

The Effectiveness of Lyubomirsky's Happiness Training on Negative Emotions (Depression, Stress, and Anxiety) and Cognitive Flexibility in Mothers of Children with Autism Spectrum Disorder

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ABSTRACT

Objective: The present study aimed to investigate the effectiveness of happiness training based on Lyubomirsky's model in reducing negative emotions and enhancing cognitive flexibility in this population.

Methods and Materials: This study employed a quasi-experimental design using a pretest-posttest control group format. The statistical population included mothers of children with autism who attended the "Golhaye Beheshti" Center in Qom during spring 2024. A total of 30 participants were selected through simple random sampling and assigned to either the experimental or control group. The experimental group participated in eight 90-minute sessions of happiness training. The research instruments included the Depression, Anxiety, and Stress Scale (DASS-21) and the Cognitive Flexibility Scale developed by Dennis and Vander Wal (2009). Data were analyzed using analysis of covariance (ANCOVA).

Findings: The results indicated that Lyubomirsky's happiness training significantly reduced depression, anxiety, and stress levels while significantly increasing cognitive flexibility in the experimental group ($P < 0.05$).

Conclusion: Happiness-based intervention can serve as an effective strategy for promoting the mental health of mothers of children with autism by alleviating negative emotions and strengthening their cognitive capacities.

Keywords: Happiness training, depression, anxiety, stress, cognitive flexibility, mothers, autism spectrum disorder.

1. Introduction

Motherhood has always been a role filled with tension and responsibility within the socio-cultural context of various societies. However, this role becomes a significant psychological challenge when coupled with

caregiving for a child with autism spectrum disorder (ASD). Mothers of children with ASD frequently experience chronic anxiety about their child's future, social pressure, persistent fatigue, and loneliness—factors that can erode the foundations of their mental health (Elemo & Can, 2025).

Beyond caregiving stress, the constant presence with a child who may lack adequate social interaction, language skills, or behavioral flexibility intensifies feelings of inefficacy, guilt, and hopelessness in these mothers (Elemo & Can, 2024, 2025). Under such conditions, negative emotions such as depression, anxiety, and stress are not only direct consequences of emotional strain but can also impair cognitive functioning and interpersonal relationships over time. The situation worsens when these emotions, combined with emotional exhaustion, diminish the mother's cognitive flexibility and lead her into psychological stagnation—a state in which the mother loses the ability to reassess perspectives, find alternative solutions, and regulate emotions effectively (Elemo & Can, 2024; Kulasinghe et al., 2021).

Negative emotions—including depression, anxiety, and stress—while natural responses to life's pressures, become major risk factors for mental health disorders and dysfunction in daily activities when prolonged or intensified. These emotional states adversely affect interpersonal relationships, decision-making, sleep quality, emotional regulation, and even immune system performance (Asaoka et al., 2023). Depression often manifests through reduced energy, feelings of worthlessness, and social withdrawal; anxiety appears through catastrophic thinking, restlessness, and muscle tension; and chronic stress can lead to long-term psychological burnout and weakened cognitive resilience (Alghamdi et al., 2022). From a neuropsychological perspective, these three components are directly associated with heightened activity in the hypothalamic–pituitary–adrenal (HPA) axis, which may disrupt executive functions, working memory, and cognitive regulation (Rahnema et al., 2020). Thus, in high-risk populations, such as mothers of children with ASD, these negative emotions reach alarming levels.

Cognitive flexibility is regarded as a key component of mental health. It refers to an individual's ability to shift perspectives, adapt thoughts, and adjust to emerging or challenging situations. This cognitive-emotional construct enables individuals to reassess threatening situations from new viewpoints, identify alternative solutions, and offer more adaptive responses (Hohl & Dolcos, 2024). Cognitive flexibility is closely related to attributes such as reality acceptance, tolerance of ambiguity, problem-solving capacity, and psychological resilience after crises. Neurologically, it is associated with the functioning of prefrontal networks and cognitive inhibition mechanisms, and its decline can lead to persistent negative thoughts,

rumination, and decision-making impairments (Rastelli et al., 2022).

