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Comparison of the Effectiveness of Positive Thinking Training and Emotional Self-Regulation on Parenting Stress and Distress Tolerance in Mothers of Children with Autism Spectrum Disorder

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ABSTRACT

The present study aimed to compare the effectiveness of positive thinking training and emotional self-regulation on parenting stress and distress tolerance in mothers of children with autism spectrum disorder. This research employed a quasi-experimental design with a pretest–posttest structure, including a control group and a two-month follow-up. The statistical population consisted of mothers of children with autism spectrum disorder in Isfahan during 2024–2025, from which 52 mothers were purposively selected and then randomly assigned to two experimental groups and one control group. The research instruments included the Parenting Stress Index (PSI; Abidin, 1995) and the Distress Tolerance Scale (DTS; Simons & Gaher, 2005). Both experimental groups received eight 90-minute sessions of positive thinking training and emotional self-regulation. Data were analyzed using repeated measures analysis of variance and Bonferroni post hoc tests. The results indicated that both positive thinking and emotional self-regulation training had a significant effect on parenting stress and distress tolerance ($p < .001$). The effectiveness of both interventions was maintained at the two-month follow-up. Furthermore, emotional self-regulation training was more effective than positive thinking training in reducing parenting stress and increasing distress tolerance ($p < .001$). The findings suggest that emotional self-regulation training should be prioritized over positive thinking training by therapists to improve parenting stress and distress tolerance in mothers of children with autism spectrum disorder.

Keywords: distress tolerance, parenting stress, emotional self-regulation, positive thinking

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Introduction

Autism spectrum disorder (ASD) is a complex neurodevelopmental condition characterized by deficits in social communication, restricted interests, and repetitive behaviors, presenting challenges that extend

beyond the child and into the broader family context. Among family members, mothers of children with ASD often experience profound psychological, emotional, and social stressors due to their central caregiving role. Extensive evidence has shown that maternal mental health is particularly vulnerable in this population, with higher rates of stress, anxiety, depression, and reduced well-being when compared with mothers of neurotypical children or children with other developmental conditions (1). These stressors often accumulate over time, shaping patterns of parenting stress, distress tolerance, and coping capacity, which in turn influence not only the well-being of the mother but also the developmental outcomes of the child (2).

Parenting stress in mothers of children with ASD has been identified as one of the most critical factors influencing parental well-being. Stress levels are often exacerbated by the continuous demands of managing challenging behaviors, navigating healthcare and educational systems, and coping with the stigma or misunderstanding frequently associated with autism (3). Research highlights that maternal stress is strongly correlated with the severity of the child's symptoms, the degree of support available, and the mother's own coping resources (4). Stress not only diminishes maternal quality of life but can also undermine parenting practices, making it more difficult to provide consistent care, patience, and emotional availability (5). These dynamics emphasize the pressing need for interventions aimed at supporting maternal coping, resilience, and emotional regulation.

One of the central psychological constructs relevant to this population is distress tolerance, defined as the capacity to endure and manage negative emotional states without resorting to maladaptive coping strategies (6). Mothers of children with ASD frequently encounter situations that evoke strong emotions, such as frustration, helplessness, or social isolation. If their tolerance for distress is limited, they may be more prone to emotional dysregulation, avoidance behaviors, or feelings of burnout (7). In contrast, greater distress tolerance has been associated with more adaptive coping, improved psychological adjustment, and better capacity to sustain caregiving responsibilities (8). This perspective underscores the therapeutic value of interventions that explicitly enhance emotional self-regulation and distress tolerance in mothers of children with ASD.

Interventions based on positive psychology principles, particularly those targeting positive thinking, have demonstrated efficacy in promoting mental health and resilience across diverse populations. Positive thinking involves cultivating optimism, focusing on strengths, and reappraising life circumstances in a constructive manner (9). By shifting attention toward personal resources and positive experiences, positive thinking interventions reduce maladaptive rumination and bolster hope and vitality (10). For mothers of children with ASD, positive thinking can serve as a valuable buffer against chronic stress, helping them to reinterpret challenges in more constructive ways and to derive meaning from their caregiving experiences (11). Such approaches can promote adaptive family functioning and contribute to overall psychological well-being (12).

