ARTICLE IN PRESS

https://doi.org/10.36570/jduhs.2024.3

JDUHS

REVIEW ARTICLE

Effectiveness of Cognitive Behavioral Therapy in Treating Adolescent Depression: A Systematic Review

Zulhaini Sartika A. Pulungan,[1] Achir Yani S. Hamid,[2] Herni Susanti,[2] Suzy Yusna Dewi[3]

1. Department of Nursing, Universitas Indonesia, Depok, Indonesia.
2. Department of Psychiatric Nursing, Universitas Indonesia, Depok, Indonesia
3. Department of Medicine, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia.

Correspondence to: Zulhaini Sartika A. Pulungan, Email: zulhainisartika@gmail.com, ORCID: 0000-0003-4222-0709

ABSTRACT

Depression is a leading mental health issue among adolescents, contributing significantly to the global disease burden. Cognitive Behavioral Therapy (CBT) is recognized as an effective intervention for adolescent depression. This systematic review aimed to evaluate the effectiveness of CBT in reducing depressive symptoms among adolescents through different delivery formats, including face-to-face, group, and digital platforms. A comprehensive literature search was conducted across five databases-Scopus, PubMed, ProQuest, Science Direct, and Cambridge Core-to identify relevant studies published from 2018 to 2022. The inclusion criteria focused on randomized controlled trials involving adolescents diagnosed with depression who received CBT. Initial searches yielded 168,216 articles, which, after deduplication and screening, resulted in 11 articles for final analysis. The findings indicate that CBT effectively reduces depressive symptoms in adolescents, with significant improvements in mood, behavioral activation, and overall functioning. Both face-to-face and internet-based CBT (iCBT) were found to be effective, with iCBT offering advantages such as reduced costs and easier accessibility. Group CBT fostered a supportive environment, promoting peer learning, while individual CBT provided personalized care. CBT was also associated with increased self-efficacy, improved coping strategies, and reduced relapse rates. These results support CBT as a flexible and effective approach to managing adolescent depression. Expanding CBT, particularly via digital means, could help address mental health care gaps, though considerations around adherence and resource availability remain crucial.

Keywords: Adolescent, Behavior Therapy, Congnitive Behavioral Therapy, Depression, Systematic Review.

INTRODUCTION

Depression is a prevalent mental health issue among teenagers, often emerging between the ages of 15 and 21.[1,2] It is one of the most disabling mental health conditions and a major contributor to the global burden of disease, accounting for substantial years lost due to pain and disability.[3,4] Globally, more than 280 million people are affected by depression, with an estimated prevalence among adolescents aged 13-18 years ranging from 1% to 7%.[5] In Indonesia, primary health research data indicates that 6.1% of individuals aged 15 years and older are affected by depression, which translates to approximately 12 million people, highlighting the urgent need to address depression as a significant public health issue.[6]

Depression is characterized by symptoms such as persistent low mood, changes in appetite and sleep, low energy, feelings of hopelessness, low self-esteem, and loneliness.[7,8] Depression in adolescence is not a temporary emotional disturbance but a serious condition that can have lasting consequences. Research indicates that adolescents who experience depression are at a higher risk of future depressive episodes and suicide attempts in adulthood.[4,9] If left untreated, adolescent depression can lead to significant disability, reduced quality of life, and an increased risk of developing severe mental disorders.[1,10]

Despite the considerable impact of depression on adolescents, efforts to prevent and treat it remain inadequate. It is estimated that only 20% of adolescents in need of mental health services receive appropriate treatment,[11] with even lower rates in Indonesia, where only 9% of affected individuals undergo treatment.[6]

Barriers to effective management include limited resources, a shortage of trained mental health professionals, social stigma, and insufficient mental health literacy. Additionally, inaccurate assessments and misdiagnosis are common challenges.[6,11] Therefore, faster and higher-quality early intervention is crucial for improving adolescent mental health outcomes.

Cognitive Behavioural Therapy (CBT) has emerged as one of the most effective interventions for treating adolescent depression and is considered the gold standard.[12,13] CBT is a first-line treatment for children and adolescents aged 5-18 years and has been shown to be effective in reducing symptoms of major depression, as well as preventing the progression of subclinical depression in adolescents.[14-16] Moreover, digital interventions, such as web- and smartphone-based CBT, have also demonstrated efficacy in reducing depressive symptoms in this population.[17,18] While the literature supports the effectiveness of CBT in reducing depression among adolescents, there is a need to strengthen the scientific evidence, particularly regarding its implementation in Indonesia.

This systematic review is essential as it focuses on a critical population-adolescents, who represent the nation's future and must be mentally healthy. CBT can help adolescents identify and modify negative thought patterns, develop effective coping strategies, and ultimately improve their quality of life. Additionally, raising awareness about the benefits of CBT among mental health professionals can facilitate better clinical decision-making, improve accessibility, and enhance the affordability of mental health services for adolescents. The aim of this systematic review is to explore the implementation of CBT in reducing depression among adolescents, with a particular focus on its applicability to adolescents in Indonesia.

METHODS

Research Design

This study utilized a systematic review approach to evaluate the effectiveness of CBT in reducing depressive symptoms among adolescents. A clinical question was formulated using the PICO (Patient, Intervention, Comparison, Outcomes) framework: "In adolescents who are depressed, can CBT decrease symptoms of depression compared to usual care?" The research process was conducted over six months, from March to August 2023, beginning with formulating the research question, followed by a comprehensive literature search, screening, data extraction, and analysis. The study was conducted by the research team at the Faculty of Nursing, University of Indonesia.

