



Journal Website

Article history:
Received 10 May 2026
Revised 03 August 2026
Accepted 10 August 2026
Initial Publication 12 August 2026
Final Publication 01 May 2027

International Journal of Education and Cognitive Sciences

Volume 8, Issue 3, pp 1-15



E-ISSN: 3041-8828

Comparison of the Effectiveness of Schema Therapy and Behavioral Activation on Depression Severity and Sleep Quality among University Students with Major Depressive Disorder

Faezeh. Arashk¹, Sayed Abbas. Haghayegh^{1*}, Sedigheh. Rezaei Dehnavi², Sheida. Jabalameli^{3,4}

¹ Department of Psychology, Na.C., Islamic Azad University, Najafabad, Iran

² Department of Psychology, Payame Noor University, Tehran, Iran

³ Department of Clinical Psychology, Na.C., Islamic Azad University, Najafabad, Iran

⁴ Clinical Research Development Center, Na.C., Islamic Azad University, Najafabad, Iran

* Corresponding author email address: abbas_haghayegh@iau.ac.ir

Article Info

Article type:

Original Research

How to cite this article:

Arashk, F., Haghayegh, S. A., Rezaei Dehnavi, S., & Jabalameli, S. (2027). Comparison of the Effectiveness of Schema Therapy and Behavioral Activation on Depression Severity and Sleep Quality among University Students with Major Depressive Disorder. *International Journal of Education and Cognitive Sciences*, 8(3), 1-15.

<https://doi.org/10.61838/kman.ijecs.429>



© 2027 the authors. Published by Iranian Association for Intelligence and Talent Studies, Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

Purpose: This study compared the effectiveness of schema therapy and behavioral activation in reducing depression severity and improving sleep quality among university students with major depressive disorder.

Methods and Materials: A quasi-experimental pretest-posttest design with a control group and two-month follow-up was used. Forty-five students were purposively selected and randomly assigned to schema therapy, behavioral activation, and control groups. Following attrition, 40 participants completed depression assessments and 39 completed sleep-quality assessments. The intervention groups received group treatments, whereas the control group received no intervention. Depression severity was measured using the Beck Depression Inventory-II, and sleep quality was assessed using the Pittsburgh Sleep Quality Index. Data were analyzed using mixed analysis of variance and Bonferroni comparisons.

Findings: Significant time, group, and group-by-time effects were found for depression severity. The interaction effect was significant, $F(2.473, 45.769) = 49.408$, $p < .001$, partial eta squared = .728. Significant effects were observed for sleep quality, including a group-by-time interaction, $F(2.261, 40.716) = 7.461$, $p = .001$, partial eta squared = .293. Both interventions significantly reduced depression severity and poor sleep-quality scores from pretest to posttest, and improvements remained stable at follow-up. Treatment groups performed better than the control group. No significant differences were found between schema therapy and behavioral activation at posttest or follow-up.

Conclusion: Schema therapy and behavioral activation were comparably effective in reducing depression severity and improving sleep quality among students with major depressive disorder. Both approaches may be applied in counseling settings, with treatment selection guided by characteristics and maintaining mechanisms.

Keywords: Major depressive disorder; Schema therapy; Behavioral activation; Depression severity; Sleep quality; University students.

1. Introduction

Major depressive disorder (MDD) is among the most prevalent, disabling, and clinically consequential mental disorders worldwide, affecting emotional, cognitive, behavioral, interpersonal, and physical functioning. It is characterized by persistent depressed mood and/or diminished interest or pleasure accompanied by symptoms such as feelings of worthlessness or excessive guilt, impaired concentration and decision-making, psychomotor changes, fatigue or loss of energy, alterations in appetite or weight, sleep disturbances, and recurrent thoughts of death or suicide (American Psychiatric Association, 2022). Beyond the immediate burden of symptoms, depression can interfere substantially with occupational, educational, relational, and social functioning and may follow a recurrent or chronic course. At the population level, depressive disorders contribute substantially to disability and reduced quality of life, while treatment gaps remain considerable despite the availability of effective pharmacological and psychological interventions. The global burden associated with mental disorders has consequently prompted increasing emphasis on accessible, evidence-based, person-centered psychological care that addresses not only symptomatic distress but also the functional and behavioral difficulties accompanying mental illness (World Health Organization, 2022). Psychotherapy represents a central component of such care, and accumulated evidence indicates that psychological treatments can produce clinically meaningful reductions in adult depressive symptoms, although effect sizes, long-term outcomes, treatment response, and comparative effectiveness vary across patients and therapeutic approaches (Cuijpers et al., 2019). These considerations underscore the importance of continuing to evaluate therapeutic models that operate through different mechanisms and may be responsive to the heterogeneous psychological and behavioral processes involved in depression.

University students represent a particularly important population in this context because the developmental transition into higher education coincides with numerous psychological, interpersonal, academic, and environmental demands. Students may encounter intensive academic workloads, competitive evaluation, uncertainty about career prospects, financial concerns, changing social networks, separation from established sources of support, identity-related challenges, interpersonal conflict, and increasing expectations for independent functioning. These pressures

may interact with pre-existing psychological vulnerabilities and contribute to the onset or exacerbation of mental health difficulties. International evidence from the World Mental Health International College Student Project has demonstrated that mental disorders are common among university students and are distributed across diverse cultural and educational environments, emphasizing that student mental health represents a significant international public health and educational concern (Auerbach et al., 2018). Similarly, systematic review and meta-analytic evidence indicates a substantial prevalence of mental health problems among undergraduate students and identifies multiple demographic, psychosocial, academic, and lifestyle-related risk factors that may increase psychological vulnerability (Sheldon et al., 2021). Depression during university education may have consequences extending beyond emotional suffering, including impaired attention, diminished motivation, reduced academic engagement, absenteeism, deterioration in interpersonal relationships, social withdrawal, decreased self-care, academic underachievement, and possible discontinuation of education. The identification of effective and feasible psychological treatments for depressed university students is therefore important not only from a clinical perspective but also for supporting academic functioning, social adjustment, and broader developmental trajectories.

One particularly important clinical issue in depressed university students is disturbed sleep. Sleep disturbance is included among the diagnostic manifestations of major depressive disorder and may present as difficulty initiating sleep, repeated nighttime awakenings, early-morning awakening, nonrestorative sleep, hypersomnia, or broader disruption of the sleep-wake cycle (American Psychiatric Association, 2022). Sleep quality is more comprehensive than sleep duration alone and encompasses subjective satisfaction with sleep, latency, continuity, efficiency, disturbances during the night, daytime consequences, and consistency of sleep-related patterns. University students may be particularly susceptible to sleep disruption because academic demands, examination schedules, nighttime studying, electronic-device use, variable class schedules, social activities, stress, reduced physical activity, and irregular bedtimes can interfere with stable sleep-wake routines. Empirical evidence among university students has demonstrated significant associations between both inadequate sleep duration and poor sleep quality and elevated depressive symptoms, suggesting that the quality and organization of sleep constitute important correlates of

students' emotional health (Li et al., 2020). Longitudinal evidence has likewise shown that poorer sleep quality is associated with mental health problems among college students, supporting the clinical importance of considering sleep as more than a transient or incidental consequence of academic stress (Zou et al., 2020). Consequently, assessment of psychological treatment effects in depressed students may be incomplete when attention is restricted exclusively to the reduction of depressive symptoms without simultaneously considering sleep-related functioning.