Parallel to positive psychology, emotion regulation interventions have also been increasingly applied to caregivers facing high levels of stress. Emotional self-regulation refers to the ability to identify, understand, and modulate emotional responses to environmental demands (13). Evidence suggests that deficits in emotional regulation are associated with elevated parental stress and maladaptive coping strategies, while effective regulation enhances resilience and improves parent–child interactions (14). For mothers of children with ASD, training in emotional self-regulation provides tools for managing overwhelming

emotions, reducing reactivity, and sustaining patience in caregiving contexts (15). This is particularly crucial given that their caregiving role often requires navigating frequent stress-inducing situations with composure and adaptability (16).

Several empirical studies have demonstrated the potential benefits of these approaches. Training in positive thinking has been shown to increase hope, self-efficacy, and psychological vitality (17, 18). Furthermore, positive thinking interventions have been effective in reducing exam anxiety and enhancing creativity and academic achievement among students (19). Although these populations differ from mothers of children with ASD, the underlying mechanism—cultivating adaptive cognitive and emotional patterns—suggests that similar benefits could extend to caregivers managing chronic stress. Similarly, emotional self-regulation training has been reported to foster adaptive coping styles, reduce psychopathological symptoms, and improve resilience in both clinical and non-clinical populations (6, 7). For mothers of children with ASD, who frequently experience emotional overload, the ability to regulate distressing emotions is an essential component of sustainable caregiving (8).

In the context of autism, interventions tailored to parental needs are especially important. Studies have documented that mothers often express feelings of social isolation, frustration with school systems, and inadequate support, all of which intensify stress (16). Many parents also report a lack of timely resources following their child's diagnosis, leading to increased uncertainty and psychological burden (15). Given these circumstances, providing structured interventions that directly target maternal psychological functioning—such as positive thinking and emotional self-regulation training—represents a pragmatic and evidence-based approach (20). By strengthening maternal coping resources, such programs not only benefit mothers but also indirectly support children's developmental trajectories and family dynamics (21).

The importance of supporting maternal well-being in families of children with ASD has been emphasized across multiple disciplines. Systemic analyses underscore that interventions addressing stress and promoting positive perceptions contribute to improved family resilience and better adaptation (4). Similarly, integrative models of parental stress highlight the need to target both external stressors (e.g., service access, financial burden) and internal psychological resources (e.g., optimism, emotion regulation) to achieve meaningful improvements (3). Research on social support further indicates that strengthening coping mechanisms enhances maternal vitality and reduces the negative impact of caregiving stress (8, 12).

It is also important to note the cultural and contextual factors that shape the experiences of mothers of children with ASD. For example, qualitative research reveals that autistic mothers themselves often feel marginalized within educational systems and perceive themselves as "always being the problem," underscoring the compounding effects of stigma and misunderstanding (16). In addition, studies conducted in regional or resource-limited contexts report heightened stress and lower quality of life among families of children with ASD, pointing to the critical role of accessible and tailored interventions (5). In such contexts, structured group-based programs that teach psychological skills can provide cost-effective and socially supportive avenues for improving maternal well-being (20).

Hope and optimism have also been identified as protective factors for parents of children with ASD. Schlebusch and Schwartz (11) found that cultivating hope plays a pivotal role in sustaining caregiving efforts and mitigating stress. Similarly, positive psychology interventions that emphasize strengths and constructive thinking have been shown to enhance family processes and overall mental health in vulnerable

populations (9). For mothers navigating the chronic stress of raising a child with ASD, fostering hope and optimism may provide the psychological endurance necessary for long-term caregiving.

Taken together, the evidence underscores the rationale for examining and comparing the effects of positive thinking training and emotional self-regulation training on key psychological outcomes in mothers of children with ASD. While both approaches aim to enhance maternal resilience and coping, they differ in emphasis: positive thinking fosters optimism and strength-based perspectives, whereas emotional self-regulation equips individuals with skills to modulate and endure negative emotions. Prior studies suggest that each approach has significant benefits, yet comparative evidence in the specific context of mothers of children with ASD remains limited.

The present study addresses this gap by directly comparing the effectiveness of positive thinking training and emotional self-regulation training on parenting stress and distress tolerance among mothers of children with ASD.

