

Comparing the Effectiveness of Dialectical Behavior Therapy and Metacognitive Therapy on Mind Wandering women with Generalized Anxiety Disorder

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ABSTRACT

The present study aimed to compare the effectiveness of dialectical behavior therapy and metacognitive therapy on mind wandering in women with generalized anxiety disorder. The research method was a quasi-experimental design with a pre-test-post-test design and a control group with a two-month follow-up period. The statistical population included women with generalized anxiety disorder who referred to the Avaye Doron and Tarnam Zeingde clinics in Tehran between March 2023 and May 2024. The research sample consisted of 45 women who were selected purposively and based on entry criteria and randomly assigned to two experimental groups and a control group (15 people in each group). The first experimental group underwent 8 sessions of dialectical behavior therapy in a group setting. The second experimental group underwent 8 sessions of metacognitive therapy in a group setting. Data were collected using the Mind Wandering Questionnaire (Mrazek et al., 2013). Data analysis was performed using the repeated measures analysis of variance statistical method. The findings showed that in the experimental groups, the scores of mind wandering in the post-test and follow-up were significantly different compared to the pre-test ($P < 0.05$). It was also found that there was no significant difference between the effectiveness of dialectical behavior therapy and metacognitive therapy on mind wandering ($P > 0.05$). Overall, the results indicated the same effectiveness of dialectical behavior therapy and metacognitive therapy on mind wandering in women with generalized anxiety disorder.

Keywords: Generalized Anxiety Disorder, Metacognitive Therapy, Dialectical Behavior Therapy, Mind Wandering

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Introduction

Generalized anxiety disorder (GAD) is a persistent and often disabling psychological condition characterized by pervasive anxiety, recurrent apprehensive expectations, difficulty controlling worry, and a broad range of cognitive, emotional, and physiological symptoms. Although worry has traditionally been regarded as the defining cognitive feature of GAD, contemporary evidence suggests that the disorder is better conceptualized as a heterogeneous syndrome involving multiple interacting cognitive and affective processes rather than excessive worry alone. Cross-national evidence has questioned whether excessive worry should remain an indispensable diagnostic requirement, showing that clinically significant patterns of generalized anxiety may occur across diverse populations and symptom configurations (1). Recent epidemiological

investigations likewise indicate that both full -threshold and subthreshold generalized anxiety symptoms are common and embedded within complex networks of emotional, cognitive, and contextual factors (2). Under conditions of severe social adversity, the burden of generalized anxiety may become particularly pronounced, as demonstrated by evidence concerning adolescents exposed to armed conflict and chronic environmental stress (3). These findings underscore the public health significance of GAD and the importance of examining cognitive mechanisms that may contribute to its persistence and functional consequences.

The clinical significance of GAD is particularly relevant among women. Gender-specific research indicates that the predictors, expression, and correlates of generalized anxiety symptoms may differ between women and men, suggesting that biological, psychosocial, and contextual factors should be considered when designing and evaluating interventions (4). Female mental health may also be influenced by hormonal and reproductive processes across the lifespan. Changes in ovarian activity and menopause have been associated with variation in vulnerability to affective and anxiety-related symptoms, highlighting the interaction between neurobiological mechanisms and psychological functioning in women (5). Sex-related differences have also been observed in resting-state cognitive and sensory networks, with evidence indicating that menstrual-cycle-related factors may affect neural systems implicated in attention and internally directed cognition (6). Related work has shown that the frequency of mind wandering may vary according to hormonal conditions in women, including oral contraceptive use (7). Collectively, these findings support the value of examining attentional and metacognitive processes specifically in women with GAD rather than assuming that cognitive manifestations of anxiety are uniform across demographic groups.

One cognitive process that may be particularly relevant to anxiety is mind wandering. Mind wandering generally refers to the shift of attention away from an ongoing external task or current environmental demands toward internally generated thoughts, memories, images, concerns, fantasies, or future-oriented scenarios. The phenomenon is common in everyday life and may occur spontaneously or deliberately; however, when frequent, poorly regulated, or dominated by negatively valenced content, it can interfere with concentration, information processing, goal-directed behavior, and emotional regulation. Schooler et al. conceptualized mind wandering in relation to meta-awareness and perceptual decoupling, emphasizing that attention can become disengaged from immediate sensory input while individuals remain immersed in internally generated thought streams (8). The development and validation of the Mind-Wandering Questionnaire further demonstrated that frequent mind wandering is associated with meaningful disruptions in psychological and cognitive functioning (9). Evidence concerning the Persian version of this questionnaire has similarly supported its reliability and validity and has demonstrated meaningful associations between mind wandering and indices of depression, anxiety, stress, and mindfulness (10).

Recent research has strengthened the view that mind wandering is not merely a neutral fluctuation in attention but may be relevant to psychopathology, particularly anxiety disorders. A comprehensive review of mind wandering in anxiety disorders concluded that anxiety can influence both the frequency and phenomenological characteristics of task-unrelated thinking, with anxious individuals often experiencing internally generated cognition that is difficult to disengage from and emotionally laden (11). Ecological momentary assessment research has also shown that off-task thinking can be meaningfully related to anxiety in naturalistic settings, indicating that anxious cognitive activity extends beyond laboratory tasks and occurs during everyday functioning (12). A systematic review and meta-analysis of ecological momentary

assessment studies further demonstrated that mind wandering is a widespread and measurable everyday phenomenon whose occurrence varies systematically with situational and psychological factors (13). These findings are important for GAD because individuals with this disorder frequently experience persistent streams of future-oriented apprehension, repetitive thinking, threat monitoring, and difficulty disengaging attention from internal concerns. Such processes may increase the likelihood that attention shifts away from present-moment demands and becomes captured by worry-related or self-referential thought.