The association between depression and sleep disturbance is especially important because evidence suggests a complex and bidirectional relationship between the two phenomena. Depressive states can interfere with sleep through rumination, hopelessness, heightened negative affect, reduced behavioral engagement, altered physiological arousal, dysfunctional daily routines, and withdrawal from regular activities. Conversely, insufficient, fragmented, or poor-quality sleep may intensify irritability, impair cognitive control, diminish emotion regulation, increase sensitivity to stress, and contribute to negative mood, thereby increasing vulnerability to depressive symptoms. Reviews of the biological and psychological mechanisms connecting sleep disturbance and depression have emphasized this reciprocal relationship and suggested that the two conditions may reinforce one another over time (Fang et al., 2019). From this perspective, depression and sleep difficulties can become components of a self-maintaining cycle in which low mood and dysfunctional cognitive-emotional processing disrupt sleep, while deteriorating sleep further compromises daytime functioning and psychological resilience. This interaction may be particularly consequential among students, for whom concentration, memory, motivation, emotional regulation, and consistent daytime functioning are essential to academic performance. Recent systematic evidence further indicates that psychological interventions can improve sleep quality among university students, although effects vary according to treatment modality and interventions designed specifically around sleep processes tend to have particularly strong support (Tadros et al., 2025). These findings raise an important clinical question regarding whether psychological treatments primarily designed to address depression can simultaneously improve sleep quality by modifying the cognitive, emotional, and behavioral mechanisms shared by both problems.

Schema therapy represents one potentially relevant intervention because it addresses enduring cognitive-

emotional patterns and maladaptive coping processes that may contribute to persistent or recurrent psychological distress. Schema therapy integrates concepts and techniques derived from cognitive-behavioral, attachment, experiential, interpersonal, and psychodynamic traditions and conceptualizes psychological disorders partly in terms of early maladaptive schemas, schema modes, unmet emotional needs, and dysfunctional coping responses. Early maladaptive schemas are broad and pervasive patterns involving memories, cognitions, emotions, bodily sensations, and beliefs regarding oneself and relationships with others. Such patterns are believed to develop when important emotional needs are inadequately met and may subsequently become activated by experiences resembling earlier adverse circumstances. Schema-focused work therefore seeks not merely to modify isolated automatic thoughts but to identify and transform deeper cognitive-emotional organizations that shape how individuals interpret themselves, other people, and stressful situations. Therapeutic strategies may include cognitive restructuring, experiential procedures, imagery work, chair dialogues, empathic confrontation, limited reparenting, and behavioral pattern breaking, with the broader objective of reducing maladaptive schema activation and strengthening healthier modes of functioning (Arntz & van Genderen, 2009).

The schema framework may be particularly relevant to depression because persistent depressive symptoms can be associated with deeply entrenched patterns of failure, defectiveness, shame, abandonment, emotional deprivation, social isolation, dependence, vulnerability, or excessively demanding standards. Such schemas may generate self-criticism, hopelessness, negative expectations, interpersonal sensitivity, avoidance, withdrawal, and dysfunctional attempts to cope with distress. When university students encounter academic failure, criticism, interpersonal rejection, uncertainty about the future, or perceived inability to meet personal and social expectations, underlying maladaptive schemas may become activated and reinforce negative interpretations of these experiences. Schema therapy attempts to interrupt this process by helping individuals recognize schema-driven reactions, understand their developmental origins, challenge dysfunctional meanings, emotionally process unmet needs and painful experiences, and develop alternative responses. Preliminary clinical evidence has suggested that schema-focused interventions may be beneficial for depressive disorders. A randomized clinical trial comparing schema therapy with cognitive behavior therapy found meaningful therapeutic

effects for depression and supported schema therapy as a potentially viable psychotherapy for depressive symptoms (Carter et al., 2013). Similarly, a multiple single-case investigation of schema therapy for chronic depression reported reductions in depressive symptomatology, providing further evidence that modification of enduring maladaptive schemas may be clinically relevant among individuals with persistent depression (Renner et al., 2016).

Interest in schema therapy for depression has subsequently expanded from preliminary investigations toward more systematic comparative evaluation. The OPTIMA randomized clinical trial was designed specifically to compare schema therapy, cognitive behavioral therapy, and individual supportive therapy in inpatient and day-clinic treatment of depression, reflecting the growing recognition that schema therapy warrants direct comparison with established therapeutic approaches (Kopf-Beck et al., 2020). More recent findings from this program of research have provided additional support for schema therapy as an effective treatment for depression in intensive clinical settings, while also suggesting that therapeutic benefit does not necessarily imply consistent superiority over other structured psychological treatments (Kopf-Beck et al., 2024). This is clinically important because different psychotherapies may produce comparable symptomatic improvement while influencing different maintaining mechanisms. Schema therapy may also plausibly influence sleep quality even when sleep is not its primary treatment target. Schema activation involving failure, rejection, vulnerability, guilt, inadequacy, or abandonment can contribute to repetitive negative thinking and emotional arousal, particularly during periods of reduced external stimulation such as bedtime. By decreasing schema-driven distress, improving emotional processing, reducing maladaptive coping, and strengthening adaptive self-regulation, schema therapy may indirectly reduce psychological processes that interfere with restorative sleep. Nevertheless, direct evidence regarding the effectiveness of schema therapy for improving sleep quality among university students diagnosed with major depressive disorder remains limited.

Behavioral activation provides a theoretically distinct approach to depression by focusing primarily on behavior, avoidance, environmental reinforcement, and patterns of daily activity. From the behavioral activation perspective, depression can be maintained when individuals withdraw from potentially rewarding experiences, reduce meaningful activity, avoid difficult or emotionally demanding situations,

and consequently lose access to sources of positive reinforcement. Depressive mood may initially lead individuals to disengage from academic, occupational, interpersonal, recreational, and self-care activities. Although avoidance and inactivity can provide temporary relief from effort, anticipated failure, interpersonal discomfort, or distressing emotions, their longer-term consequences include reduced achievement, mastery, pleasure, social connection, and environmental reward, thereby maintaining or intensifying depression. Behavioral activation therefore focuses on identifying relationships among situations, behaviors, avoidance, and mood and systematically increasing engagement in activities capable of producing reinforcement, accomplishment, meaning, or alignment with personal values. Clinical implementation commonly incorporates activity and mood monitoring, identification of avoidance patterns, graded task assignment, activity scheduling, problem solving, establishment of realistic goals, and development of alternative responses to avoidance (Martell et al., 2010).