Methods and Materials

Study Design and Participants

The present study employed a quasi-experimental design with a pretest–posttest structure, a control group, and a two-month follow-up period. The statistical population consisted of all mothers of children with autism spectrum disorder in Isfahan during 2024–2025. In this study, 52 mothers of children with autism spectrum disorder were selected through purposive sampling and then randomly assigned into two experimental groups (experimental group 1: 17 participants; experimental group 2: 17 participants) and one control group (17 participants). For the implementation of the study, after obtaining the necessary permissions and informed consent from the mothers, the educational intervention was carried out for both experimental groups, while no educational intervention was provided for the control group. At the end of the training, the aforementioned questionnaires were re-administered (posttest), and finally, a follow-up was conducted two months later.

The inclusion criteria were mothers whose children had previously been evaluated by specialists using specific instruments and diagnostic tests in autism centers and had been diagnosed with autism spectrum disorder and were receiving training in these centers; non-receipt of any other simultaneous educational intervention; and completion of the informed consent form. The exclusion criteria included failure to complete the questionnaires and unwillingness to participate in the educational sessions. In the present study, confidentiality of collected information, obtaining informed consent from participants, non-disclosure of participants' information to others, and the right to withdraw from the study at any time were observed.

Data Collection

Parenting Stress Index (PSI): This index is a short form of the original Parenting Stress Index, developed by Abidin (1995). The index includes the following subscales: parental distress, dysfunctional parent–child interactions, and difficult child characteristics. Each subscale consists of 12 items, totaling 36 items, rated on a five-point Likert scale ranging from strongly agree to strongly disagree. Higher scores indicate higher levels of parenting stress. Raw scores can be converted into percentile scores, and scores at or above the 85th

percentile are considered clinically significant. In Abidin's (1995) study, internal consistency using Cronbach's alpha for overall stress and the subscales of parental distress, dysfunctional parent–child interaction, and difficult child were .91, .87, .80, and .85, respectively. Test–retest reliability over a six-month period was .84, .85, .68, and .78, respectively (Abidin, 1995). In Iran, Fadaei Dehghani, Tahmasebian, and Farhadi (2010) examined the factorial structure, reliability, and validity of the short form of the Parenting Stress Index for mothers of typically developing children aged 7–12 years in Tehran. The results showed test–retest reliability over an 18-day interval ranging from .80 to .90, Cronbach's alpha ranging from .59 to .86, and test–retest reliability over a 16-day interval ranging from .92 to .97. Furthermore, confirmatory factor analysis supported the three-factor model of the questionnaire. Convergent validity of the scale was confirmed through correlations with the Anxiety, Stress, and Depression Scale as well as the Child Behavior Checklist, indicating the adequacy of the instrument. Shirazi et al. also reported Cronbach's alpha ranging from .59 to .86 and test–retest reliability ranging from .92 to .97 over a 16-day interval.

Distress Tolerance Scale (DTS): This scale is a self-report measure of emotional distress tolerance developed by Simons and Gaher (2005). The items assess distress tolerance based on the individual's capacity to endure emotional distress, subjective appraisal of distress, attentional focus on negative emotions when they occur, and regulatory efforts to alleviate distress. The scale includes 15 items across four subscales: tolerance of emotional distress, absorption by negative emotions, appraisal of distress, and regulation efforts to relieve distress. The items are rated on a five-point Likert scale. Higher scores indicate higher levels of distress tolerance. The Cronbach's alpha coefficients for these subscales were reported as .70, .72, .78, and .82, respectively. The intraclass correlation coefficient after six months for the total scale was .82. Furthermore, the scale demonstrated good initial criterion and convergent validity. In the study by Esmaeili Nasab et al. (2014), the Cronbach's alpha coefficient for the entire scale was .86. In another study, Shams, Azizi, and Mirzaei (2010) reported a Cronbach's alpha of .67 for the questionnaire.

