

Group Therapy to Target Anxiety and Depression for At-risk Students:

A Systematic Review

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Abstract

Importance: Occupation-based group therapy can be used in occupational therapy practice for middle and high school students who are at risk for anxiety and depression. However, the research related to the use and effectiveness of this intervention approach is limited.

Objective: To identify, evaluate, and synthesize the current literature concerning the effectiveness of occupation-based group therapy to determine the efficacy of decreasing anxiety and depression for at-risk middle and high school students.

Data Sources: A literature search occurred between May 14, 2025, and June 2, 2025. Follow up searches were conducted on June 25, 2025. Databases included EBSCO, PubMed, CINAHL, and OTSeeker using Hawai'i Pacific University's online library databases. Search terms included anxiety, depression, high school, mental health, middle school, psychosocial groups, students, as well as combinations of these terms.

Study Selection and Data Collection: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Published studies on group therapy for middle and high school students who are at-risk for anxiety and depression

were included in the systematic review. Data from presentations, non-peer reviewed literature, and dissertations were excluded.

Findings: Five studies were included (three Level I, one Level II, and one Level III studies) according to the American Occupational Therapy Association's Levels of Evidence. The outcomes of these studies indicate that occupation-based group therapy may be beneficial for middle school and high school students who are at risk for anxiety and depression.

Conclusion and Relevance: Occupation-based group therapy may be effective in reducing anxiety and depression for middle and high school students.

What This Systematic Review Adds: There are limited high quality studies that evaluate the effectiveness of group interventions to improve mental health in middle and high school students. This systematic review provides a starting point for evaluating the efficacy of occupation-based group therapy in improving mental health in OT practice. More research is needed to find preventative interventions that have a lasting impact.

Key words: Anxiety, depression, high school, mental health, middle school, psychosocial groups, students

In 2016, a study done by the National Survey of Children's Health (NSCH) reported that among children aged 3-17 years, 7.1% (approximately 4.4 million) had anxiety problems and 3.2% (approximately 1.9 million) had depression (Ghandour et al., 2019). This suggests that mental health needs to be addressed in this population. If mental health is not addressed as soon as possible, mental disorders such as anxiety and depression can lead to an increase in internalizing symptoms (McLaughlin & King, 2015). In other words, if anxiety and depression are left untreated, the symptoms usually tend to worsen over time, which may then inhibit individuals from participating in everyday life activities. Health promotion, mental health, and participation in daily life activities are within the scope of occupational therapy.

Occupational therapy can fill the gap between psychiatric care for individuals with mental disorders (Raya-Ruiz et al., 2022). Mental disorders such as anxiety and depression can affect an individual's occupational performance, participation, and overall identity. Their motivation decreases, affecting their ability to participate in activities they want and need to do (Raya-Ruiz et al., 2022). Occupational therapy addresses challenges between the person, environment, and occupations and develops strategies to increase the individual's occupational performance and participation. Occupation is both an intervention and outcome used to improve health and well-being. The client-centered approach of occupational therapy is deeply beneficial for persons with mental disorders.

The evidence supporting the efficacy of occupation-based group therapy in reducing anxiety and depression in middle and high school students is limited (Crowly et al., 2018). Occupational therapy is beneficial to improve an individual's mental health, including in group settings (Raya-Ruiz et al., 2022). This systematic review evaluated the efficacy of the current

literature related to occupation-based group therapy for middle and high school students who are at risk for anxiety and depression.