Search Strategy

The literature search was carried out across five databases: Scopus, PubMed, ProQuest, ScienceDirect, and Cambridge Core, covering studies published between 2018 and 2022. These databases were chosen for their comprehensive coverage of medical, psychological, and social sciences literature, ensuring a broad and relevant pool of research studies. Scopus and PubMed were selected for their extensive biomedical and clinical trial databases, ProQuest for its coverage of dissertations and theses, ScienceDirect for its broad access to peer-reviewed journals, and Cambridge Core for its reputable coverage of health and behavioral sciences. This combination provided a diverse range of high-quality articles for inclusion in this systematic review. The search utilized Boolean operators (AND, OR) to combine keywords and quotation marks ("") to search for specific phrases. The keywords included: (adolescent OR teenager OR young OR juvenile) AND (depression OR distress) AND ("Cognitive-behavioral therapy" OR group-CBT OR intervention OR therapy OR iCBT) AND ("counseling guidance" OR "motivational interviewing" OR "usual care") AND ("depressive symptoms" OR "emotional depression").

Selection Criteria

The inclusion criteria were designed to ensure that only relevant, high-quality studies were selected for analysis. Inclusion criteria included studies on adolescents (aged 12-21 years) diagnosed with depression who received CBT (either in-person or online), published in English language from 2018 to 2022, available as open-access journal articles, using a Randomized Controlled Trial (RCT) design, and available in full-text format. The restriction to studies published from 2018 onwards ensured that only recent evidence was considered, reflecting the latest advancements in CBT. The inclusion of open-access articles was intended to facilitate transparency and replicability, while focusing on RCTs ensured the highest level of evidence for evaluating the effectiveness of CBT.[19]

The exclusion criteria encompassed encyclopedia articles, book chapters, conference papers, correspondence, editorials, news, practice guidelines, protocols, systematic reviews, literature reviews, and meta-analyses. These sources were excluded because they either did not provide original quantitative data or lacked the methodological rigor required for a systematic review of intervention effectiveness. By excluding non-peer-reviewed sources and non-primary

research, the review maintained a high standard of quality and reliability. Additionally, limiting the review to studies published in English was a practical decision to avoid translation errors and ensure accurate interpretation of findings, though it may introduce some language bias.

Screening of Articles

The screening of articles was performed by two reviewers. The screening process involved multiple stages, including keyword identification, selection based on titles and abstracts, and evaluation of full-text availability and relevance to the inclusion criteria. In case of disagreements, a third reviewer intervened to reconcile differences and ensure consistency.[20]

Data Extraction

Data extraction focused on identifying articles relevant to the research topic. All identified articles were imported into Mendeley. The (PRISMA) Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed to maintain quality and accuracy during data extraction. After eliminating duplicates, 911 articles remained, which were subsequently re-examined to confirm their relevance to the study objectives. Ultimately, 11 articles met the criteria for inclusion and analysis (Figure 1). Data extraction was conducted using a grid synthesis format that summarized information such as author, year, study design, sample characteristics, country, intervention type, frequency, setting, outcome targets, and results. All reviewers cross-checked and summarized the extracted information in a summary table (Table 1).

Quality Assessment

The quality of the selected articles was evaluated using the Joanna Briggs Institute JBI critical appraisal tools for randomized controlled trials.[21] Two reviewers conducted the quality assessment independently. Disagreements were resolved through a reconciliation process involving the third reviewer, ensuring adherence to the JBI guidelines (Table 2).

Data Analysis

Data were analyzed using the Synthesis Without Meta-analysis (SWiM) guidelines.[22] The SWiM guidelines facilitated a structured synthesis and presentation of the results across multiple reporting sections. First, studies were grouped by author, year, design, sample characteristics, country, intervention, frequency, setting, outcome targets, and results. Steps two to six involved an in-depth analysis of the full-text articles to address the clinical question. The findings were summarized in a summary table, with similarities and differences highlighted in narrative form. The final reporting stage included a discussion of the study limitations.

RESULTS

The initial search across five databases yielded 168,216 articles. After applying filters for publication year, article type, subject field, and open access, 166,781 articles were excluded, followed by the removal of 524 duplicates, leaving 911 articles for further screening. Title and abstract screening reduced the selection to 52 articles. Additional screening, based on criteria such as full-text availability, relevance to adolescent populations, and matching study outcomes, resulted in 15 articles. Four articles were subsequently excluded due to a focus on checklists, lack of study feasibility, and low methodological quality, leaving 11 articles for final analysis (Figure 1).

Quality and Risk of Bias Assessment

The risk of bias was assessed using specific thresholds: low risk of bias if 70% or more of the questions received a "yes" score, medium risk if 50-69%, and high risk if less than 50% received a "yes" score.[23] No article scored perfectly in the analysis. The quality scores ranged from 69% to 92%, with three studies categorized as having moderate risk of bias [10,24,25] and eight studies classified as having low risk of bias[9,26-32] (Table 2).

Sample Characteristics and Study Locations

The overall sample consisted of adolescents diagnosed with depression. Nine studies included adolescents aged 12-21 years,[9,10,24-26,29-32] while two studies focused on college students aged 18-23 years.[27,28] All participants were randomly assigned to either intervention or control groups. Most studies had sample sizes ranging from 30 to 272 participants,[9,10,24-26,28-32] while one study included 1,093 adolescents.[27] The studies were conducted in seven different countries, with most studies taking place in Sweden,[10,26,29,32] followed by Japan,[24,27] Norway,[9] Nigeria,[30] Boston, USA,[28] England,[25] and Germany.[31] The studies were conducted across various settings, including community, psychiatric clinics, and college environments, and utilized different formats of CBT, such as individual, group, and internet-based interventions.

Intervention Characteristics

Regarding the interventions, seven studies utilized web/internet-based CBT and smartphone applications,[24-27,29,31,32] while four studies were conducted face-to-face.[9,10,28,30] Eight studies delivered CBT individually,[10,24-29,32] two were group-based,[9,30] and one employed a blended approach.[31] The interventions were typically delivered in 8-12 sessions, including 8 CBT sessions with

2-4 follow-up sessions over a span of 8-12 weeks. Four studies included a follow-up component.[9,28,30,31] In terms of setting, six studies were conducted in community settings using internet programs,[24,26,27,29,31,32] two in college environments,[28, 30] one in a psychiatric clinic,[10] one in a healthcare provider's practice,[9] and one across community and clinical settings.[25] The results are summarized below, highlighting key findings related to depressive symptoms, anxiety, self-efficacy, and other psychological outcomes.