Behavioral activation has accumulated substantial empirical support as a treatment for depression. An influential randomized trial comparing behavioral activation, cognitive therapy, and antidepressant medication demonstrated that behavioral activation could produce substantial improvements in adults with major depression and established the approach as an important evidence-based treatment option (Dimidjian et al., 2006). Subsequent large-scale research further strengthened this evidence. In a randomized non-inferiority trial, behavioral activation was compared directly with cognitive behavioral therapy, with findings supporting behavioral activation as an effective treatment that could achieve clinical outcomes comparable to those of a more extensively established cognitive therapy approach (Richards et al., 2016). Systematic review evidence has likewise concluded that behavioral activation is effective for adult depression, particularly relative to inactive or usual-care conditions, while highlighting variation in the certainty of evidence across different treatment comparisons (Uphoff et al., 2020). These findings are especially relevant to university settings because behavioral activation is structured, practical, behaviorally oriented, and readily connected to difficulties frequently observed among depressed students, including withdrawal from classes and social activities, procrastination, reduced exercise, disrupted self-care, excessive time spent inactive or in bed, and loss of regular daily routines.

Behavioral activation may also influence sleep through pathways that differ from those hypothesized for schema therapy. Depressed students who substantially decrease daytime activity may spend extended periods in bed, sleep irregularly during the day, reduce exposure to daylight and physical movement, disengage from academic and social routines, and experience long intervals of unstructured time associated with rumination. These behaviors can further weaken regularity in the sleep–wake cycle. By gradually restoring purposeful daytime engagement, behavioral activation may increase environmental stimulation, normalize activity patterns, reduce excessive daytime sleep, strengthen behavioral distinctions between daytime activity and nighttime rest, and decrease opportunities for prolonged rumination. Improvements in mood, experiences of mastery, and social reinforcement may further contribute to better subjective sleep. Thus, whereas schema therapy may be expected to improve sleep primarily through modification of maladaptive cognitive-emotional patterns and reductions in schema-related arousal, behavioral activation may exert a more behaviorally direct effect by modifying inactivity, avoidance, and disrupted daily rhythms. The two interventions therefore provide an informative therapeutic comparison: one emphasizes deeper cognitive-emotional structures and developmental patterns, whereas the other focuses more immediately on behavioral contingencies, withdrawal, and environmental reinforcement.

Despite growing evidence for both approaches, important gaps remain. Much of the psychotherapy literature has emphasized depression symptom reduction as the primary outcome, even though clinically meaningful recovery also involves restoration of behavioral, interpersonal, academic, and physiological functioning. Moreover, the effectiveness of psychotherapy for depression does not automatically establish whether treatment improves associated problems such as poor sleep, which may persist even when mood symptoms diminish. Comparative studies are particularly valuable because they can determine whether treatments based on substantially different theoretical models produce differential outcomes or whether distinct therapeutic pathways ultimately result in comparable improvement. Existing research supports schema therapy for depression (Carter et al., 2013) (Renner et al., 2016) (Kopf-Beck et al., 2024) and provides extensive evidence for behavioral activation (Dimidjian et al., 2006) (Richards et al., 2016) (Uphoff et al., 2020); however, direct comparison of schema therapy and behavioral activation remains limited, particularly when both depression severity and sleep quality

are considered simultaneously. This gap is especially salient among university students, given their elevated vulnerability to psychological difficulties (Auerbach et al., 2018) (Sheldon et al., 2021), the established relationship between depressive symptoms and impaired sleep in student populations (Li et al., 2020) (Zou et al., 2020), and the increasing need for interventions that address multiple dimensions of psychological functioning rather than a single symptom domain. Examining outcomes across posttreatment and follow-up assessments can additionally clarify whether improvements are maintained beyond the immediate treatment period, which is important because depression frequently follows a recurrent course and temporary symptomatic improvement may not necessarily represent durable therapeutic change.

Accordingly, the aim of the present study was to compare the effectiveness of schema therapy and behavioral activation in reducing depression severity and improving sleep quality among university students diagnosed with major depressive disorder.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental pretest–posttest design with a control group and a two-month follow-up assessment. The study aimed to compare the effectiveness of schema therapy and behavioral activation in reducing depression severity and improving sleep quality among university students diagnosed with major depressive disorder. The independent variable consisted of two psychological interventions—schema therapy and behavioral activation—whereas depression severity and sleep quality were considered the dependent variables. Measurements were conducted at three time points: pretest, posttest, and two-month follow-up.

The statistical population consisted of female university students diagnosed with major depressive disorder. Participants were recruited through purposive sampling. Following the initial screening and diagnostic evaluation, 45 eligible students were enrolled in the study. Participants were randomly assigned in equal numbers to three groups: schema therapy, behavioral activation, and control, with 15 participants in each group.

During the intervention period, two participants in the behavioral activation group and three participants in the schema therapy group discontinued participation or failed to complete the required assessments. Therefore, the final

sample consisted of 40 participants: 13 in the behavioral activation group, 12 in the schema therapy group, and 15 in the control group.

The inclusion criteria were: (a) being a female university student; (b) meeting the diagnostic criteria for major depressive disorder based on a clinical evaluation; (c) obtaining a clinically meaningful score on the depression measure; (d) having sufficient psychological and physical stability to participate in group psychotherapy; (e) providing written informed consent; and (f) being willing to attend the intervention and assessment sessions.

The exclusion criteria included: (a) receiving another psychological intervention simultaneously; (b) initiation or major modification of psychiatric medication during the study period; (c) presence of severe psychiatric disorders requiring immediate clinical intervention, including psychotic disorders or bipolar disorder; (d) active substance dependence; (e) serious suicidal ideation requiring urgent intervention; (f) absence from more than two intervention sessions; and (g) failure to complete the research questionnaires at the pretest, posttest, or follow-up stages.

Individuals who volunteered to participate underwent an initial screening. Eligible students were evaluated according to the diagnostic criteria for major depressive disorder and the inclusion and exclusion criteria. The purpose, procedures, potential benefits, possible discomforts, confidentiality principles, and voluntary nature of participation were explained to all eligible students. Written informed consent was obtained before data collection. Participants then completed the demographic information form, Beck Depression Inventory-II, and Pittsburgh Sleep Quality Index as the pretest assessment.

The 45 eligible participants were randomly assigned to the schema therapy, behavioral activation, and control groups. Random allocation was conducted using computer-generated random sequence. The two experimental groups subsequently received their assigned interventions. The treatment sessions were conducted by therapist's professional qualification, who had received training and supervision in the relevant therapeutic approach. At the end of the interventions, all three groups completed the Beck Depression Inventory-II and Pittsburgh Sleep Quality Index as posttest measures. Two months after the posttest, the same questionnaires were administered again to examine the stability of treatment effects. Participants' identities were protected by assigning numerical codes to the questionnaires, and all collected information was kept confidential.

2.2. Data Collection Tools

A demographic information form was used to collect participants' background characteristics, including age, marital status, educational level, field of study, history of psychological treatment, history of psychiatric medication use, and other relevant clinical information.

Depression severity was assessed using the Beck Depression Inventory-II developed by Beck, Steer, and Brown (1996). The inventory is a 21-item self-report instrument designed to measure the severity of cognitive, emotional, behavioral, and somatic symptoms of depression during the preceding two weeks. The items assess symptoms such as sadness, pessimism, loss of pleasure, feelings of guilt, self-criticism, suicidal thoughts, irritability, reduced interest, difficulty making decisions, changes in sleep and appetite, fatigue, and loss of energy. Each item is scored on a four-point scale ranging from 0 to 3. The total score ranges from 0 to 63, with higher scores indicating greater depression severity. Scores from 0 to 13 generally represent minimal depression, scores from 14 to 19 indicate mild depression, scores from 20 to 28 indicate moderate depression, and scores from 29 to 63 indicate severe depression. The Beck Depression Inventory-II has demonstrated satisfactory internal consistency, test-retest reliability, convergent validity, and construct validity in clinical and nonclinical populations.