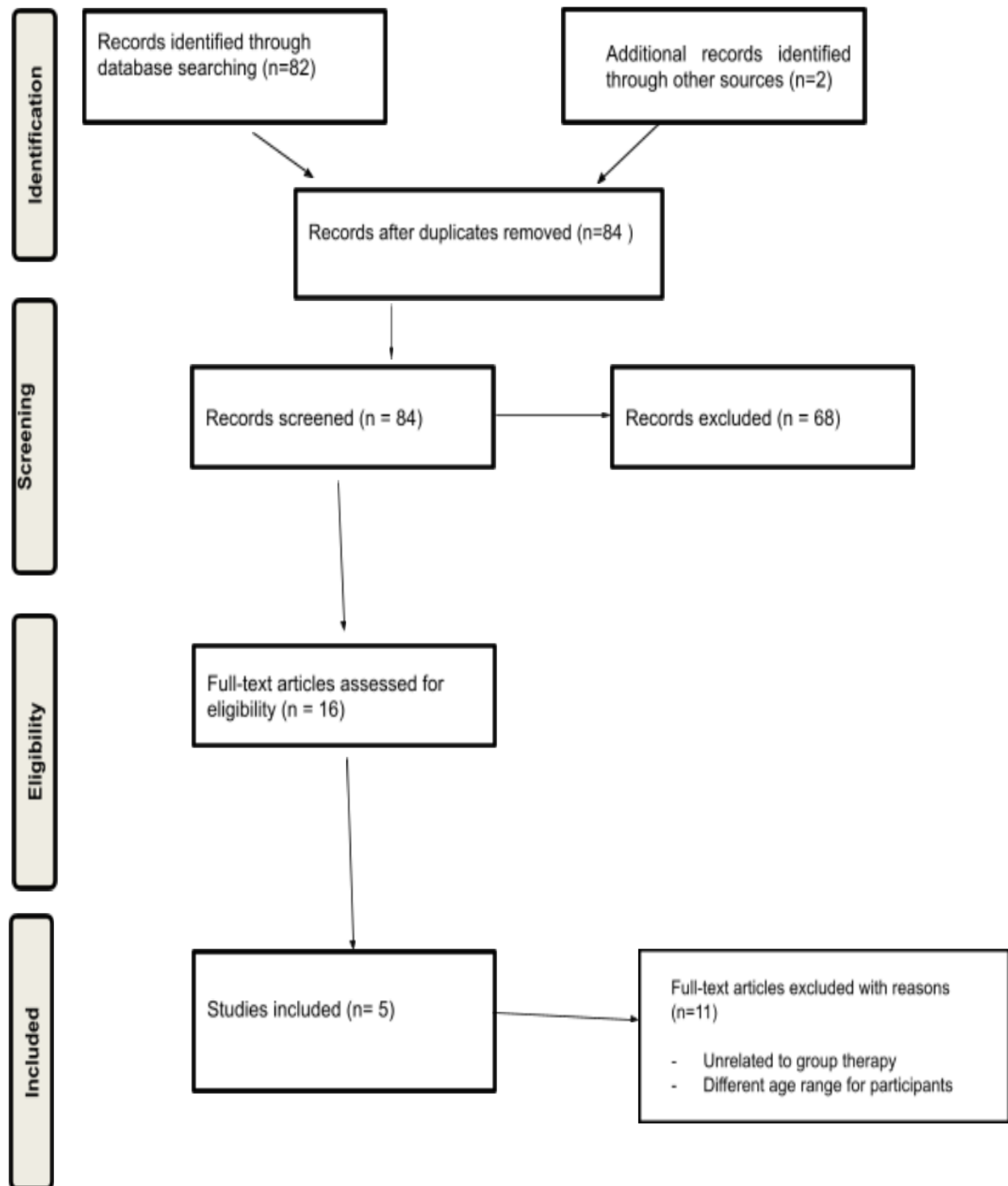
Method

The systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and incorporated recommended processes for conducting a systematic review. The guiding research question for this systematic review was: What are the benefits of occupation-focused psychosocial groups in middle and high school students identified as at-risk for anxiety and depression?