Effectiveness of CBT on Depressive Symptoms

All 11 studies reported that CBT interventions led to significant reductions in depressive symptoms among adolescents. For instance, Topooco *et al*. (2018)[29] conducted an internet-based CBT intervention among 70 adolescents (aged 15-19 years) in Sweden and found a statistically significant reduction in depressive symptoms (p-value < 0.05). Similar outcomes were observed in Ede *et al*. (2019),[30] where group-based CBT in Nigerian adolescents (n = 162) significantly reduced depressive symptoms at the end of 12 weeks (p-value < 0.001), with sustained improvements observed during the three-month follow-up.

The study by Hogberg and Hallstrom.[10] further demonstrated that CBT effectively reduced suicidal ideation and depression in a clinical setting among Swedish adolescents with a high suicide risk (p-value < 0.01). Similarly, Nagamitsu *et al*. observed that integrating CBT via a smartphone app, alongside well-care visits, significantly reduced depressive symptoms in Japanese adolescents with major depressive disorder (p-value < 0.001).[24]

CBT Delivery Formats and Settings

The results indicated that both face-to-face and internet-based CBT (iCBT) were effective in reducing depressive symptoms, though certain variations in outcomes were noted based on the delivery format and setting. Berg *et al*.[32] conducted an internet-based CBT intervention among Swedish adolescents with major depression, reporting significant improvements in explicit knowledge related to CBT (Cohen's d = 1.25; 95% CI 0.67-1.79).[32] However, there was no correlation between changes in knowledge and observable changes in depressive symptoms (Parson's r = -0.38; p-value 0.048).

Mechler *et al*.[26] compared internet-based psycho-dynamic therapy (IPDT) to iCBT in a non-inferiority trial with 272 Swedish adolescents with major depressive disorder.[26] Results showed no significant difference in depression reduction between the two modalities (d = -0.18; 90% CI -0.49 to 0.13; p = 0.34), suggesting that both approaches were equally effective for this population.

Impact on Anxiety and Other Outcomes

Several studies also measured secondary outcomes, including anxiety, self-efficacy, and quality of life. Topooco *et al*.[29] reported that while iCBT significantly increased self-efficacy (p-value < 0.001), there were no significant effects on anxiety reduction (p-value 0.881) or increased social interaction (p = 0.347). Similarly, Wright *et al*.[25] found no significant differences between computer-based CBT (Stressbusters) and a website control group in reducing anxiety scores or improving quality of life among English adolescents at both four-month and 12-month follow-ups (p-value > 0.1 for all comparisons).

In contrast, Pedrelli *et al*. demonstrated that a combination of CBT with behavioral motivational interventions significantly decreased heavy episodic drinking (HED) among college students aged 18-23 years in Boston, while also reducing depressive symptoms (B = -0.66; p-value < 0.001).[28] This highlights the versatility of CBT in addressing comorbidities, such as alcohol use, alongside depression.

Feasibility and Acceptability

The feasibility and acceptability of internet-based CBT were also assessed in several studies. Geirhos *et al*.[31] conducted a feasibility trial among German adolescents with chronic medical conditions and symptoms of anxiety and depression, reporting 60% feasibility and high levels of satisfaction with the intervention (M = 25.42, SD = 5.85).[31] Perceived therapeutic alliance was also comparable to traditional face-to-face CBT (M = 2.83, SD = 1.25).[31]

DISCUSSION

This systematic review found that CBT is effective in reducing symptoms of depression in adolescents. The findings are based on the analysis of studies using RCT designs, which are considered the gold standard for assessing therapeutic effectiveness.[33,34] Among various therapeutic approaches, CBT consistently emerged as the most effective and evidence-based intervention for adolescent depression. CBT is a structured, problem-focused approach designed to help individuals develop better strategies for managing emotions and thoughts, providing a short-term, goal-oriented method that yields faster and lasting results.[35,36] By emphasizing problem-solving and behaviour modification, CBT is highly recommended for treating depression, particularly for adolescents.

This review also found that CBT can be delivered both face-to-face and through iCBT. Each method has distinct advantages and disadvantages. iCBT offers