Interventions

The positive thinking training protocol, based on Khodayari et al. (2016), was implemented in eight 90-minute weekly group sessions. The program began with establishing rapport, introducing group members, clarifying research goals, group regulations, and familiarizing participants with the concept of positive thinking, followed by the administration of the pretest. Subsequent sessions focused on recognizing personal strengths, setting life goals, identifying factors that contribute to healthy living, and developing positive beliefs. Participants practiced optimism skills, evaluated automatic thoughts, and were tasked with recording their strengths and feedback from others. In later sessions, emphasis was placed on cultivating a positive outlook toward others, recalling and sharing 10–15 positive life experiences, and identifying the strengths embedded in those memories. Training continued with teaching strategies for using positive language, increasing positive self-talk, and prioritizing one's strengths by providing evidence for personal abilities. The final session focused on "living positively," which included creating a positive environment, maintaining health as a foundation for optimism, fostering constructive relationships, and exercising control over life events. Throughout the program, participants were given structured homework assignments to reinforce skills, culminating in the administration of the posttest.

The emotional self-regulation training protocol, adapted from Allen and Barlow (2009) and validated for mothers in Iran by Amani et al. (2020), was delivered in eight 90-minute weekly group sessions. The program began with orientation, familiarization with group members, clarification of objectives, and highlighting the importance of emotion regulation, followed by the pretest. Early sessions introduced pathological emotions, the necessity of treatment, symptoms of emotional disorders, cognitive errors, and the interplay of cognitive, physiological, and behavioral responses. Participants identified major negative emotions and recorded them in structured forms. Middle sessions emphasized interpretations by recognizing automatic thoughts, developing flexibility in reappraisal, and adopting alternative perspectives. Training then addressed emotion-driven behaviors, avoidance patterns, and the consequences of suppression, while participants completed self-exploration exercises. Later sessions involved experiential exposure to emotions, focusing on physical sensations, confronting avoidance behaviors, and practicing cognitive reappraisal. Advanced sessions introduced core beliefs related to rejection and helplessness, followed by strategies for identifying and modifying maladaptive schemas. The final session emphasized breaking dysfunctional core beliefs, replacing them with healthier cognitions, reviewing key concepts, and completing the posttest. Structured homework assignments accompanied each session, ensuring active practice and consolidation of emotion regulation skills.

Data Analysis

Data were analyzed using repeated measures analysis of variance (ANOVA) to examine within-group and between-group effects across pretest, posttest, and two-month follow-up stages. Assumptions of normality, homogeneity of variances, and sphericity were tested and confirmed through Kolmogorov–Smirnov, Levene's test, Box's M, and Mauchly's test. Bonferroni post hoc tests were conducted for pairwise comparisons, and SPSS version 26 was used for all statistical analyses.

Findings and Results

Based on demographic information, the mean and standard deviation of the participants' age in the positive thinking training group was 32.19, in the emotional self-regulation group 34.74, and in the control group 31.66.

In the table, the mean and standard deviation of the research variables (parenting stress and distress tolerance) in the pretest, posttest, and follow-up are reported separately for the experimental group (positive thinking training), the experimental group (emotional self-regulation training), and the control group.

Table 3. Mean and Standard Deviation of Research Variables in the Experimental Groups (Positive Thinking Training and Emotional Self-Regulation Training) and the Control Group in the Pretest, Posttest, and Follow-Up

Variable	Groups	Pretest (M, SD)	Posttest (M, SD)	Follow-up (M, SD)
Parenting Stress	Positive Thinking Training	96.35 ± 7.46	83.47 ± 10.78	84.47 ± 10.07
	Emotional Self-Regulation	97.41 ± 11.67	89.64 ± 14.75	90.58 ± 14.07
	Control	98.44 ± 10.90	99.33 ± 11.24	99.33 ± 11.09
Distress Tolerance	Positive Thinking Training	31.35 ± 3.56	42.65 ± 7.35	42.18 ± 7.44
	Emotional Self-Regulation	32.71 ± 4.38	43.76 ± 7.74	43.41 ± 6.87
	Control	31.83 ± 3.16	32.11 ± 1.64	32.11 ± 2.49

As shown in Table 1, the mean scores of participants in the variables of parenting stress and distress tolerance in the posttest and follow-up stages in both experimental groups were significantly higher than the control group. Based on this, it can be concluded that both training methods significantly reduced mean parenting stress scores and increased mean distress tolerance scores in mothers of children with autism spectrum disorder.