A broad search of the literature occurred between May 14, 2025, and June 2, 2025. An additional search was conducted on June 25, 2025, to ensure all relevant research was included. The inclusion criteria for studies in this systematic review were as follows: peer-reviewed, published in English, and dated between 2015-2025. Exclusion criteria, in addition to those studies that did not meet the inclusion criteria, included articles that were systematic reviews, scoping reviews, dissertations, and presentations. A search for relevant literature was completed using electronic databases: PubMed, CINAHL Complete, MEDLINE, ERIC, MasterFILE Complete, and OTSeeker through Hawai'i Pacific University's online library database. Search terms included psychosocial groups, middle school, high school, students, anxiety, depression, as well as combinations of these terms. Appendix A provides an extensive list of all search terms used for this systematic review. The initial search included 84 articles related to the research topic and yielded five articles that met the inclusion criteria (Figure 1). Three independent reviewers completed the screening and selection of the studies, assessed their quality, and extracted the data.

Figure 1

PRISMA flow diagram



Results

Five studies met the inclusion criteria. The articles were assessed according to their risk of bias, level of evidence, and quality. This systematic review included five studies that contained relevant information regarding the benefits of occupation-based psychosocial groups for middle and high school students who identify as at-risk for anxiety and depression. The information from these articles were divided into two themes: mental health and stress. An evidence table is provided in Appendix B. The Cochrane risk-of-bias guidelines were used to assess each article and are provided in Appendix C.

Mental Health

Five of the five studies on the topic discussed the efficacy of the occupation-based group interventions on mental health. Three of these studies were Level I, one of these studies was a Level II, and one was a Level III study (see Appendix B). All studies provided evidence that occupation-based interventions may be effective and beneficial.

Bazzano et al. (2022) evaluated anxiety and depression in middle school students before and after an eight-week group yoga and mindfulness program intervention. The students participating in the program had eight weekly 45-minute yoga sessions during the school week using the Yoga Ed curriculum. They were taught by two yoga instructors who had each taught children yoga and had been trained in the curriculum. During the sessions the students worked on breathing exercises, warm up, games and instructional content, and ended in final relaxation. There were 86 participants split into eight groups, where four of the groups served as controls. The anxiety symptoms were assessed with the Screen for Child Anxiety Related Disorders (SCARED). The depression symptoms were assessed by using the Patient Health Questionnaire

revised for adolescents (PHQA). There were no significant findings to note within the study. They reported that anxiety and depression decreased in the intervention groups, but the results were not statistically significant. For the control group, anxiety symptoms decreased, but depression symptoms increased. While no statistically significant findings were found, the study provided evidence to the effects of using this type of program with middle school children.

Crowley et al. (2018) looked at anxiety, global functioning, and stress in 11 middle school aged children. Their intervention was a group mindfulness therapy that was administered by a licensed occupational therapist. The intervention spanned ten weeks, where the participants served as their own control group with the pre- and post-testing that was done. The anxiety symptoms were assessed using the Multidimensional Anxiety Scale for Children (MASC), their global functioning was assessed by the Child Behavior Checklist and Youth self-report, and the stress symptoms were assessed by the perceived stress scale. The group mindfulness therapy intervention resulted in significantly reduced anxiety and perceived stress symptoms. The study findings indicate that this intervention may be beneficial for youth with anxiety.

Gaete et al. (2016) explored depression and anxiety in at-risk tenth grade children after a modified Cognitive Behavioral Therapy (CBT)-based program YPSA -I (Yo), Think (Pienso), Feel (Siento), Act (Actuo). Three hundred forty-two students were divided into two groups, with one third serving as the control group and two thirds as the intervention group. The intervention group received the YPSA school-based intervention. This intervention was revised to reduce the total number of sessions the intervention group received from eleven to eight sessions. The intervention involved thought restructuring, problem solving skills, and planning for the future. The control group received normal teaching activities and assessments. The depression symptoms were assessed using the Beck Depression Inventory II (BDI-II). The anxiety

symptoms were assessed using the Revised Child Anxiety and Depression Scale (RCADS), and adaptive skills using the Spence Child Anxiety Scale (SCAS). Their psychological functioning was assessed using the Children's Automatic Thoughts Scale (CATS), and the short form of the Social Problem-Solving Inventory Revised (SPSI-R Short Form). There were no statistically significant findings; however, the depression recovery rate was 10% higher in the intervention group than the control group.