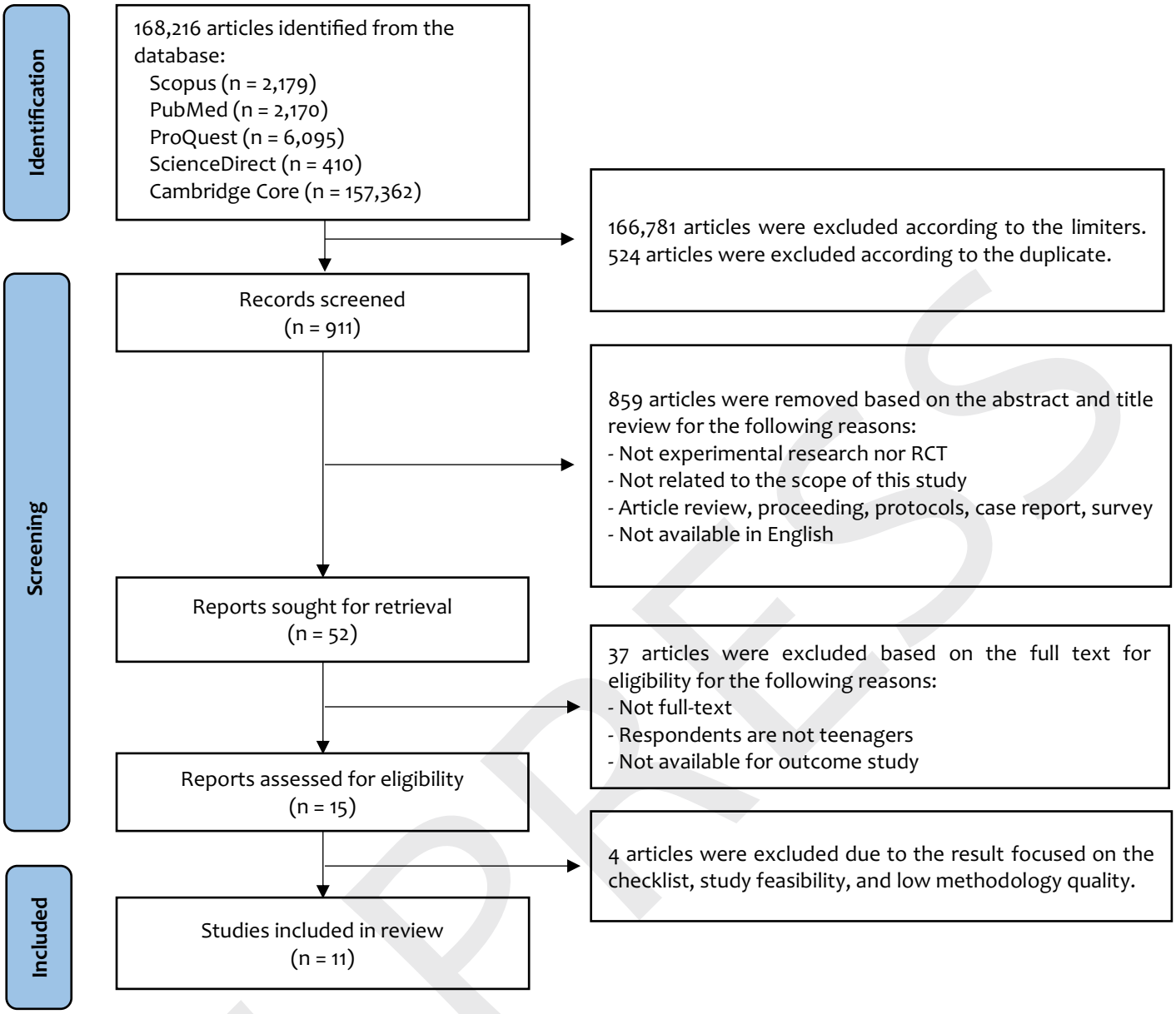

Figure 1. PRISMA flowchart

benefits such as reduced costs, easier accessibility, elimination of waiting lists, and trackable progress, making it a viable option for a larger number of patients.[37,38] Moreover, iCBT requires less therapist time per patient, allowing therapists to assist more individuals simultaneously.[39] Despite these advantages, iCBT presents certain limitations, such as challenges related to adherence, especially in adolescents who may lack the motivation to complete online sessions without direct supervision. Additionally, iCBT requires reliable internet access, which may not be available in low-resource settings, limiting its effectiveness in certain populations. Privacy concerns and the absence of a personal connection with the therapist can also hinder engagement, particularly in adolescents who may need more interpersonal support.

While studies indicate that iCBT is as effective as face-to-face CBT in many conditions,[40,41] some therapists perceive face-to-face therapy as a more impactful experience. Face-to-face CBT provides a more hands-on approach and a sense of immediacy, with participants often feeling that progress is quicker and more tangible.[42] Face-to-face therapy may also be more suitable for adolescents with severe depressive symptoms or comorbid conditions, where a stronger therapeutic alliance and direct supervision are crucial for effective intervention. Ultimately, the choice between face-to-face CBT and iCBT should be tailored to individual preferences, therapeutic goals, and resource availability, as both formats are effective in addressing depression.

Another significant finding is that CBT can be delivered

Table 1. Description of the analyzed studies

S. No	Author, year	Study Location	Study Design	Sample Characteristics	Intervention, Frequency, Setting	Outcome Targets	Result
1	Topooco *et al.* (2018)[29]	Swedish	Randomized controlled trial	70 (15-19 years), with depressive symptoms	I = iCBT C = non-specific monitoring and counseling; Eight module sessions and eight weeks of chat; Individuals in the community using an Internet program	Decreased symptoms of depression anxiety and increased social interaction, self-efficacy, and life satisfaction	Significantly reduced depression ($p < 0.05$) and increased self-efficacy ($p < 0.001$). However, there were no significant differences in decreased anxiety ($p = 0.881$), increased social interaction ($p = 0.347$), and life satisfaction ($p = 0.365$) between the intervention and control groups.
2	Hogberg & Hallstrom (2018)[10]	Swedish	Randomized controlled study	32 (14-15 years), depression with a risk of suicide	I = MR-CBT C = standard practice child psychiatry (TAU); Following clinical needs (no frequency); Individuals in a psychiatric clinic	Memory consolidation, reduction of suicidal ideation and depression in adolescents	There was a significant decrease in suicide incidence ($p < 0.01$), a reduction in depression ($p < 0.01$), and an improvement in well-being in the intervention group.
3	Idsoe *et al.* (2019)[9]	Norway	Two-arm parallel cluster randomized controlled trial	228 (16-20 years), with depression	I = Adolescent Coping with Depression Course (ACDC) C = Usual Care (UC) 10 sessions (8 CBT sessions + 2 follow-up sessions); Adolescents with depressive symptoms from community	Decrease in depressive symptoms, negative automatic thoughts, dysfunctional attitudes, rumination, and improvement of positive emotion regulation strategies.	Depression scores in the intervention group were lower compared to controls ($p = 0.045$). Negative automatic thinking decreased but was not meaningful ($p = 0.523$). There was an effect on perfectionism/ performance evaluation ($p = 0.011$); but no significant effect on dependency ($p = 0.114$). There was no significant effect on emotion regulation: suppression ($p = 0.491$) and reappraisal ($p = 0.203$). There was an effect on reflection ($p = 0.044$) but no significance in the case of contemplation ($p = 0.186$)
4	Ede *et al.* (2019)[30]	Nigeria	Randomized controlled trial	162 (16-21 years), with mild-moderate depression	I = TMCBTD C = wait-listed; 12 sessions (one session per week), 1 hour duration; Group in college	Decreases depressive symptoms in adolescents	TMCBTD significantly reduced depressive symptoms ($p < 0.001$). Follow-up assessment after three months showed a significant reduction in depressive symptoms in the treatment group ($p < 0.001$).