Sleep quality was assessed using the Pittsburgh Sleep Quality Index developed by Buysse and colleagues (1989). This self-report questionnaire evaluates an individual's sleep quality and sleep-related difficulties during the preceding month. The instrument contains 19 self-rated items that are combined into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, and the seven component scores are summed to produce a global score ranging from 0 to 21. Higher scores indicate poorer sleep quality and more severe sleep-related difficulties. A global score greater than 5 is generally interpreted as an indication of poor sleep quality. In the present study, the validated version of the questionnaire appropriate to the participants' language and cultural context was administered. The internal consistency of the scale in the present sample was calculated using Cronbach's alpha and was equal to 0.79.

2.3. Interventions

The schema therapy intervention was developed based on the theoretical and therapeutic model proposed by Young, Klosko, and Weishaar (2003). Schema therapy is an integrative psychological approach incorporating cognitive-behavioral, attachment-based, experiential, interpersonal, and psychodynamic principles. The initial sessions focused on establishing a therapeutic relationship, introducing the schema therapy model, and educating participants about early maladaptive schemas, basic emotional needs, coping styles, and schema modes. Participants were assisted in identifying situations that activated their maladaptive schemas and recognizing the relationships among schemas, emotions, thoughts, bodily sensations, and behavioral responses. Subsequent sessions focused on identifying schemas commonly associated with depression, including defectiveness and shame, failure, emotional deprivation, abandonment, dependence, social isolation, and unrelenting standards. Cognitive techniques were used to evaluate the evidence supporting maladaptive beliefs, challenge schema-driven interpretations, and develop more balanced and adaptive perspectives. Experiential techniques, including imagery rescripting and chair dialogues, were applied to facilitate emotional processing of distressing experiences and address unmet emotional needs. Participants were also trained to identify maladaptive coping responses, such as surrender, avoidance, and overcompensation. Behavioral pattern-breaking exercises were used to replace dysfunctional responses with healthier behavioral alternatives. The final sessions focused on strengthening the healthy adult mode, consolidating therapeutic gains, planning for future schema-triggering situations, and preventing the recurrence of depressive and sleep-related difficulties. Regarding sleep quality, participants were encouraged to identify schema-related thoughts and emotional reactions that became activated before bedtime or during nighttime awakenings. Therapeutic exercises were used to reduce feelings of failure, vulnerability, rejection, guilt, and inadequacy that could contribute to emotional arousal and difficulty sleeping. However, schema therapy was not presented as a direct treatment for sleep disorders; rather, improvement in sleep quality was expected to occur through reductions in depressive symptoms, emotional distress, maladaptive beliefs, and dysfunctional coping patterns.

The behavioral activation intervention was based on the model developed by Martell, Dimidjian, and Herman-Dunn

(2010). Behavioral activation conceptualizes depression as being maintained by withdrawal, avoidance, inactivity, and reduced access to positive reinforcement. During the initial sessions, participants received psychoeducation regarding the relationship among mood, behavior, avoidance, and environmental reinforcement. They were taught to monitor their daily activities and mood to identify behaviors that contributed to depressive symptoms or provided a sense of pleasure, accomplishment, and personal meaning. Subsequent sessions focused on identifying patterns of avoidance and withdrawal, establishing realistic behavioral goals, scheduling pleasurable and mastery-oriented activities, grading tasks according to difficulty, and increasing engagement in activities consistent with participants' values. Problem-solving techniques were employed to address barriers to activity engagement. Participants were also encouraged to reduce behaviors that provided short-term emotional relief but contributed to the long-term maintenance of depression. To improve sleep quality, particular attention was given to behavioral patterns that could disrupt the sleep–wake cycle, including excessive daytime sleep, prolonged inactivity, spending unnecessary time in bed, irregular daily schedules, and reduced participation in physical, academic, social, and recreational activities. Participants were encouraged to establish more consistent daily routines, increase daytime activity, avoid using the bed for prolonged wakeful activities, and maintain a clearer distinction between daytime engagement and nighttime rest. The final sessions focused on maintaining adaptive activity patterns, identifying potential triggers for relapse, and developing an individualized plan for continuing behavioral activation strategies after treatment termination.

Participants in the control group received no psychological intervention during the study period and continued their usual daily activities. They completed the research questionnaires at the same assessment points as the intervention groups. For ethical reasons, participants in the control group were offered access to an appropriate psychological intervention after completion of the follow-up assessment.

2.4. Data Analysis

Data were analyzed using SPSS software, version 22. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize participants' demographic characteristics and scores for

depression severity and sleep quality at the pretest, posttest, and follow-up stages. Before conducting the main analyses, the assumptions of parametric testing were evaluated. The normality of the score distributions was assessed using the Shapiro–Wilk test and examination of skewness and kurtosis indices. Homogeneity of error variances was examined using Levene’s test. Mauchly’s test was used to assess the assumption of sphericity. When the sphericity assumption was violated, the Greenhouse–Geisser correction was applied.

A mixed analysis of variance with repeated measures was performed separately for depression severity and sleep quality. Time, consisting of pretest, posttest, and follow-up assessments, was considered the within-subject factor, whereas group, consisting of schema therapy, behavioral activation, and control, was considered the between-subject factor. The main effects of time and group and the group $\times$ time interaction were examined. When significant effects were identified, Bonferroni-adjusted pairwise comparisons were conducted to determine differences between assessment stages and study groups. Partial eta squared was reported as the measure of effect size. The statistical significance level was set at $p < .05$. Because higher scores on both the Beck Depression Inventory-II and Pittsburgh Sleep Quality Index represent greater symptom severity, reductions in scores from pretest to posttest and follow-up were interpreted as improvements in depression severity and sleep quality.

Table 1

Demographic Characteristics of the Participants

Group	n	Mean age	SD	Age range
Behavioral activation	13	23.23	4.22	19–35
Schema therapy	12	22.83	1.85	20–25
Control	15	23.03	2.67	20–28

Before conducting the inferential analyses, the assumptions of mixed analysis of variance were examined. The results of the Shapiro–Wilk tests and the values of skewness and kurtosis supported the normal distribution of depression severity and sleep-quality scores across the groups and assessment stages. Levene’s tests were nonsignificant for both dependent variables at the pretest, posttest, and follow-up stages, $p > .05$, confirming the homogeneity of error variances.

For depression severity, Box’s M test was nonsignificant, $F = 1.751$, $p = .051$, indicating equality of covariance matrices. Mauchly’s test of sphericity was significant, $\chi^2 =$

3. Findings and Results

The study initially included 45 female university students diagnosed with major depressive disorder who were randomly assigned to the behavioral activation, schema therapy, and control groups, with 15 participants in each group. During the intervention period, two participants in the behavioral activation group and three participants in the schema therapy group withdrew from the study. Therefore, the final analysis of depression severity was conducted on 40 participants, including 13 participants in the behavioral activation group, 12 in the schema therapy group, and 15 in the control group.