To ensure that the data met the underlying assumptions of covariance analysis, the assumptions of homogeneity of variances were examined. The results of the Kolmogorov–Smirnov test indicated that the variables of parenting stress and distress tolerance for the pretest, posttest, and follow-up in the two experimental groups and the control group had significance levels greater than .05. Therefore, the assumption of normality was confirmed. Levene's test was used to examine the homogeneity of variances, and since the obtained significance level was greater than .05, the assumption of homogeneity of variances was confirmed. To assess the homogeneity of variance–covariance matrices, Box's M test was used. The results showed that for parenting stress (Box's M = 3.02, F = .023, p = .56) and distress tolerance (Box's M = 3.08, F = .016, p = .50), the significance levels were greater than .05. Therefore, using repeated measures analysis of variance was appropriate. Mauchly's test of sphericity indicated homogeneity of variance–covariance matrices for parenting stress (p = .12) and distress tolerance (p = .29).

The results of repeated measures analysis of variance for within-group and between-group effects of the two interventions (positive thinking training and emotional self-regulation training) on the research variables (parenting stress and distress tolerance) across pretest, posttest, and follow-up stages are presented in Table 2.

Table 5. Results of Repeated Measures Analysis of Variance for Within- and Between-Group Effects of Positive Thinking Training and Emotional Self-Regulation Training

Variable	Source	SS	df	MS	F	p	Effect Size	Power
Parenting Stress	Stages	1369.49	2	684.74	97.55	.0001	.66	1
	Grouping	3185.91	2	1592.96	32.33	.0001	.51	1
	Stages × Grouping	1055.13	4	263.78	37.58	.0001	.60	1
	Error	687.85	98	7.01				
Distress Tolerance	Stages	1902.16	2	951.08	94.66	.0001	.65	1
	Grouping	1933.17	2	1933.17	20.30	.0001	.46	1
	Stages × Grouping	898.33	4	224.58	22.35	.0001	.47	1
	Error	984.60	98	10.04				

The grouping results in Table 2 indicate that the grouping variable (positive thinking training and emotional self-regulation training), regardless of the stages (pretest, posttest, and follow-up), had a significant effect on the variables of parenting stress and distress tolerance in mothers of children with autism spectrum disorder. This means that both positive thinking training and emotional self-regulation training had a significant effect compared to the control group. Furthermore, the interaction between stages and grouping indicated that both positive thinking training and emotional self-regulation training also had significant effects across the test stages (pretest, posttest, and follow-up) on parenting stress and distress tolerance in mothers.

To compare the effectiveness of positive thinking training (Group 1) and emotional self-regulation training (Group 2) on parenting stress and distress tolerance in mothers of children with autism spectrum disorder, the Bonferroni post hoc test was used.

Table 3. Bonferroni Post Hoc Test for Pairwise Comparisons in the Time Series

Scale	Stage A	Stage B	Mean Difference (A-B)	Std. Error	Sig. Level
Parenting Stress	Pretest	Posttest	6.58	.66	.0001
		Follow-up	5.93	.58	.0001
	Posttest	Follow-up	-0.64	.16	.19
Distress Tolerance	Pretest	Posttest	-7.54	.76	.0001
		Follow-up	-7.26	.69	.0001
	Posttest	Follow-up	0.27	.32	.69

As shown in Table 3, the difference in mean scores of parenting stress and distress tolerance between the positive thinking training group and the emotional self-regulation training group was statistically significant ($p < .001$). This finding indicates that there was a significant difference in the effectiveness of positive thinking training and emotional self-regulation training on parenting stress and distress tolerance in mothers of children with autism spectrum disorder. Based on the descriptive findings and the obtained effect sizes, emotional self-regulation training had a greater effect compared to positive thinking training in reducing parenting stress and improving distress tolerance in mothers of children with autism spectrum disorder ($p < .001$). At the same time, the difference between both experimental groups (positive thinking training and emotional self-regulation training) and the control group was also statistically significant.