The relationship between GAD and mind wandering can also be understood through theoretical models of worry and experiential avoidance. Newman and Llera proposed the contrast avoidance model, according to which individuals with GAD may use sustained worry as a strategy for maintaining negative emotional states and avoiding abrupt emotional shifts that are experienced as aversive (14). From this perspective, repetitive negative thinking may become negatively reinforced because it provides a subjective sense of preparedness or emotional control, despite its longer-term cognitive and emotional costs. When attention is repeatedly directed toward anticipated threats, possible negative outcomes, and internal monitoring, sustained engagement with current tasks becomes more difficult, potentially increasing episodes of mind wandering. This mechanism is also consistent with evidence that anxiety-related off-task cognition may involve repetitive, intrusive, and difficult-to-control internal content rather than benign spontaneous thought (11). Consequently, treatments that improve present-focused awareness, attentional flexibility, emotion regulation, and the ability to disengage from maladaptive internal processing may be particularly relevant for reducing mind wandering in individuals with GAD.

Contemporary psychological treatment has increasingly shifted from exclusive emphasis on modifying the literal content of thoughts toward interventions targeting broader processes such as attentional control, cognitive flexibility, experiential avoidance, metacognitive beliefs, mindfulness, and emotion regulation. This development is evident in third-wave cognitive and behavioral therapies, which emphasize transdiagnostic processes and functional relationships between internal experiences and behavior (15). Evidence from other anxiety disorders supports the clinical utility of approaches that cultivate psychological flexibility and modify the person's relationship with distressing internal experiences. For example, acceptance and commitment therapy has demonstrated meaningful symptomatic and behavioral effects in individuals with social anxiety disorder, supporting the broader relevance of acceptance-based and process-oriented approaches to anxiety treatment (16). A recent systematic review and Bayesian network meta-analysis also indicates that third-wave cognitive behavioral approaches represent important therapeutic options for adults with GAD, although differences among intervention models and mechanisms remain clinically relevant (17). At the same time, treatment histories, barriers to care, and individual preferences among people with GAD indicate that no single therapeutic model is likely to be optimal for all patients, strengthening the rationale for comparative studies of evidence-based approaches (18).

Dialectical behavior therapy (DBT) is one such process-oriented treatment. Originally developed for individuals with severe emotional and behavioral dysregulation, DBT integrates behavioral change strategies with acceptance-based principles and organizes intervention around several core skill domains, particularly mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness (19). These skills may be relevant to women with GAD because persistent anxiety often involves difficulty tolerating distress, heightened emotional reactivity, rigid efforts to control internal experiences, and impaired attentional

engagement with the present moment. Mindfulness training within DBT teaches individuals to notice thoughts, emotions, bodily sensations, and environmental events without immediately reacting to or becoming absorbed in them. Distress-tolerance skills may reduce the need to escape aversive internal states through repetitive worry, while emotion-regulation strategies may decrease vulnerability to the negative affective states that capture attention and promote internally focused cognition. Interpersonal effectiveness may additionally reduce stress arising from relationship difficulties that can amplify worry and cognitive preoccupation.

Empirical findings provide support for the application of DBT-related mechanisms beyond its original clinical indications. Jafarzade Jahromi et al. found that DBT improved cognitive emotion regulation and cognitive flexibility and reduced worry among women with depression, suggesting that the approach can directly influence cognitive-emotional processes closely related to generalized anxiety and mind wandering (20). Najarpour Ostadi et al. also demonstrated beneficial effects of DBT among female university students experiencing smartphone addiction and loneliness, further supporting the adaptability of DBT skills to populations characterized by emotional and behavioral difficulties (21). The potential relevance of DBT to mind wandering is particularly apparent in its mindfulness component. Experimental evidence indicates that even relatively brief mindfulness practice can reduce mind wandering (22), while systematic review findings show that mindfulness meditation can alter the frequency and quality of wandering thought through improvements in attentional monitoring and regulation (23). Importantly, acceptance appears to be a critical mechanism in this process; brief mindfulness training incorporating an acceptance component has been shown to reduce mind wandering more effectively by changing how individuals respond to emerging thoughts and distractions (24). These mechanisms closely correspond to DBT's combined emphasis on mindful awareness and nonjudgmental acceptance.

Metacognitive therapy (MCT) offers a different but theoretically complementary approach. Rather than focusing primarily on the content or objective accuracy of thoughts, MCT targets beliefs about thinking and the processes through which individuals regulate attention and respond to internal cognitive events. The model proposes that emotional disorders are maintained by a cognitive-attentional syndrome involving persistent worry and rumination, threat-focused attention, and maladaptive coping behaviors, all of which are influenced by positive and negative metacognitive beliefs (25). Positive metacognitive beliefs may lead individuals to regard worry as useful for preparation, threat prevention, or problem solving, whereas negative metacognitive beliefs may involve assumptions that worry is uncontrollable, dangerous, or psychologically damaging. These beliefs can create a self-perpetuating cycle in which individuals monitor their thoughts, attempt to control them, become increasingly preoccupied with their presence, and experience further attentional disruption. Because mind wandering involves disengagement from current tasks and immersion in internally generated cognition, a treatment specifically designed to alter metacognitive engagement with thought may have direct relevance for this outcome.

Several empirical studies support the use of metacognitive interventions for repetitive negative thinking and related cognitive difficulties. Mirzaian reported that metacognitive strategy training reduced rumination and worry, suggesting that strengthening awareness and regulation of thinking processes can decrease perseverative cognition (26). Earlier work comparing metacognitive therapy with mindfulness-based cognitive therapy also emphasized the capacity of MCT to modify depressive symptoms, rumination,

experiential avoidance, and dysfunctional metacognitive beliefs (27). In children with attention-deficit/hyperactivity disorder, metacognitive therapy has been associated with improvements in behavioral-emotional difficulties, cognitive emotion-regulation strategies, and mind wandering, providing more direct evidence that metacognitive intervention can influence attentional disengagement and internally generated thought (28). In addition, randomized and follow-up research in depression has demonstrated that metacognitive therapy can produce durable clinical improvements, indicating that changes in maladaptive thinking processes may persist beyond active treatment (29). Although depression differs diagnostically from GAD, the shared prominence of repetitive negative thinking makes these findings relevant to the transdiagnostic application of MCT.