Levy and Travis (2020) examined mental health, specifically the depression and anxiety of 14-17 year old high school students. They set up three groups of six students each that had different leadership styles assigned to each group for the creation of a mixtape. The researchers used this intervention approach to have the students research topics the students feel were important to the community through music. Groups were asked to create a mixtape under the guidance of a peer integrating leadership styles that included a deliberative group, semi-structured group, and a non-deliberative group, which was meant to represent authoritarian, democratic, and laissez-faire style leadership respectively. The leadership styles were used to see the relationship between each style and the well-being of the students, with each group having a differing level of control and structure. There was not a control group for this study. The depression and anxiety symptoms were assessed using the Abbreviated Brief Symptom Inventory. The study findings indicated that the entire youth experienced a significant decrease in stress and depression, but not a significant decrease in anxiety. They also noted that the semi-structured group had a statistically significant reduction in stress. Their findings indicated that the leadership style of the group was an important factor in predicting outcomes.

Zhao et al. (2021) evaluated anxiety of 133 seventh grade, middle school students. The intervention was a Character strengths-based group intervention (CSBGI), in which the

intervention group received ten weekly sessions. The control group was told they would receive intervention sessions the next semester. The anxiety symptoms were assessed using the self-rating anxiety scale. Measurements were taken at the first week and considered the pre-test, at week five, week ten, and three months after the intervention as follow up. The study findings indicated that the CSBGI group's anxiety scores were significantly lower once the intervention began at each check in of the study. The control group had no significant changes across the study duration. The CSBGI group had anxiety scores that were significantly lower than the control group at the first check in during week five. However, that was the only time that the scores were significantly different between the groups at the weekly check-in during the 10-week intervention period. The researchers did note that the CSBGI group had lower scores throughout the study compared to the control group.

Limitations of the studies included small sample sizes, single group comparisons, and a difference between groups at baseline. Three of the studies had a small sample size (Bazzano et al., 2022; Crowley et al., 2018; Levy & Travis, 2020). Another one of the studies mentioned a low follow up and attendance rate for the intervention which affected their sample size, but they still had a larger sample than the other studies (Gaete et al., 2016). Two of the studies used a single group comparison design instead of having a control group (Crowley et al., 2018; Levy & Travis, 2020). Two of the studies reported a difference between the groups at baseline, which might have affected the outcomes (Bazzano et al., 2022; Levy & Travis, 2020). One study reported the timing of the study may have skewed the results and the intervention effects (Zhae et al., 2021).

Stress

Two of the five studies on the topic discussed the efficacy of occupation-based group interventions to reduce stress levels. Both studies were classified as a Level III study (see Appendix B). All studies provided evidence that occupation-based group interventions are effective and potentially beneficial.

Crowly et al. (2018) examined the efficacy of group mindfulness therapy (GMT) on reducing anxiety and stress in 11 adolescents with elevated anxiety levels. Group mindfulness therapy sessions were led by a licensed occupational therapist. Sessions were once a week for 60 minutes, over 10 weeks. The sessions consisted of teachings of attention skills that help manage anxiety and stress. Outcome measures included anxiety symptom severity measured by the Multidimensional Anxiety Scale for Children (MAS), global functioning evaluated by the Child Behavior Checklist and Youth Self Reports, and stress levels assessed using the Perceived Stress Scale. The findings indicated GMT significantly reduced anxiety, perceived stress levels, and attention deficits in adolescents.

Levy and Travis (2020) evaluated the use of Hip Hop-based group work curriculum during a summer camp program amongst three different leadership styles: deliberative or authoritarian, semi-structured or democratic, and non-deliberative or laissez faire on reducing stress and depressive levels in 18 high school students. Outcome measures included perceived stress measured by the Perceived Stress Scale (PSS-10), and anxiety and depression assessed by the Abbreviated Brief Symptom Inventory. Leadership style had an impact on the outcomes for the students' well-being. The results showed that group work opportunities for high school students improve overall well-being by reducing anxiety, depression, and stress levels.