Table 1. Description of the analyzed studies (Cont. .)

S. No	Author, Year	Study Location	Study Design	Sample Characteristics	Intervention, Frequency, Setting	Outcome Targets	Result
5	Berg *et al.* (2019)[32]	Swedish	Randomized controlled trial	71 (15-19 years), with major depression	I = ICBT C = non-specific counseling; Guided internet-based CBT program, 8 module sessions over eight weeks; Individuals in the community using Internet program	Increased explicit knowledge after ICBT administration in depressed adolescents	Increased knowledge after ICBT compared with controls (Cohen's d = 1.25; 95% CI 0.67-1.79). There is no relationship between changes in knowledge and observable changes in depressive symptoms (Parson's r = −0.38; p = 0.048).
6	Pedrelli *et* al. (2020)[28]	Boston	Randomized controlled trial	94 (18-23 years), depressed with alcoholism	I = CBT-D+BMI C= CBT-D; Eight sessions with a duration of 50-60 minutes + 2 follow-up sessions; Individual in college	Decreased Heavy Episodic Drinking (HED), alcohol-related problems (ARP), and depressive symptoms	There was a significant decrease in HED in both groups (B = -0.66; p < 0.001). CBT-D can reduce symptoms of depression and HED in college students. The moderation analysis showed that in college students with fewer depressive symptoms at baseline, CBT-D was associated with a sustained, more significant reduction in heavy drinkers relative to CBT-D+BMI one month later.
7	Wright *et al.* (2020)[25]	English	Randomized controlled trial	139 (12-18 years), with depression	I = CCBT (Stressbusters) C = website; Eight sessions with a duration of 30-45 minutes; Individuals in community and clinical settings	Decrease in symptoms of depression anxiety, improved quality of life	There was no significant difference between CCBT and the website group at 12 months. Both showed improvement in all sizes. There was a change in depression scores after four months of intervention 30 (95% CI -1.5 to 7.5; p = 0.192) and 12 months 1.5 (95% CI -3.3 to 6.3; P=0.528) but meaningless. Likewise, the four monthly anxiety score was 1.8 (95% CI -8.6 to 12.3; p = 0.728), and at 12 months, -0.9 (95% CI -12.7 to 10.9; p = 0.8). The quality of life from baseline at four months was 6.3 (95% CI -1.1 to 13.7; P = 0.097), and at 12 months, it was 0.5 (95% CI -9.3 to 8.2; p = 0.904).
8	Nagamitsu *et al.* (2022)[24]	Japanese	Randomized controlled trial	211 (13-18 years), with major depressive disorder (MDD)	I = WCV+ Smartphone CBT app C = WCV Psychoeducational sessions (week 1) and self-monitoring sessions (week 2);	Decrease in symptoms of depression and suicidal ideation	Both intervention groups showed a meaningful effect on a 1-month reduction in depressive symptom scores in high school students. DSRS-C scores were significant from baseline to 1 month between the WCV group (mean −0.88, SD 3.16) and the non-intervention group (mean 0.90, SD 4.49) and between WCV

Table 1. Description of the analyzed studies (Cont. .)

S. No	Author, Year	Study Location	Study Design	Sample Characteristics	Intervention, Frequency, Setting	Outcome Targets	Result
					Individuals in the community using a smartphone		with the CBT application group (mean −1.67, SD 3.80) and the non-intervention group. Significant intervention prevented suicidal ideation (p <0.001).
9	Mechler *et* al. (2022)[26]	Swedish	Randomized controlled non-inferiority trial	272 (15-19 years), with major depressive disorder (MDD)	I = IPDT C = ICBT; 8 modules delivered online over 10 weeks + 30 minutes of chat/week; Individuals in the community using an Internet program	Lowers depression in adolescents	Changes in depression severity were measured weekly with QIDS-A17-SR in the IPDT and ICBT groups. There was no significant difference between IPDT and ICBT in depression reduction for the treatment of adolescents with MDD (d=−0.18; 90% CI−0.49 to 0.13; p = 0.34).
10	Sakata *et al*. (2022)[27]	Japanese	Randomized factorial trial	1093 (18-39 years), with subthreshold depression	I = Smartphone cognitive-behavioral therapy (iCBT); Eight weeks; Individuals in the community using a smartphone	Improve five iCBT skills: self-monitoring, behavioral activation, cognitive restructuring, assertiveness training, and problem-solving.	There was a significant reduction in depression for all participants (-0.65 and -0.78) at week 8. The reduction in depression did not differ significantly between the presence or absence of any component, with standard averages ranging from -0.04 (95% CI −0.16 to 0.08) for BA and 0.06 (95% CI −0.06 to 0.18) for AT-improvement of CBT skills on the components of cognitive restructuring and assertiveness training.
11	Geirhos *et* al. (2022)[31]	German	Randomized controlled feasibility trial	33 (12-21 years), chronic medical conditions with symptoms of anxiety and depression	I = iCBT youthCOACHCD C = waitlist; One introductory session and 7 module sessions, 1 module/ week, in 12 weeks; Individuals and groups in the community using an Internet program	Decrease symptoms of anxiety and depression in coping with illness.	Feasibility of intervention 60%; Intervention satisfaction (M = 25.42, SD = 5.85) and perceived therapeutic alliance (M = 2.83, SD = 1.25) were comparable to other iCBTs. There are no negative side effects resulting from participation in YouthCOACHCD