Evidence specifically concerning GAD is also promising. Group-based metacognitive therapy has been examined in individuals with generalized anxiety disorder and has shown clinically meaningful changes in worry-related and metacognitive processes, suggesting that MCT can be feasibly delivered in a group format (30). This is especially important because GAD is characterized by beliefs about the necessity and uncontrollability of worry, processes that are central treatment targets within MCT. The capacity of metacognitive strategies to disengage attention from repetitive internal processing may also make them particularly relevant to mind wandering. Detached mindfulness, attention training, postponement of worry or rumination, and challenging beliefs concerning the usefulness or danger of persistent thoughts all encourage a shift from immersion in cognition toward flexible observation and regulation of mental activity. In this sense, MCT may reduce mind wandering not by eliminating spontaneous thoughts altogether, but by decreasing prolonged engagement with them and strengthening intentional control over attentional deployment.

Despite the conceptual overlap between DBT and MCT, the two interventions may influence mind wandering through partly different mechanisms. DBT approaches attentional dysregulation within a broader system of mindfulness, acceptance, emotion regulation, distress tolerance, and behavioral skills, whereas MCT places greater emphasis on modifying metacognitive beliefs and cognitive-attentional processing. DBT may reduce mind wandering by improving present-moment awareness and decreasing emotional states that trigger cognitive escape or absorption, while MCT may operate more directly by reducing the tendency to engage with worry, rumination, and self-focused processing. At the same time, both approaches encourage a less reactive relationship to internal experiences, making similar clinical outcomes plausible. Research on anxiety treatments increasingly emphasizes that different therapeutic models may converge on common processes even when their techniques and theoretical language differ (15). Determining whether one of these approaches provides greater benefit for mind wandering, or whether both are comparably effective, therefore has both theoretical and clinical significance.

The need for such a comparison is strengthened by gaps in the existing literature. Although GAD has been widely investigated and reliable screening procedures such as the GAD-7 are available and psychometrically supported in Persian-speaking populations (31), relatively limited attention has been devoted to mind wandering as a specific treatment outcome in women with GAD. Much of the existing work has examined worry, rumination, anxiety severity, emotion regulation, or general psychological distress rather than the everyday tendency for attention to drift away from current activities. Similarly, studies of mind wandering have often focused on healthy samples, meditation interventions, other anxiety conditions, or developmental

populations rather than women diagnosed with GAD. The literature therefore provides strong theoretical reasons to expect that both DBT and MCT may reduce mind wandering, yet direct comparative evidence remains limited. Given the functional importance of sustained attention in occupational, interpersonal, academic, and everyday activities, identifying interventions capable of reducing maladaptive mind wandering may contribute to a more comprehensive treatment approach for GAD.

Accordingly, the present study aimed to compare the effectiveness of dialectical behavior therapy and metacognitive therapy in reducing mind wandering among women with generalized anxiety disorder.

Methods and Materials

Study Design and Participants

The present study employed a quasi-experimental pretest–posttest design with two experimental groups and one control group, followed by a two-month follow-up assessment, to compare the effectiveness of dialectical behavior therapy and metacognitive therapy in reducing mind wandering among women with generalized anxiety disorder. The statistical population consisted of women diagnosed with generalized anxiety disorder who attended the Avaye Daroon and Taranom-e Zendegi clinics in Tehran between March 2023 and May 2024. Participants were recruited through purposive sampling from women who met the eligibility criteria and voluntarily agreed to participate in the study. Following the initial screening and diagnostic procedures, 45 eligible women were enrolled and randomly assigned to three groups, including a dialectical behavior therapy group, a metacognitive therapy group, and a control group, with 15 participants in each group. Random allocation was conducted after completion of the pretest assessment to reduce systematic differences between the groups at baseline. The first experimental group participated in eight weekly sessions of dialectical behavior therapy, while the second experimental group received eight weekly sessions of metacognitive therapy. The control group did not receive either of the study interventions during the intervention period and participated only in the assessment phases. All three groups completed the study measures at the pretest, immediately after completion of the interventions, and at the two-month follow-up. The inclusion criteria consisted of obtaining a score of 10 or higher on the Generalized Anxiety Disorder-7 Scale as the screening cutoff for clinically meaningful anxiety symptoms (Spitzer et al., 2006); confirmation of generalized anxiety disorder by an experienced psychiatrist working at the participating clinics through a diagnostic interview based on the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision* (American Psychiatric Association, 2022); provision of informed consent for participation; having at least a lower-secondary level of education to ensure adequate comprehension of questionnaire items and therapeutic exercises; no self-reported use of narcotic substances; no receipt of psychological or psychotherapeutic interventions during the previous year; and no use of psychiatric medication according to participants' self-reports and information documented in their medical records. Withdrawal criteria included absence from more than two intervention sessions, unwillingness to continue participation at any stage of the study, incomplete completion of the research questionnaires, and unwillingness to undertake the therapeutic assignments and exercises incorporated into the dialectical behavior therapy or metacognitive therapy programs. Ethical principles were observed throughout the research process. Participants were informed about the objectives and procedures of the study, the voluntary nature of participation, their right to withdraw without adverse consequences, and the confidentiality of

their personal and research information. Written informed consent was obtained before participation, and appropriate measures were taken to protect participants' privacy and minimize the possibility of psychological harm. The study protocol was reviewed and approved by the Ethics Committee of Islamic Azad University, Arak Branch, under ethics code R.IAU.ARAK.REC.1403.320.