Limitations of the studies on stress levels include small sample sizes and low evidence level designs in both studies. The research conducted by Crowley et al. (2018) had 11 participants, while the study by Levy and Travis (2022) had 18 participants. Both studies used a one-group pretest and posttest design. Crowley et al (2018) used a subjective outcome measure completed by the participants' parents. The study by Levy and Travis (2022) separated the participants into three groups. All the participants met at one location in the evening and were advised not to speak about the current projects. However, contamination is a possibility related to the internal validity of the study.

Discussion

The results of this systematic review suggest that occupation-based psychosocial groups may be an effective intervention approach to improve mental health issues like anxiety and depression and reduce stress for middle school and high school students. As discussed previously, all five articles in this review suggested that occupation-based group therapy has positive effects on mental health (Bazzano et al., 2022; Crowley et al., 2018; Gaete et al., 2016; Levy & Travis, 2020; Zhao et al., 2021). Specifically, both depression and anxiety were observed to decrease as a result of occupation-based group therapy. Additionally, in two of the five articles, the studies suggested that group therapy can decrease stress (Crowley et al., 2018; Levy & Travis, 2020). Occupation-based group therapy may be an effective way to help middle school and high school students who are at risk of developing anxiety and depression, but more research should be done.

One thing to note about the articles included in this systematic review is the lack of occupational therapy presence. Occupational therapists are capable of carrying out these

occupation-based group therapies. Occupational therapy originally emerged during the moral treatment movement, within the field of psychiatry (American Occupational Therapy Association, 2017). The founders of occupational therapy utilized the therapeutic use of occupations, or activities, to help improve physical and mental health and well-being of others (American Occupational Therapy Association, 2017). Occupational therapists are equipped with knowledge on how to address psychosocial, physical, cognitive, sensorimotor, and trauma-related issues (American Occupational Therapy Association, 2017). This knowledge results in a broad perspective on how to properly address all types of physical and mental health needs. Overall, occupational therapists share similar knowledge with other mental health professionals, but occupational therapists can also provide a unique perspective on how to utilize occupations in a way that will promote the health and well-being of others.

Of the five studies in this systematic review, only one study had occupational therapists helping with the intervention. The study done by Crowley et al. (2018) had occupational therapists to help carry out the group mindfulness interventions. While the effects of the presence of occupational therapists weren't really addressed in this study, future research should aim to utilize the unique perspectives of occupational therapists and see how they may influence the outcomes of these occupation-based group therapies for adolescents; especially since occupational therapists are capable of helping children and adolescents with the performance of occupations and management of mental health (Táparo, 2024).

Strengths and Limitations

Strengths of the systematic review process included the use of the PRISMA guidelines and flow diagram that allowed for organizing and filtering the articles as they were collected in

the research process. Another strength and asset to the process was access to Hawai'i Pacific University's online library databases that allowed for an extensive search catalog. Additionally, the team dynamic and open communication throughout the process limited potential bias. Every member of the research team participated fully in the research process, reviewing the articles, and completing the writing process. Guidelines, access to resources, and team dynamics facilitated the systematic review.

Limitations of the systematic review process included the inexperience by every team member in writing a systematic review. The team of researchers were not as familiar with every database within the library system and selected specific databases for the review that were most likely to yield results on the topic. Another limitation was the low number of articles that addressed the topic of interest, which only further emphasized the need for more research in this area. Some articles that were found to have potential relevance to the topic but were out of the date range the team agreed upon within the systematic review protocol. All the above mentioned limitations could have contributed to the team missing key or relevant articles to this systematic review.

Implications for Occupational Therapy Practice

The results of this systematic review have the following implications for occupational therapy practice:

- Occupation-based group therapy may be an effective intervention for addressing mental health, including depression, anxiety, and stress in middle school and high school students.