Notes: I = Intervention; C = Control; iCBT = Internet-based Cognitive-Behavioural Therapy; MR-CBT = Mood Regulation focused CBT; ACDC = Adolescent Coping with Depression Course; TMCBTD = Treatment Manual for Cognitive Behavioral Therapy for Depression; CBT-D+BMI = Cognitive-Behavioral Therapy for Depression and Brief Motivational Interviewing; CCBT = Computerised Cognitive-Behavioural Therapy; WCV = Well-Care Visits; IPDT = Internet-based Psychodynamic Therapy; ICBT = Internet-based Cognitive Behavioural Therapy

Table 2. Assessment of quality of studies by JBI scoring

S. No	Question	Author, (Year)										
		Hogberg & Hallstrom (2018)	Nagamitsu *et al.* (2020)	Mechler *et al.* (2022)	Sakata *et al.* (2022)	Idsoe *et al.* (2019)	Pedrelli *et al.* (2020)	Topooco *et al.* (2018)	Wright *et al.* (2020)	Ede *et al.* (2020)	Geirhos *et al.* (2022)	Berg *et al.* (2019)
1	Was true randomization used for the assignment of participants to treatment groups?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Was allocation to treatment groups concealed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Were treatment groups similar at the baseline?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Were participants blind to treatment assignment?	No	No	No	No	Yes	No	No	No	No	Yes	No
5	Were those delivering treatment blind to treatment assignment?	No	No	No	No	Yes	No	No	No	No	No	No
6	Were outcomes assessors blind to treatment assignment?	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes
7	Were treatment groups treated identically other than the intervention of interest?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	Was follow-up complete, and if not, were differences between groups in terms of their follow-up adequately described and analyzed?	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
9	Were participants analyzed in the groups to which they were randomized?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	Were outcomes measured in the same way for treatment groups?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	Were outcomes measured reliably?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total	9/13	9/13	10/13	10/13	12/13	10/13	10/13	9/13	11/13	12/13	11/13

individually or in a group setting. Each format has distinct benefits. Group CBT leverages social dynamics to create a supportive environment, allowing participants to share experiences, learn from peers, and gain new insights. The social aspect of group CBT fosters a sense of belonging and collective growth, creating a rich and diverse learning experience.[43-45] Group CBT may be particularly effective in adolescents who benefit from peer support and are comfortable discussing their challenges in a group setting. Conversely, individual CBT offers highly personalized care, with the therapist dedicating their full attention to the specific needs and challenges of the patient, enabling tailored treatment plans and deeper assessments.[46,47] Individual CBT may be more appropriate for adolescents with severe or complex issues requiring focused attention. Both formats require well-structured training for therapists and ongoing feedback to ensure effectiveness. With proper support, CBT-whether delivered individually or in groups-is a powerful tool in addressing adolescent depression.[48,49]

The findings of this systematic review emphasize the versatility of CBT, which can be delivered via various face-to-face or digital platforms, including websites and smartphone applications. This versatility allows researchers and therapists to consider numerous factors when determining the most appropriate CBT approach for clients, such as individual characteristics, therapeutic goals, and available resources. Overall, the evidence demonstrates that CBT significantly improves adolescent mental health outcomes.[50,51] Additionally, expanding the use of CBT could help address existing mental health care gaps, including the shortage of healthcare workers, limited financial resources, lack of awareness among adolescents, time constraints, and stigma-related barriers. Digital CBT applications offer a means to promote adolescent mental health and provide timely, effective treatment, though considerations around accessibility, adherence, and personal connection remain important factors to address.[52,53]

CONCLUSION

This systematic review confirms that CBT is an effective intervention for reducing depressive symptoms in adolescents. The flexibility of CBT allows it to be adapted to various needs and conditions, whether delivered individually or in groups, face-to-face, or through digital platforms. These findings highlight CBT's potential to address gaps in adolescent mental health care, particularly by improving accessibility and affordability of treatment options. As such, CBT holds great promise in enhancing adolescent mental health outcomes. However, continued efforts are necessary to expand the availability and quality of CBT services, and further research is needed to fully explore the potential of this therapy in diverse settings and populations.

FUNDING: This research did not use funds.

CONFLICT OF INTEREST: None

Received: April 22, 2024
Accepted: January 15, 2025

REFERENCES

1. Indonesian Ministry of Health. Depression services technical manual. Jakarta: Republic of Indonesia Ministry of Health; 2021.
2. Milatz F, Klotsche J, Niewerth M, Sengler C, Windschall D, Kallinich T, et al. Anxiety and depression symptoms in adolescents and young adults with juvenile idiopathic arthritis: results of an outpatient screening. Arthritis Res Ther 2024; 26:1–13. doi:10.1186/s13075-024-03312-x
3. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. Lancet 2013; 382:1575–86. doi:10.1016/S0140-6736(13)61611-6
4. Copeland WE, Alaie I, Jonsson U, Shanahan L. Associations of childhood and adolescent depression with adult psychiatric and functional outcomes. J Am Acad Child Adolesc Psych 2021; 60:604-11. doi:10.1016/j.jaac.2020.12.022
5. World Health Organization. Depressive disorder (depression) [Internet]. WHO; 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/depression
6. Indonesian Ministry of Health. Basic Health Research 2018. Jakarta: Balitbangkes Kemenkes RI; 2018.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders V. 5th ed. Washington, DC: Am Psyc Publ; 2013. doi:10.1176/appi.books.9780890425787
8. Kim AW, Nyengerai T, Mendenhall E. Evaluating the mental health impacts of the COVID-19 pandemic: perceived risk of COVID-19 infection and childhood trauma predict adult depressive symptoms in urban South Africa. Psychol Med 2022; 52:1587-99. doi:10.1017/S0033291720003414
9. Idsoe T, Keles S, Olseth AR, Ogden T. Cognitive behavioral treatment for depressed adolescents: results from a cluster randomized controlled trial of a group course.