One participant in the schema therapy group did not complete the Pittsburgh Sleep Quality Index at all three assessment stages. Consequently, the repeated-measures analysis of sleep quality was conducted on 39 participants: 13 in the behavioral activation group, 11 in the schema therapy group, and 15 in the control group. The mean age of the participants was 23.23 years ($SD = 4.22$) in the behavioral activation group, 22.83 years ($SD = 1.85$) in the schema therapy group, and 23.03 years ($SD = 2.67$) in the control group. A one-way analysis of variance indicated no statistically significant difference among the three groups regarding age, $F(2, 37) = 0.053$, $p = .949$. Thus, the groups were comparable in terms of age before the interventions.

34.58, $p < .001$. Therefore, the Greenhouse–Geisser correction was applied. For sleep quality, Box’s M test was also nonsignificant, $F = 1.426$, $p = .176$. Mauchly’s test indicated that the assumption of sphericity had been violated, $\chi^2 = 24.86$, $p < .001$. Accordingly, the Greenhouse–Geisser correction was used in the analysis of sleep-quality scores.

Table 2 presents the means and standard deviations of depression severity and sleep-quality scores across the pretest, posttest, and two-month follow-up stages. Depression severity decreased substantially from pretest to posttest in both intervention groups, and the reductions were

maintained at follow-up. In contrast, depression scores did not decrease in the control group and showed a slight increase at the follow-up assessment. Sleep-quality scores also decreased in both intervention groups. Because higher scores on the Pittsburgh Sleep Quality Index indicate poorer

sleep quality, these reductions demonstrated improvement in participants' sleep quality. The reductions remained relatively stable during the two-month follow-up period. No meaningful improvement was observed in the control group.

Table 2

Means and Standard Deviations of Depression Severity and Sleep Quality Across the Assessment Stages

Outcome	Group	n	Pretest M (SD)	Posttest M (SD)	Follow-up M (SD)
Depression severity	Behavioral activation	13	25.84 (4.98)	13.07 (5.99)	13.02 (5.25)
	Schema therapy	12	21.50 (3.65)	12.75 (5.13)	13.02 (4.86)
	Control	15	23.73 (4.65)	24.46 (4.83)	26.20 (4.32)
Sleep quality	Behavioral activation	13	10.56 (2.08)	8.50 (1.76)	8.29 (1.82)
	Schema therapy	11	10.73 (3.52)	7.32 (3.96)	7.04 (4.01)
	Control	15	11.00 (2.49)	10.82 (2.47)	10.95 (2.57)

A mixed analysis of variance was performed to examine the effects of time, group, and the group $\times$ time interaction on depression severity. The main effect of time was statistically significant, $F(1.237, 45.769) = 109.825$, $p < .001$, $\eta^2p = .748$. This finding indicated that depression severity changed significantly across the pretest, posttest, and follow-up assessments. The main effect of group was also statistically significant, $F(2, 37) = 16.011$, $p < .001$, $\eta^2p = .464$, indicating an overall difference among the behavioral activation, schema therapy, and control groups.

More importantly, the group $\times$ time interaction was statistically significant, $F(2.473, 45.769) = 49.408$, $p < .001$, $\eta^2p = .728$. Therefore, the pattern of change in depression severity across the three assessment stages differed significantly among the study groups. The magnitude of the interaction effect was large, indicating that 72.8% of the variance in changes in depression severity was associated

with the interaction between treatment condition and assessment time.

A separate mixed analysis of variance was conducted for sleep-quality scores. The results demonstrated a statistically significant main effect of time, $F(1.131, 40.716) = 27.525$, $p < .001$, $\eta^2p = .433$. Thus, sleep-quality scores changed significantly across the three assessment stages. The main effect of group was also statistically significant, $F(2, 36) = 3.516$, $p = .040$, $\eta^2p = .163$, showing an overall difference in sleep-quality scores among the three groups.

The group $\times$ time interaction was statistically significant, $F(2.261, 40.716) = 7.461$, $p = .001$, $\eta^2p = .293$. This result indicated that the pattern of change in sleep quality differed significantly across the behavioral activation, schema therapy, and control groups. The interaction effect accounted for approximately 29.3% of the variance in changes in sleep quality. The complete mixed analysis of variance results for both dependent variables are presented in Table 3.

Table 3

Mixed Analysis of Variance for Depression Severity and Sleep Quality

Outcome	Source	SS	df	MS	F	p	η^2p
Depression severity	Time	1163.570	1.237	940.915	109.825	< .001	.748
	Group	1955.042	2.000	977.521	16.011	< .001	.464
	Group $\times$ Time	1046.926	2.473	423.296	49.408	< .001	.728
Sleep quality	Time	96.744	1.131	85.538	27.525	< .001	.433
	Group	138.570	2.000	69.285	3.516	.040	.163
	Group $\times$ Time	52.446	2.261	23.196	7.461	.001	.293

Bonferroni-adjusted pairwise comparisons showed that depression severity decreased significantly from pretest to posttest in the behavioral activation group, with a mean difference of 12.76, $p < .001$. The difference between pretest

and follow-up was also significant, with a mean difference of 12.84, $p < .001$. No significant difference was observed between posttest and follow-up, $p > .05$, indicating that the

therapeutic effect was maintained during the follow-up period.

In the schema therapy group, depression severity decreased significantly from pretest to posttest, with a mean difference of 8.75, $p < .001$. A significant reduction was also observed from pretest to follow-up, with a mean difference of 8.50, $p < .001$. The difference between posttest and follow-up was not statistically significant, $p > .05$, demonstrating the stability of the treatment effect. In the control group, no improvement in depression severity was observed. Depression scores increased from pretest to follow-up, with a mean difference of -2.46 , $p = .001$. Between-group comparisons indicated that both behavioral activation and schema therapy produced significantly lower depression scores than the control condition at posttest and follow-up, $p < .001$. However, no statistically significant difference was found between behavioral activation and schema therapy at either posttest or follow-up, $p > .05$.

Bonferroni-adjusted comparisons showed that sleep-quality scores decreased significantly in the behavioral activation group from pretest to posttest, with a mean difference of 2.06, $p = .014$. A significant reduction was also

observed from pretest to follow-up, with a mean difference of 2.27, $p = .009$. The difference between posttest and follow-up was not statistically significant, $p > .05$, indicating that the improvement in sleep quality was maintained. In the schema therapy group, sleep-quality scores decreased significantly from pretest to posttest, with a mean difference of 3.41, $p = .022$. The reduction from pretest to follow-up was also statistically significant, with a mean difference of 3.68, $p = .014$. No significant difference was observed between posttest and follow-up, $p > .05$. No significant changes in sleep quality were observed across the assessment stages in the control group, $p > .05$.

Between-group comparisons indicated that the schema therapy and behavioral activation groups had significantly lower sleep-quality scores than the control group at posttest and follow-up, $p < .05$. Nevertheless, the difference between schema therapy and behavioral activation was not statistically significant at either posttest or follow-up, $p > .05$. Therefore, although the numerical reduction in sleep-quality scores was greater in the schema therapy group, the two interventions demonstrated statistically comparable effectiveness.