Data Collection Tools

Mind-Wandering Questionnaire (MWQ). The Mind-Wandering Questionnaire was developed by Mrazek et al. (2013) as a brief self-report instrument for assessing the frequency of mind wandering in everyday life. The questionnaire consists of five items assessing individuals' tendency to experience task-unrelated thoughts and lapses of attention during ongoing activities. Each item is rated on a six-point Likert scale ranging from 1 (almost never) to 6 (almost always), resulting in a possible total score ranging from 5 to 30. Higher total scores indicate a greater tendency toward mind wandering. In the original psychometric evaluation, Mrazek et al. (2013) reported a Cronbach's alpha coefficient of .85, demonstrating satisfactory internal consistency. Evidence for concurrent validity was also obtained through theoretically meaningful correlations between scores on the Mind-Wandering Questionnaire and other psychological constructs, including perceived stress ($r = .27$), mindful attention awareness ($r = -.57$), and self-esteem ($r = -.29$). The psychometric properties of the Persian version were examined by Pourabdol (2023), who reported a Cronbach's alpha coefficient of .89 and a four-week test-retest reliability coefficient of .81. Evidence supporting concurrent validity of the Persian version was obtained through significant associations with the Depression Anxiety Stress Scale, including correlations with the depression ($r = .43$), anxiety ($r = .48$), and stress ($r = .52$) dimensions, as well as with a measure of mindfulness ($r = .49$). In the present study, the Mind-Wandering Questionnaire was administered at the pretest, posttest, and two-month follow-up assessments as the principal outcome measure, and its internal consistency reliability, assessed using Cronbach's alpha, was .82.

Generalized Anxiety Disorder-7 Scale (GAD-7). The Generalized Anxiety Disorder-7 Scale was developed by Spitzer et al. (2006) as a brief self-report screening and severity measure for symptoms associated with generalized anxiety disorder. The instrument contains seven symptom items assessing the frequency of core anxiety manifestations during the preceding two weeks, together with an additional functional-impairment question concerning the extent to which the reported symptoms interfere with everyday functioning. The seven symptom items are scored on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day), producing a total symptom score ranging from 0 to 21, with higher scores representing greater severity of generalized anxiety symptoms. In the present study, a score of 10 or higher was used as one of the initial eligibility criteria, in conjunction with diagnostic confirmation by a psychiatrist. Spitzer et al. (2006) demonstrated strong psychometric properties for the scale, including a Cronbach's alpha coefficient of .92 and satisfactory convergent validity, as evidenced by correlations of .72 with the Beck Anxiety Inventory and .74 with the anxiety subscale of the Symptom Checklist. The psychometric properties of the Persian version were also evaluated by Naeinian et al. (2011), who reported a Cronbach's alpha coefficient of .85. Convergent validity was supported by correlations of .71 with state anxiety and .52 with trait anxiety as measured by the Spielberger State-Trait Anxiety Inventory. In the present study, the GAD-7 was primarily employed during the screening procedure to identify women exhibiting clinically meaningful

generalized anxiety symptoms before diagnostic confirmation and allocation to the study groups. The Cronbach's alpha coefficient obtained for the GAD-7 in the present sample was .80, indicating acceptable internal consistency.

Data Analysis

Dialectical Behavior Therapy. The dialectical behavior therapy protocol was developed on the basis of the principles, techniques, skills, and therapeutic assignments described in the *Dialectical Behavior Therapy: Skills Training Manual* (Linehan, 2021) and was further adapted according to the intervention protocol employed by Najarpour Ostadi et al. (2021). The intervention was delivered by the researcher in a group format across eight 90-minute weekly sessions, held once per week on Mondays at the Taranom-e Zendegi Psychology Clinic. Before implementation, the content and face validity of the intervention were assessed through expert review, and the resulting inter-rater agreement was satisfactory, with a kappa coefficient of .82, indicating a high level of agreement concerning the appropriateness of the intervention content. The first session focused on introducing dialectical behavior therapy, establishing group rules and treatment objectives, explaining fundamental dialectical concepts, differentiating emotional, rational, and wise states of mind, and introducing comprehensive awareness; participants were also asked to develop a personal commitment to treatment and identify different states of mind in daily situations. The second session introduced basic distress-tolerance skills, including distraction from harmful or dysfunctional behaviors, engagement in pleasurable activities, and development of an individualized distress-tolerance plan. The third session extended distress-tolerance training through safe-place imagery, clarification of personal values, radical acceptance, and the development of adaptive coping strategies. The fourth session introduced foundational mindfulness skills, including purposeful attention, deliberate disengagement from distracting experiences, nonjudgmental observation, focused breathing, and sensory awareness exercises. The fifth session advanced mindfulness practice by emphasizing beginner's mind, nonjudgmental awareness, radical acceptance, awareness during interpersonal exchanges, and identification and modification of judgmental thoughts. The sixth session concentrated on emotion-regulation skills, including recognizing and labeling emotions, identifying emotional patterns, reducing vulnerability to intense negative emotions, increasing positive emotional experiences, problem solving, and selecting healthier behavioral responses to emotionally challenging situations. The seventh session addressed interpersonal effectiveness through identifying ineffective interpersonal patterns, evaluating the appropriateness of requests, practicing assertive communication, active listening, boundary setting, and appropriate refusal skills through role-play and group exercises. The eighth and final session was devoted to reviewing and consolidating the skills taught throughout the intervention, revisiting interpersonal effectiveness and negotiation strategies, analyzing participants' remaining interpersonal difficulties, discussing the continued application of learned skills in everyday life, administering the posttest measures, and establishing arrangements for the two-month follow-up assessment. Homework assignments were incorporated throughout the program to facilitate generalization of skills outside the treatment setting and included daily mindfulness exercises, monitoring emotional and cognitive experiences, distress-tolerance practice, implementation of assertiveness skills, and application of emotion-regulation strategies in real-life situations.