- Additional research should be done to explore the outcomes of occupation-based group therapy, especially with occupational therapists facilitating the occupation-based group therapy.
- Early mental health interventions play a pivotal role in functional outcomes. Occupational therapy can assist with holistic, client-centered care to address mental health needs, as well as occupations impacted. Occupation-based group therapy can address the inter-service void many can face while seeking care, allowing for better performance and satisfaction long term (Iyer et al., 2019).
- Additional research should be done to systematically examine the effectiveness of occupation-based group therapy across adult and pediatric populations outside of the scope of this systematic review.

Conclusion

Studies included within this systematic review suggest that occupation-based group therapy may be an appropriate intervention approach to address anxiety and depression in at-risk middle and high school students. This approach was found to have some success in reducing both anxiety and depression as well as having a positive effect on the mental health of the population of interest. Additional research is necessary to identify long term translation within practice, and to further investigate the effect of this intervention outside of the reduction of anxiety and depression. In addition, further research into the investigation of the use of occupation-based group therapy for larger, diverse populations still needs to be explored.

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of self-efficacy. *Current Psychology*, 42, 11287-11302. <https://doi.org/10.1007/s12144-021-02377-0>

Appendix A

Search Terms

Occupation focused OR activity based OR occupational therapy

AND

Psychosocial groups OR group interventions OR group therapy

AND

Middle school OR high school students

AND

Anxiety OR depression OR mental health OR psych groups

Appendix B

Evidence Table

Table 1. Evidence Table of Interventions Supporting the Use of Group Therapy to Address Mental Health in Middle School and High School Students.					
Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
Bazzano et al. (2022)	Level 1B RCT <i>Risk of Bias: Low</i>	<i>Participants:</i> N=86 (Gender and race excluded) <i>Inclusion Criteria:</i> Be a student in a middle school located in New Orleans, LA, USA (7th & 8th grade) and willingly to participate, ages 11-14 <i>Intervention Setting:</i> Middle School	<i>Intervention:</i> 4 groups received the intervention, 8 week yoga program with sessions once a week lasting 45 minutes each <i>Control Group:</i> 4 groups were the control, received an attention control - usual course schedule	<i>Symptoms of anxiety:</i> Screen for Child Anxiety Related Disorders (SCARED) <i>Symptoms of depression:</i> Patient Health Questionnaire revised for adolescents (PHQA)	<i>Significant Findings:</i> None <i>Nonsignificant Findings:</i> Anxiety and depression symptoms decreased in the intervention group; Anxiety symptoms decreased but depression symptoms increased in the control group
Crowley et al. (2018)	Level 3B One-Group Pretest/Posttest <i>Risk of Bias: Low</i>	<i>Participants:</i> N=11 (7 females; ages 12-13) Inclusion Criteria: 6th	<i>Intervention:</i> Group mindfulness therapy (GMT) was given to each participant for 10 weeks. The	<i>Anxiety symptom severity:</i> Multidimensional Anxiety Scale for Children (MASC)	<i>Significant Findings:</i> GMT seems to significantly reduce anxiety and perceived stress.