Table 4

Bonferroni-Adjusted Pairwise Comparisons of Depression Severity and Sleep Quality

Outcome	Group	Comparison	Mean difference	p
Depression severity	Behavioral activation	Pretest–Posttest	12.76	$< .001$
	Behavioral activation	Pretest–Follow-up	12.84	$< .001$
	Schema therapy	Pretest–Posttest	8.75	$< .001$
	Schema therapy	Pretest–Follow-up	8.50	$< .001$
	Control	Pretest–Follow-up	-2.46	.001
Sleep quality	Behavioral activation	Pretest–Posttest	2.06	.014
	Behavioral activation	Pretest–Follow-up	2.27	.009
	Schema therapy	Pretest–Posttest	3.41	.022
	Schema therapy	Pretest–Follow-up	3.68	.014

Overall, both schema therapy and behavioral activation significantly reduced depression severity and improved sleep quality among university students diagnosed with major depressive disorder. The improvements observed at posttest remained stable at the two-month follow-up. The significant group $\times$ time interactions for both depression severity and sleep quality demonstrated that the improvements were attributable to the interventions rather than merely to the passage of time. Both intervention groups showed significantly better outcomes than the control group. However, no statistically significant difference was found between schema therapy and behavioral activation in reducing depression severity or improving sleep quality.

Therefore, both approaches demonstrated comparable therapeutic effectiveness.

4. Discussion and Conclusion

The present study compared the effectiveness of schema therapy and behavioral activation in reducing depression severity and improving sleep quality among university students diagnosed with major depressive disorder. The findings demonstrated significant effects of time, group, and the group $\times$ time interaction for both depression severity and sleep quality. Both schema therapy and behavioral activation produced substantial reductions in depression severity from

pretest to posttest, and these improvements were maintained at the two-month follow-up. Similarly, both interventions significantly improved sleep quality, with lower poor-sleep-quality scores at posttest and follow-up compared with pretest. In contrast, the control group did not demonstrate meaningful improvement in either outcome. Between-group comparisons showed that both intervention groups performed significantly better than the control group, whereas no statistically significant difference was observed between schema therapy and behavioral activation at either posttest or follow-up. Thus, both interventions appeared to be effective and relatively stable approaches for reducing depressive symptoms and improving sleep quality among the participating students.

The first major finding was that schema therapy significantly reduced depression severity among students with major depressive disorder. This result is consistent with previous evidence suggesting that schema therapy can produce meaningful improvements in depressive symptoms. Carter and colleagues compared schema therapy with cognitive behavioral therapy and found that schema therapy was effective in treating depression and produced outcomes comparable with an established cognitive-behavioral intervention (Carter et al., 2013). Similarly, Renner and colleagues reported favorable effects of schema therapy among individuals with chronic depression, indicating that changes in deeply rooted maladaptive cognitive-emotional patterns may contribute to reductions in persistent depressive symptoms (Renner et al., 2016). More recent randomized clinical evidence has also demonstrated that schema therapy can be effective in treating depression in inpatient and day-clinic settings, although it has not consistently demonstrated superiority over other active psychotherapies (Kopf-Beck et al., 2024). The current findings therefore extend previous research by suggesting that schema therapy may also be useful among university students diagnosed with major depressive disorder.

The effectiveness of schema therapy can be understood in terms of its emphasis on early maladaptive schemas, dysfunctional schema modes, unmet emotional needs, and maladaptive coping responses. Students with depression may hold persistent beliefs related to failure, defectiveness, shame, abandonment, emotional deprivation, dependence, vulnerability, social isolation, or excessively demanding standards. Academic difficulties, interpersonal rejection, uncertainty about future employment, perceived inability to meet expectations, and conflict within close relationships may activate these schemas and intensify hopelessness,

guilt, self-criticism, and negative interpretations of everyday experiences. Schema therapy attempts to modify these mechanisms by helping individuals identify schema activation, examine the validity of schema-driven beliefs, process unresolved emotional experiences, and replace maladaptive coping patterns with healthier responses. Techniques such as imagery rescripting, chair dialogues, empathic confrontation, and behavioral pattern breaking can facilitate both cognitive and emotional change (Arntz & van Genderen, 2009). By strengthening adaptive modes of functioning and reducing the dominance of maladaptive schemas, participants may develop more balanced self-evaluations and greater emotional flexibility, thereby reducing depressive symptoms.

This interpretation is also compatible with the broader rationale underlying recent schema-therapy research in depression. The OPTIMA trial was specifically designed to evaluate schema therapy alongside cognitive behavioral therapy and supportive therapy, reflecting increasing recognition of schema-focused treatment as a potentially valuable intervention for depressive disorders (Kopf-Beck et al., 2020). The subsequent results of this clinical program confirmed that schema therapy can produce clinically significant improvement, while also suggesting that different structured psychotherapies may achieve broadly comparable outcomes (Kopf-Beck et al., 2024). This pattern corresponds closely with the present finding that schema therapy was effective but was not significantly superior to behavioral activation. The result suggests that modification of persistent cognitive-emotional patterns represents one viable pathway toward recovery, even when alternative interventions operate through different therapeutic mechanisms.

The second major finding was that behavioral activation significantly reduced depression severity. This result strongly aligns with previous controlled studies and systematic evidence supporting behavioral activation as an effective psychological intervention for depression. Dimidjian and colleagues demonstrated that behavioral activation produced substantial improvements in adults with major depression and was comparable with other established treatments under several conditions (Dimidjian et al., 2006). Richards and colleagues also found that behavioral activation was not inferior to cognitive behavioral therapy for depression, supporting its effectiveness as a structured and comparatively straightforward intervention (Richards et al., 2016). In addition, a Cochrane review concluded that behavioral activation can significantly reduce depressive symptoms, especially when compared with inactive control

conditions or treatment as usual (Uphoff et al., 2020). These findings support the present result and suggest that behavioral activation is capable of producing meaningful therapeutic change even though it focuses more directly on behavior and environmental reinforcement than on the explicit restructuring of dysfunctional beliefs.

The effect of behavioral activation may be explained through its impact on avoidance, withdrawal, inactivity, and reduced access to positive reinforcement. Depressed students frequently disengage from academic, social, recreational, and self-care activities because these behaviors require effort or are anticipated to result in failure, disappointment, or discomfort. Such withdrawal may initially reduce distress, but it also decreases opportunities for pleasure, achievement, social connection, competence, and mastery. Behavioral activation seeks to reverse this cycle by helping individuals systematically increase engagement in meaningful and rewarding activities, monitor the relationship between mood and behavior, reduce avoidance, and gradually restore patterns of active functioning (Martell et al., 2010). Through repeated experiences of successful task completion and environmental reinforcement, students may develop greater motivation and confidence while simultaneously reducing inactivity and hopelessness. In this way, behavioral change can lead to emotional improvement even when negative cognitions are not directly challenged.