Discussion and Conclusion

The findings of this study demonstrated that both positive thinking training and emotional self-regulation training significantly reduced parenting stress and increased distress tolerance among mothers of children with autism spectrum disorder. Moreover, the effects of both interventions were sustained at the two-month follow-up, underscoring their long-term effectiveness. Importantly, emotional self-regulation training showed a greater impact than positive thinking training on both parenting stress reduction and improvement in distress tolerance. These results align with the theoretical assumptions that both interventions enhance psychological resilience, but that emotion regulation skills may provide mothers with more direct strategies to cope with the overwhelming and persistent emotional demands of caregiving for a child with ASD.

The observed reduction in parenting stress is consistent with prior research, which has consistently shown that interventions targeting psychological resources can alleviate caregiver burden in mothers of children with ASD. Parenting stress in this population has been widely documented as being higher than in parents of typically developing children or those with other developmental disorders (1, 14). Studies have noted that the unique and ongoing demands of caregiving, coupled with the unpredictability of behavioral challenges and limited systemic supports, result in chronic stress that negatively affects maternal well-being (2, 4). By providing structured psychological interventions, this study demonstrates that it is possible to buffer against these stressors, improving maternal coping capacity and well-being.

The greater impact of emotional self-regulation training can be explained by its direct targeting of maladaptive emotional responses. Emotional dysregulation has been strongly associated with psychopathology and heightened caregiver stress (7). Mothers of children with ASD often encounter high-intensity emotions such as frustration, guilt, and helplessness, which may escalate in the absence of adaptive regulation skills. Training in emotional self-regulation helps individuals identify, label, and modulate their emotional states, thereby reducing reactivity and preventing maladaptive coping patterns. These findings

are consistent with prior studies indicating that deficits in emotion regulation exacerbate parental distress, while interventions that enhance regulation skills reduce symptoms of stress and improve psychological resilience (6, 13). This suggests that teaching mothers how to manage their emotions is more directly impactful than interventions that only promote optimistic cognitive framing.

Although positive thinking training was also effective in reducing stress and enhancing distress tolerance, its effects were comparatively smaller. This is consistent with prior literature, which highlights the role of optimism and positive cognitive appraisals as protective factors against stress (9, 11). By encouraging mothers to focus on strengths, cultivate optimism, and reframe negative experiences, positive thinking interventions can alleviate some of the psychological burden associated with caregiving. For example, studies have shown that positive thinking training increases hope, vitality, and self-efficacy in diverse populations (10, 17). Similarly, Bagheri (19) found that positive thinking skills significantly reduced exam anxiety and improved academic outcomes, highlighting their broad utility in reducing stress-related outcomes. However, while optimism and positive appraisals are valuable, they may not fully equip mothers to manage the intensity of negative emotions that arise in the daily context of raising a child with ASD. Thus, while beneficial, positive thinking appears to be less robust than emotional self-regulation in addressing the complex emotional challenges experienced by mothers in this context.

The findings regarding distress tolerance are particularly noteworthy. Distress tolerance, or the ability to endure negative emotional states without engaging in avoidance or maladaptive coping, is a critical factor in caregiver well-being (8). Mothers of children with ASD often face recurrent emotionally charged situations—ranging from public meltdowns to interpersonal conflicts with teachers or family members—that demand endurance and composure (15, 16). Improvements in distress tolerance following both interventions reflect their shared focus on strengthening mothers' resilience in the face of adversity. Positive thinking promotes adaptive cognitive appraisals that reframe distressing events, while emotional self-regulation provides concrete strategies to reduce the intensity and duration of negative emotional experiences. However, the greater effectiveness of emotion regulation training indicates that direct practice in regulating emotions provides a more practical and transferable skill set for enduring distress in real-life contexts (7).

These findings are also consistent with broader theoretical and empirical frameworks that emphasize the role of psychological flexibility and coping in maternal well-being. Parsons and colleagues (5) showed that stress, coping, and quality of life are closely interlinked in families of children with ASD, with adaptive coping strategies mediating the relationship between stress and life satisfaction. Similarly, Nematpour and colleagues (20) demonstrated that acceptance- and commitment-based interventions improved social support and adjustment in mothers of children with ASD, underscoring the importance of targeting psychological resources to foster resilience. The present study adds to this literature by directly comparing two evidence-based approaches, highlighting that emotional self-regulation may yield stronger and more sustained outcomes.