For mothers of children with ASD, cognitive flexibility plays a protective role against negative emotions. These mothers face chronic stressors, and their ability to reassess reality, attribute meaning to difficult experiences, and discover new psychological coping mechanisms is particularly crucial. For instance, the study by Aydemir and Önal (2024) revealed that cognitive flexibility is negatively correlated with depression and anxiety and may function as a mediator in emotional regulation processes (Aydemir & Önal, 2024). Likewise, research conducted by Kermani et al. (2020) in Iran confirmed that training in cognitive-emotional skills contributes to enhancing this capacity in parents of children with special needs (Kermani et al., 2020). Therefore, strengthening cognitive flexibility not only mitigates the psychological effects of long-term caregiving but also facilitates the mother's journey toward reclaiming hope, meaning, and mental vitality.

With the emergence of positive psychology in recent decades, a new perspective on mental health promotion has taken shape. This perspective shifts the focus from pathology and illness to psychological resources, strengths, and human potential. Within this framework, Sonja Lyubomirsky's "Sustainable Happiness" theory presents practical interventions such as gratitude, fostering hope, meaning-making, mindfulness, and cultivating positive relationships. The aim is not only to enhance positive emotions but also to embed them into individuals' cognition and behavior (Lyubomirsky, 2008). Unlike pharmacological or strictly cognitive approaches, this method actively engages individuals in the process of meaning-making and emotional reconstruction.

In the specific context of mothers raising children with autism, such interventions can offer a novel approach to alleviating psychological pressure and restoring cognitive-emotional balance. Numerous studies have found that positive psychology-based interventions not only reduce depression and anxiety but simultaneously enhance cognitive flexibility (Azad & Aleyasin, 2023; Çomaklı Duvar et al., 2025; Faraji Amiri et al., 2022; Garcia & et al., 2022; Martinez, 2024). Within this framework, cognitive flexibility is not merely a mental skill, but a psychological survival tool for navigating the complex and painful realities of caring for a child with special needs.

Consequently, it is imperative to focus on interventions that impact both the emotional and cognitive dimensions of mothers' psychological well-being. Lyubomirsky's

happiness training program, with its structured, evidence-based, and culturally adaptable design, holds significant potential for implementation in contexts like Iran, where mothers often bear full responsibility for their child's care, education, and emotional regulation. This intervention may not only be effective at the individual level but could also, in the long term, improve family dynamics, increase psychological coherence, and reduce caregiving burden.

2. Methods and Materials

2.1. Study Design and Participants

The present study aimed to examine the effectiveness of Lyubomirsky's happiness training package on negative emotions and cognitive flexibility in mothers of children with autism spectrum disorder. The research design employed was a two-group quasi-experimental model with pretest-posttest measurements in both experimental and control groups. The statistical population included all mothers of children with autism spectrum disorder attending the "Golhayeh Beheshti" Center in Qom during spring 2024. Accordingly, using simple random sampling and the child registry of the center, 40 mothers were selected. Using a table of random numbers, they were randomly assigned—along with their children—to the experimental and control groups.

The sample size was determined based on the sample size formula for interventional studies and the research by Moghtadai and Khosh Akhlagh (2015), resulting in 20 participants per group (Moghtadai & Khosh Akhlagh, 2015). Considering an expected dropout rate of 10%, 20 participants were assigned to each group, for a total of 40 participants.

After identifying the members of both the experimental and control groups, introductory sessions were held separately. For the experimental group, the session covered an overview of the research, autism spectrum disorder, and its impact on the family. For the control group, only the study overview was discussed. All participants completed the pretest questionnaires. Subsequently, the Lyubomirsky happiness training package (Moghtadai & Khosh Akhlagh, 2015) was administered to the experimental group in the form of group training sessions, while the control group received no training. After the intervention, the posttest questionnaires were completed by all participants. Due to the absence of several mothers during the training and incomplete questionnaire data, each group was ultimately reduced to 15 participants.

The inclusion criteria for the study were: having a child clinically diagnosed with autism spectrum disorder by a licensed psychiatrist or psychologist; being the child's biological mother or primary caregiver; age between 25 and 55 years; having at least a high school diploma to comprehend the training content; not receiving concurrent psychotherapy or similar interventions (e.g., positive psychology, CBT, mindfulness) in the past three months; willingness and commitment to regularly attend the training sessions (i.e., eight 90-minute sessions over four weeks); absence of severe current psychiatric disorders based on self-report or clinician referral (e.g., psychosis, bipolar I disorder, active substance use); and provision of written informed consent.

Exclusion criteria included: missing more than two training sessions (over 25% absenteeism); non-cooperation in completing research tools during pretest, posttest, or follow-up; initiating new psychiatric or psychological treatment during the study that could affect study variables; providing false information in the entry forms or initial interview; experiencing acute psychiatric crises (e.g., active suicidal ideation or psychiatric hospitalization during the intervention); and formally requesting withdrawal at any stage of the study.