BMC Psychiatry 2019; 19:1–17. doi:10.1186/s12888-019-2134-3
10. Hogberg G, Hallstrom T. Mood regulation-focused CBT based on memory reconsolidation reduced suicidal ideation and depression in youth in a randomized controlled study. Int J Environ Res Public Health 2018; 15:1-10. doi:10.3390/ijerph15050921
11. Ebert DD, Zarski AC, Christensen H, Stikkelbroek Y, Cuijpers P, Berking M, et al. Internet and computer-based cognitive behavioral therapy for anxiety and depression in youth: A meta-analysis of randomized controlled outcome trials. PLoS One 2015; 10:1-15. doi:10.1371/journal.pone.0119895
12. David D, Cristea I. The new great psychotherapy debate: scientific integrated psychotherapy vs. plurality. Why cognitive-behavior therapy is the gold standard in psychotherapy and a platform for scientific integrated psychotherapy. J Evidence-Based Psychother 2018; 18:1-17. doi:10.24193/jebp.2018.2.11
13. Weersing VR, Jeffreys M, Do MCT, Schwartz KTG, Bolano C. Evidence base update of psychosocial treatments for child and adolescent depression. J Clin Child Adolesc Psychol 2017; 46:11–43. doi:10.1080/15374416.2016.1220310
14. Wise J. Depression in children: offer digital CBT as first-line treatment, says NICE. BMJ 2019; 364:l364. doi:10.1136/bmj.l364
15. Miller I, Peake E, Strauss G, Vierra E, Koepsell X, Shalchi B, et al. Self-guided digital intervention for depression in adolescents: feasibility and preliminary efficacy study. JMIR Form Res 2023; 7:e43260. doi:10.2196/43260
16. Rossello J, Bernal G, Rivera-Medina C. Individual and group CBT and IPT for Puerto Rican adolescents with depressive symptoms. Cult Divers Ethn Minor Psychol 2008; 14:234–45. doi:10.3390/ijerph15050921
17. Christ C, Schouten MJ, Blankers M, van Schaik DJF, Beekman AT, Wisman MA, et al. Internet and computer-based cognitive behavioral therapy for anxiety and depression in adolescents and young adults: systematic review and meta-analysis. J Med Internet Res 2020; 22:1-20. doi:10.2196/17831
18. Grist R, Croker A, Denne M, Stallard P. Technology-delivered interventions for depression and anxiety in children and adolescents: a systematic review and meta-analysis. Clin Child Fam Psychol Rev 2019; 22:147-71. doi:10.1007/s10567-018-0271-8
19. Considine J, Shaban RZ, Fry M, Curtis K. Evidence-based emergency nursing: designing a research question and searching the literature. Int Emerg Nurs 2017; 32:78–82. doi:10.1016/j.ienj.2017.02.001
20. Polanin JR. Best practice guidelines for abstract screening large-evidence systematic reviews and meta-analyses. Res Synth Methods 2019; 10:330–42. doi:10.1002/jrsm.1354
21. Joanna Briggs Institute. Critical appraisal checklist for randomized controlled trial [Internet]. 2023. Available from: https://jbi.global/critical-appraisal-tools
22. Campbell M, McKenzie JE, Sowden A, Katikireddi SV, Brennan SE, Ellis S, et al. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. BMJ 2020; 368:1-6. doi:10.1136/bmj.l6890
23. Goplen CM, Verbeek W, Kang SH, Jones CA, Voaklander DC, Churchill TA, et al. Preoperative opioid use is associated with worse patient outcomes after total joint arthroplasty: a systematic review and meta-analysis. BMC Musculoskelet Disord 2019; 20:1-12. doi:10.1186/s12891-019-2619-8
24. Nagamitsu S, Kanie A, Sakashita K, Sakuta R, Okada A, Matsuura K, et al. Adolescent health promotion interventions using well-care visits and a smartphone cognitive behavioral therapy app: randomized controlled trial. JMIR Mhealth Uhealth 2022; 10:e34154. doi:10.2196/34154
25. Wright B, Tindall L, Hargate R, Allgar V, Trepel D, Ali S. Computerised cognitive–behavioural therapy for depression in adolescents: 12-month outcomes of a UK randomised controlled trial pilot study. BJPsych Open 2020; 6:e5. doi:10.1192/bjo.2019.91
26. Mechler J, Lindqvist K, Carlbring P, Topooco N, Falkenstrom F, Lilliengren P, et al. Therapist-guided internet-based psychodynamic therapy versus cognitive behavioural therapy for adolescent depression in Sweden: a randomised, clinical, non-inferiority trial. Lancet Digit Heal 2022; 4:e594–603. doi:10.1016/S2589-7500(22)00095-4
27. Sakata M, Toyomoto R, Yoshida K, Luo Y, Nakagami Y, Uwatoko T, et al. Components of smartphone cognitive-behavioural therapy for subthreshold depression among 1093 university students: a factorial trial. Evid Based Ment Health 2022; 25:E18-25. doi:10.1136/ebmental-2022-300455
28. Pedrelli P, Fisher LB, Nyer M, Shapero BG, Farabaugh A, Hayden ER, et al. Evaluating the combination of a brief motivational intervention plus cognitive behavioral therapy for depression and heavy episodic drinking in college students. Psychol Addict Behav 2019; 34:1-38. doi:10.1037/adb0000538
29. Topooco N, Berg M, Johansson S, Liljethorn L, Radvogin E, Vlaescu G, et al. Chat- and internet-based cognitive-behavioural therapy in treatment of adolescent depression: randomised controlled trial. BJPsych Open 2018; 4:199-207. doi:10.1192/bjo.2018.18
30. Ede MO, Igbo JN, Eseadi C, Ede KR, Ezegbe BN, Ede AO, et al. Effect of group cognitive behavioural therapy on depressive symptoms in a sample of college adolescents in Nigeria. J Ration Emotive Cogn Behav Ther 2020; 38:306-18. doi:10.1007/s10942-019-00327-1
31. Geirhos A, Domhardt M, Lunkenheimer F, Temming S, Holl RW, Minden K, et al. Feasibility and potential efficacy of a guided internet- and mobile-based CBT for adolescents and young adults with chronic medical

conditions and comorbid depression or anxiety symptoms (youthCOACHCD): A randomized controlled pilot trial. BMC Pediatr 2022; 22:69. doi:10.1186/s12887-022-03134-3