The finding that schema therapy and behavioral activation did not significantly differ in their effects on depression severity is particularly important. Although these interventions are grounded in different theoretical traditions, both may ultimately influence overlapping processes involved in recovery. Schema therapy focuses on entrenched cognitive-emotional patterns, but it also incorporates behavioral pattern breaking and encourages individuals to act in ways inconsistent with maladaptive schemas. Behavioral activation focuses primarily on behavior, yet successful engagement in meaningful activities may indirectly challenge negative beliefs about helplessness, failure, and incompetence. Thus, the two interventions may approach depression from different starting points while converging on improvements in adaptive behavior, emotional regulation, self-efficacy, and access to reinforcing experiences. The broader psychotherapy literature also suggests that different structured interventions can produce comparable improvements in depression even when they operate through distinct mechanisms (Cuijpers et al., 2019). The present findings are therefore consistent with the

possibility that multiple therapeutic pathways can lead to clinically meaningful symptom reduction.

Another important finding was that both schema therapy and behavioral activation significantly improved sleep quality. This result is clinically relevant because sleep disturbance is a common component of major depressive disorder and may involve difficulties initiating or maintaining sleep, early-morning awakening, hypersomnia, fatigue, and disruption of the sleep–wake cycle (American Psychiatric Association, 2022). The improvement observed in the present study is consistent with research demonstrating a close association between sleep quality and depressive symptoms among university students. Li and colleagues found that both sleep duration and sleep quality were significantly associated with depressive symptoms in university students (Li et al., 2020), while Zou and colleagues reported longitudinal associations between poorer sleep quality and mental health problems in college students (Zou et al., 2020). These findings suggest that improvement in depression may be accompanied by improvement in sleep-related functioning and that therapeutic changes in one domain may facilitate changes in the other.

The improvement in sleep quality following schema therapy may be interpreted through reductions in emotional arousal, rumination, and schema-related distress. Individuals with maladaptive schemas involving vulnerability, abandonment, failure, defectiveness, rejection, or inadequacy may experience heightened cognitive and emotional activation during the evening, when external distractions are reduced. At such times, negative memories, self-critical thoughts, interpersonal concerns, and anticipated future problems may become especially salient and interfere with the ability to initiate or maintain sleep. By modifying maladaptive schemas, reducing the emotional intensity associated with schema activation, and strengthening more adaptive coping modes, schema therapy may indirectly decrease pre-sleep arousal. This interpretation is compatible with evidence showing that depression and sleep disturbance are connected through reciprocal psychological and biological mechanisms, including rumination, emotional dysregulation, and stress reactivity (Fang et al., 2019). The improvement in sleep quality in the schema-therapy group may therefore have occurred partly because changes in emotional and cognitive functioning reduced the processes that interfere with restorative sleep.

Behavioral activation may improve sleep quality through a different pathway. Depressed students may experience irregular schedules, prolonged inactivity, reduced physical activity, excessive daytime sleep, extended time spent in bed, and diminished engagement with social and academic routines. These behaviors may weaken the normal distinction between daytime activity and nighttime rest. Behavioral activation increases daytime engagement and promotes more regular patterns of activity, potentially strengthening sleep–wake organization. Increased physical movement, social interaction, exposure to environmental stimulation, and engagement in structured activities may contribute to greater sleep pressure and reduce unstructured time available for rumination. As depressive symptoms improve and students become more active during the day, subjective sleep quality may consequently improve. This interpretation is consistent with behavioral activation theory and with evidence that psychological treatments can influence both mood and functional behavioral patterns (Martell et al., 2010) (Uphoff et al., 2020).

The simultaneous improvements in depression and sleep are also consistent with the bidirectional relationship between these two domains. Depression can disrupt sleep through rumination, reduced activity, emotional distress, and physiological arousal, whereas poor sleep can increase negative affect, impair cognitive functioning, reduce emotion regulation, and increase sensitivity to stress (Fang et al., 2019). Consequently, improvements in depressive symptoms may facilitate better sleep, while improvements in sleep may further support recovery by enhancing energy, concentration, emotional stability, and tolerance of academic stress. This reciprocal process may be particularly relevant in university populations, where both depression and poor sleep are common and closely associated with academic and psychosocial functioning (Auerbach et al., 2018) (Sheldon et al., 2021). Recent systematic review and meta-analytic evidence has further shown that psychological interventions can improve sleep quality among university students, providing broader support for the present findings (Tadros et al., 2025).

The absence of a significant difference between schema therapy and behavioral activation in improving sleep quality suggests that both approaches may influence sleep through different but comparably effective mechanisms. Schema therapy may primarily reduce internal cognitive-emotional arousal, whereas behavioral activation may primarily improve daily structure, behavioral engagement, and sleep–wake regularity. The fact that neither intervention was

specifically developed as a sleep treatment makes this finding noteworthy, although it should be interpreted as evidence of general improvement in sleep quality rather than proof of sleep-specific therapeutic mechanisms. The maintenance of both depression and sleep improvements at the two-month follow-up also indicates that participants were able to preserve at least some of the therapeutic gains after treatment ended. Schema therapy may promote stability by modifying relatively enduring cognitive-emotional patterns, whereas behavioral activation may support maintenance by establishing practical routines and continued engagement in reinforcing activities. Overall, the findings are consistent with the broader goal of mental health treatment emphasized internationally: achieving improvements not only in psychiatric symptoms but also in daily functioning and quality of life (World Health Organization, 2022).

The present study has several limitations. First, the relatively small sample size reduces statistical power and may limit the ability to detect modest differences between schema therapy and behavioral activation. Second, the sample consisted only of female university students, which restricts the generalizability of the findings to male students, nonstudent populations, older adults, and individuals from other social or clinical backgrounds. Third, both depression severity and sleep quality were evaluated primarily using self-report instruments and may therefore have been influenced by recall bias, response tendencies, or participants' expectations regarding treatment. The follow-up period was limited to two months, preventing conclusions regarding the longer-term durability of therapeutic gains. Moreover, sleep quality was assessed subjectively without objective measures such as actigraphy, polysomnography, or systematic sleep diaries. The study also did not include an active placebo or attention-control condition, making it difficult to separate intervention-specific effects from common therapeutic factors such as group interaction, therapist attention, expectancy, and emotional support. Finally, variables such as medication use, caffeine consumption, physical activity, electronic-device use, chronotype, academic workload, and pre-existing sleep disorders were not comprehensively controlled.

Future research should replicate these findings using larger, more heterogeneous samples that include male and female students from different universities, academic disciplines, socioeconomic backgrounds, and cultural contexts. Longer follow-up periods are recommended to determine whether reductions in depression and

improvements in sleep quality are maintained over six months, one year, or longer. Future studies should also incorporate objective and subjective measures of sleep and separately examine dimensions such as sleep latency, sleep duration, sleep efficiency, nighttime disturbance, and daytime dysfunction. Active comparison conditions and dismantling designs could help identify which components of schema therapy and behavioral activation are responsible for therapeutic change. Mediation analyses should examine whether changes in early maladaptive schemas, schema modes, behavioral avoidance, activity level, emotional regulation, rumination, or sleep quality account for reductions in depression. Research might also compare these approaches with specialized sleep interventions or investigate whether adding sleep-focused components to either treatment produces additional benefits.