Metacognitive Therapy. The metacognitive therapy intervention was developed using the theoretical framework, therapeutic techniques, and assignments presented by Fisher and Wells (2021) and was adapted with reference to the protocol employed by Larijani (2021). The intervention was administered by the researcher in a group format in eight 90-minute sessions conducted once weekly on Wednesdays at the Taranom-e Zendegi Psychology Clinic. The intervention protocol was evaluated by experts for content and face validity before implementation, and the calculated kappa agreement coefficient was .80, indicating satisfactory agreement regarding the appropriateness and relevance of the therapeutic content. The first session introduced participants to the structure, rules, and objectives of treatment and provided an overview of the metacognitive model, with particular emphasis on identifying repetitive negative thinking, recognizing episodes of rumination and worry, enhancing meta-awareness, and introducing mindfulness-based observation of mental events. The second session focused on detached mindfulness and postponement of repetitive negative thinking as strategies for weakening beliefs concerning the uncontrollability of persistent thoughts, with participants practicing observation of thoughts without attempting to suppress, analyze, or engage with them. The third session concentrated on identifying internal and external triggers of repetitive thinking, continuing detached mindfulness practice, challenging negative metacognitive beliefs regarding uncontrollability, and examining avoidance patterns and reductions in everyday activity. During the fourth session, participants reviewed their implementation of thought-postponement strategies, challenged positive metacognitive beliefs concerning the usefulness of worry and rumination, and practiced attentional control techniques intended to strengthen flexible allocation of attention and reduce perseverative self-focused processing. The fifth session was devoted to consolidating detached mindfulness, further challenging positive metacognitive beliefs, evaluating participants' daily activity patterns, increasing adaptive and rewarding activities, and examining changes in emotional responses associated with reduced engagement in repetitive thinking. The sixth session focused more extensively on negative metacognitive beliefs, including beliefs regarding the danger, uncontrollability, and harmful consequences of persistent negative thoughts, and involved cognitive dialogue, restructuring of maladaptive beliefs, and attention-training exercises. The seventh session addressed reassurance-seeking tendencies and associated fears, with participants learning to recognize reassurance-seeking as a maintaining process, practicing attentional flexibility, engaging in gradual exposure to situations in which reassurance would ordinarily be sought, and observing distressing thoughts without judgment or excessive cognitive engagement. The eighth and final session reviewed all previously taught metacognitive strategies, addressed remaining maladaptive metacognitive beliefs, identified likely future triggers for worry and repetitive thinking, strengthened individualized adaptive processing plans, and emphasized relapse prevention and continued independent use of treatment skills. The posttest assessment was administered following completion of the final session, and participants were informed of the arrangements for the two-month follow-up assessment. Throughout the intervention, homework assignments included monitoring triggers of worry and rumination, practicing detached mindfulness, postponing repetitive thinking, challenging positive and negative metacognitive beliefs, increasing adaptive daily activities, reducing reassurance-seeking behavior, and developing an individualized plan for responding to future episodes of persistent negative thinking.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics, including means and standard deviations, were calculated to summarize mind-wandering scores across the three assessment occasions of pretest, posttest, and two-month follow-up for the dialectical behavior therapy, metacognitive therapy, and control groups. To evaluate changes in mind wandering over time and determine whether these changes differed according to treatment condition, repeated-measures analysis of variance was employed, with assessment time considered the within-subject factor and study group considered the between-subject factor. This analytical approach enabled examination of the main effect of time, the main effect of group, and, most importantly, the time-by-group interaction, which indicated whether patterns of change across the three measurement occasions differed among the two experimental groups and the control group. Prior to conducting the inferential analysis, the assumptions required for repeated-measures analysis of variance were evaluated, including the distributional characteristics of the study variables, homogeneity of variances across groups, and the assumption of sphericity for repeated measurements. Where appropriate, post hoc and pairwise comparisons were used to determine the specific assessment occasions between which statistically significant differences occurred and to compare the effects of dialectical behavior therapy and metacognitive therapy. All statistical tests were conducted using a two-tailed significance criterion, and the level of statistical significance was set at $P < .05$.

Findings and Results

The participants in the present study were 45 women with generalized anxiety disorder. The mean age and standard deviation were 32.60 ± 6.62 years in the experimental group receiving dialectical behavior therapy, 33.53 ± 5.33 years in the group receiving metacognitive therapy, and 32.93 ± 6.25 years in the control group. The results of analysis of variance showed that the groups were homogeneous in terms of age and that there was no statistically significant difference among them ($F = .090, p = .941$).

Most participants reported having an associate degree (8 participants in the dialectical behavior therapy group, 17.8%; 6 participants in the metacognitive therapy group, 13.3%; and 7 participants in the control group, 15.6%). The results of analysis of variance showed that the groups were homogeneous in terms of educational level and that there was no statistically significant difference among them ($F = .096, p = .908$).

Table 1 presents the descriptive indices of the experimental and control groups for the study variable across the three assessment stages. As shown in Table 1, the mean mind-wandering scores of the experimental and control groups were approximately similar at pretest. However, after the implementation of dialectical behavior therapy and metacognitive therapy, the mean scores of the experimental groups changed at posttest and follow-up. The significance of these changes was examined using repeated-measures analysis of variance.

Table 1. Descriptive Indices of the Study Variable by Group at Pretest, Posttest, and Follow-Up

Variable	Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Follow-Up Mean	Follow-Up SD
Mind Wandering	Dialectical Behavior Therapy	24.67	3.99	17.87	4.50	18.93	4.93
	Metacognitive Therapy	24.00	3.53	21.13	4.90	21.00	5.41
	Control	24.33	3.72	26.13	5.11	26.67	3.54

Next, the assumptions of repeated-measures analysis of variance, including homogeneity of variances, homogeneity of the variance–covariance matrix, and normality of data distribution, were examined. The Shapiro–Wilk test at the pretest, posttest, and follow-up stages showed that the variables were normally distributed in both experimental groups and the control group ($p > .05$).

Homogeneity of variances was examined using Levene’s test, and the results showed that this assumption was supported for mind wandering at posttest ($F = .260, p = .894; p > .05$). Examination of the variance–covariance matrix assumption using Box’s M test showed that the F statistic for the dependent variable across groups was not significant ($F = .175, p = .902$). The assumption of sphericity for mind wandering was not violated ($\chi^2 = 1.66, p = .43$). Therefore, repeated-measures analysis could be used to examine the stability of intervention effects. The results are presented in Table 2.