32. Berg M, Rozental A, Johansson S, Liljethorn L, Radvogin E, Topooco N, et al. The role of knowledge in internet-based cognitive behavioural therapy for adolescent depression: Results from a randomised controlled study. Internet Interv 2019; 15:10-7. doi:10.1016/j.invent.2018.10.001
33. King CA, Eisenberg D, Pistorello J, Coryell W, Albucher RC, Favorite T, et al. Electronic bridge to mental health for college students: A randomized controlled intervention trial. J Consult Clin Psychol 2022; 90:172–83. doi:10.1037/ccp0000709
34. Craske MG, Meuret AE, Echiverri-Cohen A, Rosenfield D, Ritz T. Positive affect treatment targets reward sensitivity: A randomized controlled trial. J Consult Clin Psychol 2023; 91:350–66. doi:10.1037/ccp0000805
35. Gautam M, Tripathi A, Deshmukh D, Gaur M. Cognitive Behavioral Therapy for Depression. Indian J Psychiatry 2020; 62:223. doi:10.4103/psychiatry
36. Geschwind N, Arntz A, Bannink F, Peeters F. Positive cognitive behavior therapy in the treatment of depression: A randomized order within-subject comparison with traditional cognitive behavior therapy. Behav Res Ther 2019; 116:119-30. doi:10.1016/j.brat.2019.03.005
37. Pescatello MS, Pedersen TR, Baldwin SA. Treatment engagement and effectiveness of an internet-delivered cognitive behavioral therapy program at a university counseling center. Psychother Res 2021; 31:656–67. doi:10.1080/10503307.2020.1822559
38. Hedman-Lagerlof E, Axelsson E. Using the Internet to provide treatment for health anxiety. In: The clinician's guide to treating health anxiety. Elsevier 2019; 143-54. doi:10.1016/B978-0-12-811806-1.00008-1
39. de Gier M, Beckerman H, Twisk J, Knoop H, de Groot V. Blended versus face-to-face cognitive behavioural therapy for severe fatigue in patients with multiple sclerosis: A non-inferiority RCT. Mult Scler J 2023; 29:1316-26. doi:10.1177/13524585231185462
40. Axelsson E, Andersson E, Ljótsson B, Bjorkander D, Hedman-Lagerlöf M, Hedman-Lagerlof E. Effect of Internet vs Face-to-Face Cognitive Behavior Therapy for Health Anxiety. JAMA Psy 2020; 77:915. doi:10.1001/jamapsychiatry.2020.0940
41. Hedman-Lagerlof E, Carlbring P, Svardman F, Riper H, Cuijpers P, Andersson G. Therapist-supported Internet-based cognitive behaviour therapy yields similar effects as face-to-face therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. *World Psy* 2023; 22:305-14. doi:10.1002/wps.21088
42. Bengtsson J, Nordin S, Carlbring P. Therapists' experiences of conducting cognitive behavioural therapy online vis-a-vis face-to-face. Cogn Behav Ther 2015; 44:470-9. doi: 10.1080/16506073.2015
43. Friedberg RD, Xie I, Goodman C, Zucker J, Neley M, Chen R, et al. Useful techniques in group cognitive behavioral therapy with youth. In: Handbook of Cognitive-Behavior Group Therapy with Children and Adolescents New York: Routledge; 2024; p. 60-72.
44. Nowakowski ME, Bieling PJ. An overview of group cognitive behavioral therapy: Science and practice. In: Comprehensive Clinical Psychology. Elsevier; 2022. p. 245-62.
45. Scheffert A. Setting considerations for group-based cognitive behavior therapy for children and adolescents. In: Handbook of Cognitive-Behavior Group Therapy with Children and Adolescents. New York: Routledge 2024; p 73-84.
46. Goss C, Rossi A, Moretti F. Assessment stage: Data gathering and structuring the interview. *In:* Communication in Cognitive Behav Ther New York, NY: Springer New York 2011; p. 25-51.
47. Freeman A. The conceptualization process in cognitive behavioral therapy. Commentary on Chapter "Case formulation in standard cognitive therapy." In: CBT Case Formulation as Therapeutic Process Cham: Springer International Publishing 2021; p. 35-8.
48. Karlin BE, Brown GK, Jager-Hyman S, Green KL, Wong M, Lee DS, et al. Dissemination and implementation of cognitive behavioral therapy for depression in the Kaiser Permanente Health Care System: Evaluation of initial training and clinical outcomes. *Behav Ther* 2019; 50:446–58. doi:10.1016/j.beth.2018.08.002
49. Terpstra JA, van der Vaart R, Spillekom-van Koulil S, van Dam A, Rosmalen JGM, Knoop H, et al. Becoming an eCoach: Training therapists in online cognitive-behavioral therapy for chronic pain. *Patient Educ Couns* 2018; 101:1702–7. doi: 10.1016/j.pec.2018.03.029
50. Givens A, Moeller K, Johnson TL. Prison-based interventions for early adults with mental health needs: A systematic review. *Int J Offender Ther Comp Criminol* 2021; 65:613–30. doi: 10.1177/0306624X20952395
51. Yoon IA, Slade K, Fazel S. Outcomes of psychological therapies for prisoners with mental health problems: A systematic review and meta-analysis. *J Consult Clin Psychol* 2017; 85:783–802. doi: 10.1037/ccp0000214
52. Hargreaves DS, Elliott MN, Viner RM, Richmond TK, Schuster MA. Unmet health care need in US adolescents and adult health outcomes. *Pediatrics* 2015; 136:513-20. doi:10.1542/peds.2015-0237
53. Corrigan PW, Druss BG, Perlick DA. The impact of mental illness stigma on seeking and participating in mental health care. *Psychol Sci Public Interes* 2014; 15:37-70. doi:10.1177/1529100614531398