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Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
		<p>and 7th graders that made the SCARED clinical cutoff (≥ 30); participants were not currently receiving mental health services</p> <p><i>Study Setting:</i> Classroom</p>	<p>participants would meet once a week for 60 minutes with a licensed occupational therapist.</p> <p><i>Control Group:</i> The participants served as their own controls.</p>	<p><i>Global Functioning:</i> Child Behavior Checklist, Youth Self Report</p> <p><i>Stress:</i> Perceived Stress Scale</p>	<p>Additionally, GMT seems to reduce attention problems.</p> <p><i>Nonsignificant Findings:</i> None</p>
Gaete et al. (2016)	<p>Level 1B</p> <p>RCT</p> <p><i>Risk of Bias:</i> Low</p>	<p><i>Participants:</i> $N=342$ (Control $n=113$, 45.1% females, Age: 15.9; Intervention $n=229$, 52.8% females, Age: 15.9)</p> <p><i>Inclusion Criteria:</i> Attending 2° Medio in a municipal</p>	<p><i>Intervention Group:</i> YPSA-R (Revised version of YPSA - I (Yo), Think (Pienso), Feel (Siento), Act(Actuo) ($n=113$); 8 weekly session lasting 45 minutes</p> <p><i>Control Group:</i> ($n=229$)</p>	<p><i>Depression symptoms:</i> Beck Depression Inventory II (BDI-II)</p> <p><i>Anxiety symptoms:</i> Revised Child Anxiety and Depression Scale (RCADS), adaptation of the</p>	<p><i>Significant Findings:</i> None</p> <p><i>Nonsignificant Findings:</i> Recovery rate was 10% higher in the intervention group than the control group</p>

Table 1. Evidence Table of Interventions Supporting the Use of Group Therapy to Address Mental Health in Middle School and High School Students.					
Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
		school, BDI score ≥ 10 (boys) and ≥ 15 (girls) <i>Intervention setting:</i> School	Received normal teaching activities and assessments	Spence Child Anxiety Scale (SCAS) <i>Psychological functioning:</i> Children's Automatic Thoughts Scale (CATS), Short Form of the Social Problem-Solving Inventory Revised (SPSI-R Short Form)	
Levy & Travis (2020)	Level 2B Randomized trial <i>Risk of Bias:</i> Moderate	<i>Participants:</i> N=18 14-17 year olds - (8 girls 10 boys)10 - LatinX, 3 Black, 2 multi-racial/multi- ethnic <i>Inclusion Criteria:</i> LatinX and Black high school students	<i>Intervention:</i> 3 Leadership styles - Group #1 Deliberative, Group #2 Semi-Structured, Group #3 Non- deliberative <i>Control:</i> no control group was included	Pretest-posttest survey <i>Stress:</i> The Perceived Stress Scale (PSS-10) <i>Depression and Anxiety:</i> Abbreviated Brief Symptom Inventory	<i>Significant Finding:</i> Entire youth experienced significant decrease in stress and depression between Time 2 & 2 of mixtape camp Only semi- structured group/Group#2 experienced a statistically

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Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
		<i>Study Setting:</i> University-based research lab that included music studio and workstations			significant reduction in stress <i>Nonsignificant Findings:</i> Leadership style was an important factor in predicting outcomes for participants
Zhao et al. (2021)	Level 1B RCT <i>Risk of Bias:</i> Low	<i>Participants:</i> N=151 originally, but after removing invalid data N=133 (73 females; Mean Age: 14.27) <i>Inclusion Criteria:</i> 7th grader (at the urban middle school in Beijing, China) <i>Study Setting:</i> School	<i>Intervention:</i> Participants received ten 45 minute sessions on Thursdays. <i>Control:</i> Participants were told that they would receive intervention sessions next semester.	<i>Anxiety Symptoms:</i> Self-rating anxiety scale <i>Self-efficacy:</i> general self-efficacy scale	<i>Significant Findings:</i> The character strengths-based group intervention (CSBGI) group's anxiety scores were significantly lower at time 2, 3 and 4 in comparison to time 1. The control group had no significant changes across each time period. The CSBGI group's anxiety scores in

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Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
					<p>comparison to the control group were significantly lower at time 2. While the difference between time 3 and 4 were not statistically different between groups, the CSBGI group was still lower than the control.</p> <p><i>Nonsignificant Findings:</i> In terms of self-efficacy reports, there were no statistically significant differences between time periods within the individual groups or between the groups.</p>
<p><i>Note.</i> BDI=Beck Depression Inventory, CATS=Children's Automatic Thoughts Scale, CSBGI=Character Strengths-Based Group Intervention, GMT=Group Mindfulness Therapy, MASC=Multidimensional Anxiety Scale for Children, PHQA=Patient Health Questionnaire Revised for Adolescents, PSS-10=Perceived Stress Scale, RCADS=Revised Child Anxiety and Depression</p>					