Table 2. Results of Repeated-Measures Analysis of Variance for Mind Wandering

Variable	Source	df	Mean Square	F	p	Effect Size
Mind Wandering	Time	2	87.50	4.01	.02	.09
	Group	2	323.52	20.33	< .001	.49
	Time $\times$ Group	4	89.32	4.09	< .001	.16
	Error	84	21.83	—	—	—

According to Table 2, the effect of time on mind-wandering scores across the pretest, posttest, and follow-up stages was significant ($p = .02$). The group effect also showed that the difference between the treatment and control groups in mean mind-wandering scores across all study stages was significant ($p < .001$). Furthermore, the interaction effect of time and group on mind wandering was significant ($p < .001$), indicating the effectiveness of dialectical behavior therapy and metacognitive therapy in reducing mind wandering among women with generalized anxiety disorder at posttest and follow-up compared with the control group. Bonferroni post hoc tests were subsequently used for pairwise comparisons across time and between groups. The results are presented in Table 3.

Table 3. Bonferroni Post Hoc Test for Pairwise and Between-Group Comparisons

Variable	Reference Group/Time	Comparison Group/Time	Mean Difference	Standard Error	p
Mind Wandering	Pretest	Posttest	2.622	.947	.025
	Pretest	Follow-up	2.13	.804	.034
	Posttest	Follow-up	-.489	1.169	1.000
	Dialectical Behavior Therapy	Metacognitive Therapy	-1.556	.841	.214
	Dialectical Behavior Therapy	Control	-5.222	.841	< .001
	Metacognitive Therapy	Control	-3.667	.841	< .001

As shown in Table 3, the Bonferroni pairwise comparison results indicated significant differences in mind-wandering scores between the pretest and posttest and between the pretest and follow-up, demonstrating a reduction in mind wandering compared with the pretest ($p = .025$). No statistically significant difference was observed between the posttest and follow-up, indicating stability of the results over time ($p = 1.000$).

Between-group pairwise comparisons showed that both dialectical behavior therapy and metacognitive therapy were effective in reducing mind wandering compared with the control group ($p < .001$). It was also found that the difference between the dialectical behavior therapy and metacognitive therapy groups in mind wandering was not significant ($r = .214$), indicating equal effectiveness of the two therapeutic approaches on mind wandering among women with generalized anxiety disorder.

Discussion and Conclusion

The present study aimed to compare the effectiveness of dialectical behavior therapy and metacognitive therapy in reducing mind wandering among women with generalized anxiety disorder. The findings showed that participants who received either dialectical behavior therapy or metacognitive therapy experienced a significant reduction in mind-wandering scores from pretest to posttest, and these improvements remained evident at the two-month follow-up assessment. In contrast, no comparable pattern of improvement was observed in the control group. The findings therefore support the effectiveness of both therapeutic approaches in reducing the tendency of women with generalized anxiety disorder to disengage from ongoing activities and become absorbed in internally generated thoughts. However, the comparison between the two experimental groups showed no statistically significant difference in effectiveness, indicating that dialectical behavior therapy and metacognitive therapy produced broadly comparable effects on mind wandering. Taken together, these findings suggest that although the two treatments arise from different theoretical traditions and employ distinct therapeutic techniques, both may influence cognitive and attentional processes involved in the maintenance of mind wandering in generalized anxiety disorder.

The finding regarding the effectiveness of dialectical behavior therapy in reducing mind wandering is consistent with evidence showing that interventions emphasizing mindfulness, acceptance, emotion regulation, and attentional awareness can reduce maladaptive patterns of internally directed thought. Mind wandering is characterized by a shift of attention away from ongoing tasks toward internally generated cognitive material, often without full awareness that attention has drifted (8). In individuals with anxiety disorders, such internally oriented attention is frequently dominated by threat-related, self-referential, or future-oriented material, potentially increasing the disruptive consequences of mind wandering (11). Dialectical behavior therapy directly addresses several processes that may contribute to this phenomenon through structured training in mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness (19). By repeatedly practicing observation of thoughts and emotions without judgment and returning attention to immediate experience, participants may become more capable of recognizing attentional drift at an earlier stage and redirecting attention toward present-moment demands.

This interpretation is supported by research demonstrating the role of mindfulness in reducing mind wandering. A systematic review of mindfulness meditation studies showed that mindfulness practice can reduce the frequency of wandering thoughts and improve the capacity to regulate internally generated cognition (23). Similarly, experimental evidence has indicated that even a single session of mindfulness meditation can influence mind-wandering processes (22). Rahl et al. further demonstrated that acceptance is an important component of mindfulness-based reductions in mind wandering, suggesting that attempts to suppress unwanted thoughts may be less useful than learning to acknowledge thoughts while avoiding prolonged engagement with them (24). These findings closely correspond with the dialectical behavior therapy framework used in the present study, in which participants practiced nonjudgmental awareness, radical acceptance, beginner's mind, and deliberate attention to present-moment experience. Through these exercises, participants may have developed greater meta-awareness of attentional shifts and a more flexible response to intrusive or distracting internal experiences.

The positive effect of dialectical behavior therapy may also be explained by its emphasis on emotion regulation. Women with generalized anxiety disorder commonly experience sustained emotional arousal,

anticipatory worry, and difficulty disengaging from perceived threat. Such affective states can consume attentional resources and increase the probability that attention becomes diverted from current activities toward internal concerns. Dialectical behavior therapy teaches individuals to identify emotional states, reduce vulnerability to intense emotions, increase positive emotional experiences, and apply adaptive problem-solving strategies rather than reacting automatically to emotional discomfort (19). As emotional regulation improves, the cognitive load associated with unresolved emotional distress may decline, thereby reducing opportunities for anxiety-driven mind wandering. In agreement with this explanation, Jafarzade Jahromi et al. found that dialectical behavior therapy improved cognitive emotion regulation and cognitive flexibility while reducing worry among women with psychological difficulties (20). These mechanisms are particularly relevant because increased cognitive flexibility may help individuals disengage from repetitive internal thoughts and return attention to the immediate task.