From a practical perspective, university counseling centers and mental health services may consider both schema therapy and behavioral activation as useful treatment options for students with major depressive disorder, particularly when depression is accompanied by poor sleep quality. Treatment selection may be individualized according to the dominant maintaining mechanisms and practical circumstances of each student. Schema therapy may be especially appropriate when longstanding negative self-beliefs, recurrent interpersonal difficulties, emotional deprivation, or persistent maladaptive coping patterns are prominent, whereas behavioral activation may be particularly useful when withdrawal, inactivity, avoidance, disrupted routines, and reduced engagement in meaningful activities are central features. Clinicians should also routinely assess sleep quality when treating depressed students and monitor whether sleep problems improve alongside depressive symptoms. Combining depression-focused psychotherapy with basic behavioral strategies that promote regular daytime activity, consistent routines, reduced unnecessary time in bed, and healthier sleep-related habits may further strengthen functional recovery and help students maintain therapeutic gains.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We hereby thank all individuals for participating and cooperating us in this study.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

References

- American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders* (5th, text rev. (DSM-5-TR) ed.). American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890425787>
- Arntz, A., & van Genderen, H. (2009). *Schema Therapy for Borderline Personality Disorder*. Wiley-Blackwell.
- Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., & Kessler, R. C. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders. *Journal of abnormal psychology*, 127(7), 623-638. <https://doi.org/10.1037/abn0000362>
- Carter, J. D., McIntosh, V. V. W., Jordan, J., Porter, R. J., Frampton, C. M. A., & Joyce, P. R. (2013). Psychotherapy for Depression: A Randomized Clinical Trial Comparing Schema Therapy and Cognitive Behavior Therapy. *Journal of affective disorders*, 151(2), 500-505. <https://doi.org/10.1016/j.jad.2013.06.034>
- Cuijpers, P., Karyotaki, E., Reijnders, M., & Ebert, D. D. (2019). Was Eysenck Right After All? A Reassessment of the Effects of Psychotherapy for Adult Depression. *Epidemiology and Psychiatric Sciences*, 28(1), 21-30. <https://doi.org/10.1017/S2045796018000057>
- Dimidjian, S., Hollon, S. D., Dobson, K. S., Schmalzing, K. B., Kohlenberg, R. J., Addis, M. E., Gallop, R., McGlinchey, J. B., Markley, D. K., Gollan, J. K., Atkins, D. C., Dunner, D. L., & Jacobson, N. S. (2006). Randomized Trial of Behavioral Activation, Cognitive Therapy, and Antidepressant

- Medication in the Acute Treatment of Adults with Major Depression. *Journal of consulting and clinical psychology*, 74(4), 658-670. <https://doi.org/10.1037/0022-006X.74.4.658>
- Fang, H., Tu, S., Sheng, J., & Shao, A. (2019). Depression in Sleep Disturbance: A Review on a Bidirectional Relationship, Mechanisms and Treatment. *Journal of Cellular and Molecular Medicine*, 23(4), 2324-2332. <https://doi.org/10.1111/jcmm.14170>
- Kopf-Beck, J., Müller, C. L., Tamm, J., Fietz, J., Rek, N., Just, L., Spöck, Z. I., Weweck, K., Takano, K., Rein, M., Keck, M. E., & Egli, S. (2024). Effectiveness of Schema Therapy Versus Cognitive Behavioral Therapy Versus Supportive Therapy for Depression in Inpatient and Day Clinic Settings: A Randomized Clinical Trial. *Psychotherapy and psychosomatics*, 93(1), 24-35. <https://doi.org/10.1159/000535492>
- Kopf-Beck, J., Zimmermann, P., Egli, S., Rein, M., Kappelmann, N., Fietz, J., Tamm, J., Rek, K., Lucae, S., Brem, A. K., Sämann, P., Schilbach, L., & Keck, M. E. (2020). Schema Therapy Versus Cognitive Behavioral Therapy Versus Individual Supportive Therapy for Depression in an Inpatient and Day Clinic Setting: Study Protocol of the OPTIMA-RCT. *BMC psychiatry*, 20, 506. <https://doi.org/10.1186/s12888-020-02880-x>
- Li, W., Yin, J., Cai, X., Cheng, X., & Wang, Y. (2020). Association Between Sleep Duration and Quality and Depressive Symptoms Among University Students: A Cross-Sectional Study. *PLoS One*, 15(9), e0238811. <https://doi.org/10.1371/journal.pone.0238811>
- Martell, C. R., Dimidjian, S., & Herman-Dunn, R. (2010). *Behavioral Activation for Depression: A Clinician's Guide*. Guilford Press.
- Renner, F., Arntz, A., Peeters, F. P. M. L., Lobbestael, J., & Huibers, M. J. H. (2016). Schema Therapy for Chronic Depression: Results of a Multiple Single Case Series. *Journal of Behavior Therapy and Experimental Psychiatry*, 51, 66-73. <https://doi.org/10.1016/j.jbtep.2015.12.001>
- Richards, D. A., Ekers, D., McMillan, D., Taylor, R. S., Byford, S., Warren, F. C., Barrett, B., Farrand, P. A., Gilbody, S., Kuyken, W., O'Mahen, H., Watkins, E. R., Wright, K. A., Hollon, S. D., Reed, N., Rhodes, S., Fletcher, E., & Finning, K. (2016). Cost and Outcome of Behavioural Activation Versus Cognitive Behavioural Therapy for Depression: A Randomised, Controlled, Non-Inferiority Trial. *The lancet*, 388(10047), 871-880. [https://doi.org/10.1016/S0140-6736\(16\)31140-0](https://doi.org/10.1016/S0140-6736(16)31140-0)
- Sheldon, E., Simmonds-Buckley, M., Bone, C., Mascarenhas, T., Chan, N., Wincott, M., Gleeson, H., Sow, K., Hind, D., & Barkham, M. (2021). Prevalence and Risk Factors for Mental Health Problems in University Undergraduate Students: A Systematic Review with Meta-Analysis. *Journal of affective disorders*, 287, 282-292. <https://doi.org/10.1016/j.jad.2021.03.054>
- Tadros, M., Newby, J. M., Li, S., & Werner-Seidler, A. (2025). A Systematic Review and Meta-Analysis of Psychological Treatments to Improve Sleep Quality in University Students. *PLoS One*, 20(2), e0317125. <https://doi.org/10.1371/journal.pone.0317125>
- Uphoff, E., Ekers, D., Robertson, L., Dawson, S., Sanger, E., South, E., Samaan, Z., Richards, D., Meader, N., & Churchill, R. (2020). Behavioural Activation Therapy for Depression in Adults. *Cochrane Database of Systematic Reviews*, 2020(7), CD013305. <https://doi.org/10.1002/14651858.CD013305.pub2>
- World Health Organization. (2022). *World Mental Health Report: Transforming Mental Health for All*.
- Zou, P., Wang, X., Sun, L., Liu, K., Hou, G., Yang, W., Liu, C., Yang, H., Zhou, N., Zhang, G., Ling, X., Liu, J., Cao, J., Ao, L., & Chen, Q. (2020). Poorer Sleep Quality Correlated with Mental Health Problems in College Students: A Longitudinal Observational Study Among 686 Males. *Journal of psychosomatic research*, 136, 110177. <https://doi.org/10.1016/j.jpsychores.2020.110177>