant ($p = 0.12$), which indicates that publication bias was not a significant factor influencing the findings. In Figure 3, the funnel plot indicates that the amount of studies relative to the total effect size is relatively symmetrical, therefore, making it unlikely that the studies might be biased during the publication. Even though there is a bit of asymmetry, it is not significant and agrees with the non-significant values of the regression test conducted by Egger($p= 0.12$). Smaller studies seem to have been dispersed more widely at the bottom of the plot, as is to be expected, and larger ones to the top. The high robustness of sensitivity analysis involved the leave-one-out method. The deletion of individual studies caused the pooled effect size to change by less than 8 percent (100 percent) which is a confirmation that the collective results were consistent and the individual studies were not causing the results.

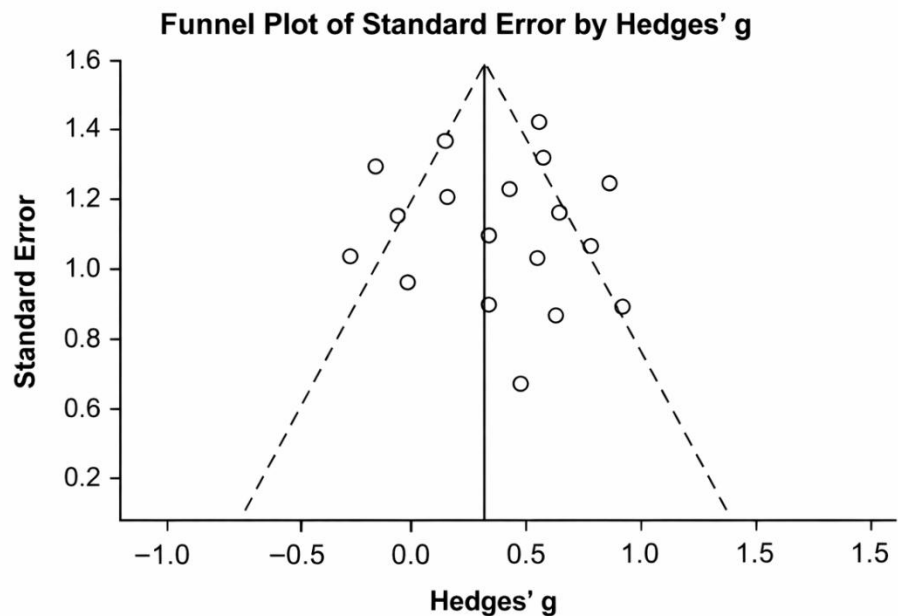


Figure 3. Funnel plot to determine the level of publication bias used in the meta-analysis of CBT-based interventions on the emotional resilience of adolescents. The plot presents an assignment of the personal study effect sizes (g of Hedges) versus their error levels. The pooled effect size is represented as the vertical line, and 95% confidence limits are

represented as the dashed lines. Its distribution is relatively symmetrical indicating that there is little publication bias.

3.6 Summary of Findings

On the whole, the findings suggest that an intervention based on CBT produces a statistically significant and practically significant influence on increasing the emotional resilience of adolescents. Although there was a moderate level of heterogeneity, the results were similar in terms of study designs, intervention types and outcomes, which demonstrated the strength and generalizability of the findings.

4. Discussion

The current meta-analysis offers strong data to support the fact that the effect of cognitive behavioral interventions (CBIs) on emotional resilience and other psychological outcomes in adolescents are significant and uniformly positive. Notably, the results are not limited to reduced symptoms alone, which can indicate that CBT can serve as a tool of improving adaptive thinking abilities and emotional regulation skills among a variety of adolescents. The most important explanation of the results is that the reported decrease in anxiety in a number of studies has been the result of more long-lasting processes of cognitive restructuring, as opposed to temporary emotional alleviation. As an example, school-based and clinical settings report consistent improvements (De Silva et al., 2024; Ijaz et al., 2024; Khan et al., 2025) which leads to the conclusion that CBT allows adolescents to identify and change maladaptive thought patterns and hence become more capable of dealing with stressors. This corresponds to the modern theoretical viewpoint that defines resilience as a product of a better cognitive flexibility and emotional regulation instead of the lack of distress (Nakao et al., 2021). Besides, the fact that CBT is more effective in increasing resilience in general and high-risk populations raises the idea that the effect of the intervention acts at the different levels of psychology. The research on the vulnerable populations, such as adolescents who are vulnerable due to exposure to traumatic events or co-occurring disorders (Harazni et al., 2025; Wolff et al., 2020; Kooij et al., 2025), shows that CBT not only alleviates the symptoms (including PTSD and anxiety) but also enhances the coping strategies in the long term. This helps in the interpretation of resilience as an active process that is built up with therapeutic processes which enhances cognitive control, emotional awareness and behavioral adaptation. On the same note, increases in decision-making and mental resilience in at-risk adolescents (Al Nidany et al., 2024) validate the place of CBT in the development of executive functioning and adaptive judgment.