The present finding is also compatible with prior applications of dialectical behavior therapy in populations experiencing difficulties with emotional and behavioral self-regulation. Najarpour Ostadi et al. reported favorable effects of dialectical behavior therapy among female university students with smartphone addiction, including improvement in psychosocial functioning (21). Although the target population and outcome variables differed from those of the present study, such findings indicate that DBT skills may improve an individual's ability to manage internal discomfort and reduce maladaptive patterns that compete with adaptive engagement in everyday activities. From this perspective, reductions in mind wandering may represent one consequence of broader improvement in self-regulatory capacity. When individuals can tolerate negative affect without becoming absorbed in worry, impulsive avoidance, or repetitive mental activity, their attention may remain more consistently connected to current environmental demands.

The effectiveness of metacognitive therapy in reducing mind wandering was likewise supported by the present findings. This result is consistent with the theoretical premise of metacognitive therapy, which proposes that persistent psychological distress is maintained not primarily by the occurrence of negative thoughts themselves, but by maladaptive beliefs about thinking and by repetitive cognitive-attentional processing (25). Within this framework, worry, rumination, threat monitoring, and attempts to control thoughts form a cognitive-attentional syndrome that prolongs emotional disturbance. Generalized anxiety disorder is particularly suited to this formulation because individuals frequently report both positive beliefs about worry, such as believing that worrying helps prepare for danger, and negative beliefs, such as perceiving worry as uncontrollable or harmful. These beliefs encourage continued engagement with internal cognition and make it difficult to allocate attention flexibly to ongoing activities.

The reduction in mind wandering following metacognitive therapy can therefore be interpreted as a consequence of weakened engagement with repetitive negative thinking. Detached mindfulness, worry postponement, attention training, and challenging metacognitive beliefs may enable individuals to recognize thoughts as transient mental events rather than signals requiring extended analysis or control. This process may reduce the duration of internally focused episodes and facilitate more rapid return of attention to current tasks. Consistent with this explanation, Mirzaian found that training in metacognitive strategies reduced both rumination and worry (26). Similarly, Larijani reported beneficial effects of metacognitive therapy on rumination, experiential avoidance, and dysfunctional metacognitive beliefs (27). Because repetitive worry and rumination frequently constitute the content of mind wandering in anxious individuals,

reductions in these cognitive processes could reasonably account for the decline in mind-wandering scores observed in the present study.

More direct support comes from Mohammadi et al., who found that metacognitive therapy improved cognitive-emotional regulation and reduced mind wandering among children with attention-related difficulties (28). Although developmental and diagnostic differences limit direct comparison, the study demonstrates that metacognitive intervention can affect mind wandering as an identifiable cognitive outcome. Moreover, evidence from metacognitive therapy research suggests that therapeutic gains may be maintained after active treatment. Hjemdal et al. reported sustained effects of metacognitive therapy at long-term follow-up among individuals with depression (29). The maintenance of reduced mind wandering at the two-month follow-up in the present study may similarly reflect durable changes in participants' relationships with thoughts rather than temporary suppression of anxiety-related cognition.

The present results are especially congruent with emerging research on metacognitive therapy for generalized anxiety disorder. Hammersmark et al. demonstrated the feasibility and clinical usefulness of group-based metacognitive therapy for generalized anxiety disorder, showing that the intervention can effectively target core worry-related and metacognitive processes in a group setting (30). Generalized anxiety is strongly characterized by persistent repetitive thinking, and contemporary conceptualizations increasingly recognize that the clinical burden of GAD cannot be understood solely through the intensity of worry but must also include how individuals respond to and regulate their thoughts (1). Consequently, by reducing beliefs regarding the necessity and uncontrollability of worry, metacognitive therapy may diminish the tendency for attention to become persistently captured by internally generated content.

The significant reductions observed in both intervention groups are also consistent with the wider movement toward process-based and third-wave cognitive behavioral interventions. Modern behavioral therapies increasingly target transdiagnostic psychological processes such as attentional inflexibility, experiential avoidance, repetitive negative thinking, and maladaptive emotional regulation rather than focusing exclusively on diagnostic symptom categories (15). Recent evidence indicates that third-wave cognitive behavioral therapies are effective options for adults with generalized anxiety disorder (17). In addition, acceptance-based approaches have produced favorable outcomes in other anxiety disorders, suggesting that changing an individual's relationship with internal experiences can improve both symptoms and behavioral functioning (16). The findings of the present study fit within this broader literature because both DBT and MCT appear capable of modifying processes through which thoughts become persistent, attentionally dominant, and functionally disruptive.

The persistence of treatment effects at follow-up is clinically meaningful. Mind wandering is a common cognitive phenomenon, but its maladaptive form may interfere with everyday concentration, task completion, interpersonal engagement, and emotional well-being. Ecological momentary research indicates that mind wandering varies according to psychological and contextual conditions in daily life (13), while research involving anxious individuals shows that off-task thought may be particularly associated with distressing affective states (12). The sustained reductions found in the current study therefore suggest that the interventions may have altered not only participants' responses during therapy sessions but also habitual patterns of attentional regulation in everyday contexts. The psychometric work of Mrazek et al. showed that frequent mind wandering is associated with disruptive consequences for functioning (9), and findings from

the Persian validation of the Mind-Wandering Questionnaire similarly demonstrated relationships between mind wandering and anxiety, depression, stress, and mindfulness (10). Thus, sustained reductions in this construct may have implications extending beyond attention itself.

The absence of a significant difference between dialectical behavior therapy and metacognitive therapy represents another important finding. Although the two interventions differ conceptually, they may converge on several common mechanisms. DBT trains mindfulness, nonjudgmental observation, distress tolerance, and emotion regulation, whereas MCT trains detached mindfulness, attentional flexibility, and disengagement from repetitive cognitive processing. Both therefore teach participants to observe mental events without automatically becoming immersed in them. From the perspective of meta-awareness, successful regulation of mind wandering requires recognizing when attention has become decoupled from ongoing experience and intentionally redirecting it (8). Both treatments may facilitate this capacity, albeit through different therapeutic pathways. DBT may achieve it primarily through present-centered mindful awareness and reduced emotional reactivity, whereas MCT may achieve it through restructuring beliefs about thoughts and reducing prolonged cognitive engagement.