Table 1. Evidence Table of Interventions Supporting the Use of Group Therapy to Address Mental Health in Middle School and High School Students.					
Author/Year	Level of Evidence Study Design Risk of Bias	Participants Inclusion Criteria Study Setting	Intervention and Control Groups	Outcome Measures	Results
Scale, SCARED=Screen for Child Anxiety Disorders, SCAS=Spence Child Anxiety Scale, SPSI-R Short Form=Short Form of the Social Problem-Solving Inventory Revised, YPSA-R=I (Yo), Think (Pienso), Feel (Siento), Act(Actuo)-Revised					

Appendix C

Risk-of-Bias Tables

Table 2a. Risk-of-Bias Table for Randomized Controlled Trial (RCT) and Non-RCT (Two or More Group Design)

	Selection Bias (Risk of bias arising from randomization process)			Performance Bias (effect of assignment to intervention)		Detection Bias		Attrition Bias	Reporting Bias	Overall risk-of-bias (low, moderate, high)
Citation	Random Sequence Generation	Allocation Concealment (until participants enrolled and assigned)	Baseline difference between intervention groups	Blinding of Participants During the Trial	Blinding of Study Personnel During the Trial	Blinding of Outcome Assessment: Self-reported outcomes	Blinding of Outcome Assessment: Objective Outcomes (assessors aware of intervention received?)	Incomplete Outcome Data (data for all or nearly all participants)	Selective Reporting (results being reported selected on basis of the results?)	
Bazzano et al., (2022)	+	+	+	-	-	+	-	+	+	Low
Gaete et al., (2016)	+	+	+	-	-	-	-	?	+	Low
Levy, I & Travis, R., (2020)	+	+	-	-	-	-	+	+	+	Moderate
Zhao et al., (2021)	+	+	?	+	+	-	?	-	+	Low

Note. Categories for risk of bias are as follows: Low risk of bias (+), unclear risk of bias (?), high risk of bias (-). Scoring for overall risk of bias assessment is as follows: 0–3 minuses, low risk of bias (L); 4–6 minuses, moderate risk of bias (M); 7–9 minuses, high risk of bias (H).

Citation. Table format adapted from Higgins, J. P. T., Sterne, J. A. C., Savović, J., Page, M. J., Hróbjartsson, A., Boutron, I., . . . Eldridge, S. (2016). A revised tool for assessing risk of bias in randomized trials. *Cochrane Database of Systematic Reviews* 2016, Issue 10 (Suppl. 1), 29–31. <https://doi.org/10.1002/14651858.CD201601>

Table 2b. Risk of Bias for Before-After (Pre-Post) Studies with No Control Group (One Group Design)

Citation	Study question or objective clear	Eligibility or selection criteria clearly described	Participants representative of real-world patients	All eligible participants enrolled	Sample size appropriate for confidence in findings	Intervention clearly described and delivered consistently	Outcome measures pre-specified, defined, valid/reliable, and assessed consistently	Assessors blinded to participant exposure to intervention	Loss to follow-up after baseline 20% or less	Statistical methods examine changes in outcome measures from before to after intervention	Outcome measures were collected multiple times before and after intervention	Overall risk of bias assessment (low, moderate, high risk)
Crowley et al., (2018)	Y	Y	N	Y	NR	Y	Y	NR	Y	NR	N	Low

Note. Y = yes; N = no; NR = not reported. Scoring for overall risk of bias assessment is as follows: 0–3 N, Low risk of bias (L); 4–8 N, Moderate risk of bias (M); 9–11 N, High risk of bias (H).

Citation. Table format adapted from National Heart Lung and Blood Institute. (2014). Quality assessment tool for before–after (pre–post) studies with no control group. Retrieved from <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>