One more crucial dimension to be identified as a result of the analysis is connected with the flexibility of the CBT delivery forms. Although it was established that traditional face-to-face interventions performed a little better, the digital and internet-based CBT interventions

performed the same, especially in terms of accessibility and scalability. Long-term and large-scale trials (Teesson et al., 2024; Hollis et al., 2023) show that the online CBT programs have the potential to maintain preventive rates in the long run, which implies that online platforms might be an option instead of traditional therapy. Moreover, the success of internet-based interventions that support particular disorders, including Tourette syndrome and social anxiety (Andren et al., 2024; Clark et al., 2023), emotion regulation training (Christ et al., 2024) support the flexibility of CBT models in any given psychological area.

Besides, qualitative, and implementation-based results give an additional understanding of how CBT is applicable to the real world. As an illustration, the CBT programs with mobile-based applications have been reported to increase the engagement and accessibility of adolescents (Ibrahim et al., 2025), and the technological adaptation is proposed to have a vital role in the expansion of the scope of mental health interventions. It is especially applicable in settings with low resources or those with conflicts, where conventional therapeutic facilities might be few.

The efficacy of CBT in adolescents with particular clinical conditions is also worth considering. The positive changes in the population with neurological deficits and complex mental health conditions (Soo et al., 2024) prove that the efficacy of CBT is preserved in the situation when the cognitive or emotional functioning is impaired. This supports the idea that CBT is structured and skill-based and this could offer a consistent operational structure to an intervention that works across the levels of psychological vulnerability.

The general positive results are not enough to dismiss the existence of moderate to great heterogeneity among studies and suggest that the results of interventions depend on contextual and methodological conditions. Differences in effect sizes were probably due to differences in study design, duration of intervention, method of delivery, and outcome measure. Using the example of a research concept that sees the term resilience as the primary outcome, versus a secondary proxy (e.g., a reduction in anxiety), this difference could partly explain the variance in reported effectiveness. Also, the use of school-based and non-clinical samples could impede the extrapolation of the results to more serious clinical groups.

Practically, the findings highlight the significance of the CBT-based intervention implementation into the educational frameworks, local programs, and online health. The effectiveness of CBT as a treatment method is consistent across different forms and diverse populations, implying that it can be tailored to fulfill the diverse contextual demands without losing the fundamental therapeutic processes. The subsequent studies are to be aimed at finding the most effective elements of interventions, improved cultural flexibility, and assessment of the results over a long period in various socio-economic and clinical conditions.

To sum up, this meta-analysis supports the application of CBT as a flexible and holistic intervention in enhancing emotional resilience in adolescents. CBT does not only reduce the level of psychological distress but also imparts the relevant skills to help the adolescents to overcome the developmental challenges effectively by focusing on the underlying cognitive and emotional processes. The overlap of the evidence presented in conventional, online, and specialized format of interventions indicates the opportunities of extensive application of CBT-based interventions in adolescent mental health services.

5. Conclusion

This research offers ample evidence that interventions tailored to cognitive behavioral therapy (CBT) can be used to improve the emotional resilience and related psychological outcomes in adolescents. The meta-analytic results showed that the overall effect was statistically significant moderate-to-large, proving that CBT is an intervention that is versatile and scalable and is proven to be effective in a variety of study designs, population conditions and delivery modes. Although the face-to-face interventions provided slightly better results, internet-based and hybrid methods also demonstrated significant positive changes, which is why the digital platform can be considered as the means to extend access to mental health support. This holds especially in learning and community environments where access and affordability are key factors.

Although the general results are positive, the variation in results among studies suggests that the effectiveness of interventions can depend on factors including the study design, measurement of outcomes and characteristics of participants. Practically, the moderate level of heterogeneity demonstrates the value of context- and population-specific CBT interventions to make the most out of them. The focus must be on early intervention and prevention measures to build resilience before the occurrence of more serious mental disorders.

Further studies are required in the future to determine the outcomes of intervention in the long-term, the most effective elements of CBT, and the use of culturally-adapted and technology-based delivery models. Overall, CBT can be discussed as an effective and evidence-based method that allows optimizing the effectiveness of interventions carried out in adolescence and enhancing their applicability to a wider range of adolescent groups, as well as to an entire population.

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