The equivalence between the two interventions can also be understood in light of the multidimensional nature of generalized anxiety disorder. GAD involves interconnected processes of worry, attentional bias, emotional dysregulation, avoidance, and cognitive preoccupation. The contrast avoidance model proposes that worry can function as an experiential strategy through which individuals maintain a negative emotional state to avoid unexpected emotional shifts (14). Both DBT and MCT may disrupt this cycle. DBT may increase willingness to tolerate emotional fluctuation without escaping into repetitive cognition, whereas MCT may undermine the beliefs that encourage continued worry and monitoring. Therefore, despite differences in technique, both interventions may reduce the same functional outcome: excessive immersion in internally generated thought. This interpretation may explain why neither treatment demonstrated statistical superiority.

The finding of comparable effectiveness also has practical relevance because individuals with generalized anxiety disorder differ in treatment histories, preferences, perceived barriers, and willingness to engage with specific therapeutic strategies (18). For some patients, a skills-based intervention emphasizing emotion regulation, distress tolerance, and interpersonal functioning may be particularly acceptable, whereas others may respond more readily to an intervention focused explicitly on beliefs about thinking and attentional control. In this context, the absence of a meaningful difference between DBT and MCT may support individualized treatment selection based on patient needs, treatment accessibility, therapist expertise, and preference rather than assuming that one model is categorically superior for reducing mind wandering. Given the broad prevalence and complex symptom networks associated with generalized anxiety (2), availability of multiple effective therapeutic options is clinically advantageous.

Another relevant consideration is that the study focused specifically on women. Evidence suggests that sex-specific biological and psychosocial factors may influence anxiety symptoms and attentional processes (4). Hormonal and ovarian processes have been linked to mental health vulnerability across different stages of women's lives (5), and research has also identified sex and menstrual-cycle differences in neural networks related to cognitive and sensory processing (6). Furthermore, Raymond et al. found variation in mind-wandering frequency among women according to oral contraceptive use (7). Although these factors were not

directly examined in the present research, they reinforce the importance of studying mind wandering within female clinical samples. The results suggest that psychological interventions capable of strengthening attentional and emotional regulation can reduce mind wandering despite the potential contribution of broader biological and contextual influences.

Overall, the findings indicate that both dialectical behavior therapy and metacognitive therapy can produce meaningful and relatively stable reductions in mind wandering among women with generalized anxiety disorder. The results can be understood through partially overlapping mechanisms involving improved meta-awareness, enhanced attentional flexibility, reduced repetitive negative thinking, greater acceptance of internal experiences, and improved emotional regulation. The absence of a significant difference between the two therapies suggests that multiple therapeutic pathways may lead to similar improvements in the regulation of internally generated thought. Accordingly, mind wandering may represent a useful transdiagnostic cognitive target in the treatment of generalized anxiety disorder and may provide an additional dimension through which therapeutic improvement can be assessed.

Several limitations should be considered when interpreting the findings of this study. The sample was relatively small and consisted exclusively of women with generalized anxiety disorder attending two psychological clinics in Tehran, which may limit the generalizability of the findings to men, individuals from other geographical regions, different age groups, and patients receiving treatment in other clinical settings. Participants were recruited through purposive sampling, and although they were subsequently randomly assigned to study groups, the initial nonprobability sampling procedure may have introduced selection bias. Mind wandering was assessed using a self-report questionnaire, which may be influenced by recall bias, self-awareness, and social desirability and does not provide an objective measure of attentional fluctuations during daily activities. The follow-up period was limited to two months, preventing conclusions regarding the longer-term durability of treatment effects. In addition, potentially relevant variables such as hormonal status, menstrual-cycle phase, life stress, sleep quality, treatment expectancy, and participants' adherence to homework exercises were not systematically controlled or measured.

Future studies are recommended to replicate these findings using larger and more heterogeneous clinical samples that include both women and men and participants from different cultural, socioeconomic, and geographical backgrounds. Randomized controlled trials with larger samples and longer follow-up periods of six months or one year would provide stronger evidence regarding the durability and comparative effectiveness of the interventions. Future investigations could combine self-report assessments with behavioral attention tasks, ecological momentary assessment, or neurocognitive measures to examine changes in mind wandering more comprehensively. Researchers are also encouraged to investigate possible mediators of treatment response, such as mindfulness, meta-awareness, cognitive flexibility, emotion regulation, metacognitive beliefs, worry, and rumination, in order to clarify the mechanisms through which each therapy affects mind wandering. Examining potential moderators such as age, severity of anxiety, comorbid symptoms, hormonal status, treatment preference, and baseline attentional functioning may also help identify which individuals are more likely to benefit from each intervention.

Clinicians working with women with generalized anxiety disorder may consider incorporating strategies specifically targeting mind wandering into routine assessment and treatment planning. Dialectical behavior therapy may be particularly useful when anxiety occurs alongside difficulties in emotion regulation, distress

tolerance, interpersonal functioning, or present-moment awareness, whereas metacognitive therapy may be especially appropriate when persistent worry, rumination, dysfunctional beliefs about thinking, and attentional fixation are prominent clinical features. Because the present findings suggest comparable effectiveness, treatment selection can be guided by the patient's individual symptom profile, preferences, motivation, and the therapist's competence in each approach. Mental health centers may also benefit from providing group-based versions of these interventions, which can increase access to structured psychological treatment while allowing patients to practice attentional, emotional, and metacognitive skills in a supportive environment. Continued practice of mindfulness, attentional control, emotion-regulation, and detached-observation skills after formal treatment should be encouraged to support maintenance of therapeutic gains.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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