It is also important to consider these findings in light of research on social and systemic supports. Billider and colleagues (16) reported that autistic mothers often felt misunderstood and marginalized by their children's schools, intensifying their sense of stress and isolation. Similarly, Fenrich and colleagues (15) documented that parents frequently experience a lack of timely resources following their child's diagnosis. These contextual stressors highlight that while psychological interventions can buffer maternal stress,

systemic changes are also necessary to provide comprehensive support. Nonetheless, the present findings suggest that by equipping mothers with skills in emotion regulation and positive thinking, interventions can mitigate the negative psychological consequences of these broader systemic challenges.

Another significant contribution of this study lies in the demonstration that the effects of both interventions were sustained over a two-month follow-up. This sustainability is crucial, as chronic caregiving demands require long-term coping strategies rather than short-lived improvements. Research has emphasized that enduring psychological benefits are vital for preventing caregiver burnout and promoting long-term family stability (2, 12). The persistence of effects observed here suggests that both positive thinking and emotional self-regulation training provide mothers with skills that can be maintained and applied beyond the intervention context, though emotional regulation skills may be more enduring due to their practical applicability in daily challenges.

Overall, the findings of this study reinforce the importance of developing interventions tailored to the unique psychological needs of mothers of children with ASD. Parenting stress and low distress tolerance are critical risk factors for maternal mental health and family functioning (1, 3). By demonstrating the efficacy of two distinct yet complementary interventions, this study contributes to the growing body of evidence supporting multi-faceted approaches to caregiver support. The superior effectiveness of emotional self-regulation training suggests that interventions should prioritize teaching concrete emotional management strategies, while positive thinking may serve as a valuable complementary approach to reinforce optimism and hope. Together, these strategies can create a comprehensive framework for enhancing caregiver resilience and promoting family well-being.

Despite its contributions, this study is not without limitations. First, the sample size was relatively small (n=52), which may limit the generalizability of the findings to larger and more diverse populations of mothers of children with ASD. Future studies with larger, more heterogeneous samples would strengthen confidence in the applicability of the results. Second, the study relied on self-report measures of parenting stress and distress tolerance, which may be subject to social desirability or recall biases. Although the instruments used were validated, incorporating observational or physiological measures could provide a more comprehensive assessment of outcomes. Third, the study was conducted in a single cultural and geographical context, which may influence the extent to which findings can be applied across different cultural settings where parenting practices, support systems, and societal perceptions of autism vary. Finally, the follow-up period was limited to two months. While the sustained effects are encouraging, longer follow-up assessments are necessary to determine whether the benefits of the interventions persist over the long term.

Future studies should aim to expand upon the current findings by incorporating larger and more diverse samples of mothers from different cultural, socioeconomic, and demographic backgrounds. This would allow for a more nuanced understanding of how contextual factors influence the effectiveness of positive thinking and emotional self-regulation interventions. Additionally, future research could explore the integration of these two approaches into a combined intervention protocol, assessing whether the complementary benefits of optimism and emotional regulation produce synergistic effects on caregiver well-being. Longitudinal studies with extended follow-up periods are also needed to examine the durability of intervention effects and their impact on long-term outcomes such as caregiver burnout, marital satisfaction, and child

development. Finally, it would be valuable to examine the potential mediating and moderating variables that influence intervention effectiveness, such as baseline levels of maternal resilience, availability of social support, and severity of the child's ASD symptoms.

Practitioners working with mothers of children with ASD should consider prioritizing interventions that teach emotional self-regulation, as these skills appear to yield the most substantial improvements in reducing stress and enhancing distress tolerance. Positive thinking interventions can also be integrated to foster optimism, hope, and meaning-making, serving as a supportive complement to regulation training. Delivering these interventions in group formats may provide additional benefits by fostering social support networks among mothers who often feel isolated in their caregiving roles. It is also essential for practitioners to tailor interventions to the individual needs of mothers, recognizing differences in coping styles, emotional resources, and contextual challenges. Finally, embedding such psychological interventions within broader service systems—such as schools, healthcare centers, and community organizations—can increase accessibility and ensure that mothers receive comprehensive, sustainable support in their caregiving journey.

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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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