Ethical considerations included informing participants of the study objectives, ensuring confidentiality and anonymity, obtaining informed consent, voluntary participation, the right to withdraw, answering participants' questions, and providing results upon request.

2.2. Measures

2.2.1. Negative Emotion

The DASS-21 was developed by Lovibond and Lovibond (1995) and consists of 21 items across three subscales: depression (items 3, 5, 10, 13, 16, 17, 21), anxiety (items 2, 4, 7, 9, 15, 19, 20), and stress (items 1, 6, 8, 11, 12, 14, 18). Items are rated on a 4-point Likert scale ranging from 0 to 3. Each subscale score ranges from 0 to 21. The internal consistency coefficients (Cronbach's alpha) for the subscales have been reported between 0.87 and 0.94 (Lovibond & Lovibond, 1995). In the Persian version validated by Afzali et al. (2007), Cronbach's alpha was reported as 0.77 for depression, 0.79 for anxiety, and 0.78 for stress. Construct validity was confirmed via factor analysis (Afzali et al., 2007).

2.2.2. Cognitive Flexibility

The CFI was developed by Dennis and Vander Wal (2010) and contains 20 items with three subscales: perception of controllability (items 1, 2, 4, 7, 9, 11, 15, 17), alternative thinking (items 3, 5, 6, 12, 13, 14, 16, 18, 19, 20), and willingness to experience (items 8, 10). The scoring is based on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 20 to 140. Cronbach's alpha for the total scale was reported at 0.91, and for the subscales ranged from 0.84 to 0.88 (Dennis & Vander Wal, 2010). In the Persian version validated by Soltani et al. (2020), Cronbach's alpha for the total scale was 0.90, and confirmatory factor analysis supported construct validity (Soltani et al., 2020).

2.3. Intervention

The intervention consisted of eight 90-minute group sessions based on Lyubomirsky's happiness training model, delivered weekly. In Session 1, participants were introduced to the study, the principles of positive psychology, and the purpose of happiness education. They learned to choose happiness-enhancing activities aligned with their values, needs, and interests, and practiced "acting like a happy person." In Session 2, the focus was on gratitude, optimism, and managing rumination and social comparison. Session 3 covered loving-kindness, enhancing social connections, and stress coping strategies. Session 4 addressed forgiveness,

flow, and savoring the present. In Session 5, participants explored goal commitment, spirituality and meaning, and physical self-care through meditation and exercise. Session 6 introduced five strategies for sustainable happiness. Session 7 provided psychoeducation on clinical depression, its symptoms, causes, and evidence-based treatments. Finally, Session 8 reviewed all prior content and participant-selected practices, followed by the administration of the posttest. Each session included homework assignments to reinforce the techniques discussed.

2.4. Data Analysis

Descriptive statistics (mean and standard deviation) and inferential statistics (analysis of covariance) were used to analyze the data through SPSS version 26.

3. Findings and Results

According to the demographic results, the mean age of mothers in the intervention group was 36.00 years with a standard deviation of 6.14, while in the control group, the mean age was 33.94 years with a standard deviation of 5.18. Approximately 65% of the mothers in the intervention group and 37% of the mothers in the control group had a high school diploma. The means and standard deviations for negative emotions and cognitive flexibility before and after the intervention are presented in Table 1.

Table 1

Means and Standard Deviations of Negative Emotions and Cognitive Flexibility

Variable	Time	Intervention (M)	Intervention (SD)	Control (M)	Control (SD)
Negative Emotions					
Depression	Pretest	6.85	5.52	5.06	4.87
	Posttest	3.50	4.22	5.25	4.76
Stress	Pretest	9.55	3.87	6.62	5.17
	Posttest	6.50	4.98	7.37	5.25
Anxiety	Pretest	6.55	4.50	4.31	4.42
	Posttest	3.25	3.47	4.06	4.79
Cognitive Flexibility					
Total Score	Pretest	68.00	5.42	68.37	5.25
	Posttest	74.20	4.52	66.87	4.88
Perceived Control	Pretest	24.20	3.53	24.75	3.45
	Posttest	26.80	3.28	24.31	3.23
Alternative Thinking	Pretest	37.60	4.05	36.81	3.46
	Posttest	39.85	3.84	36.31	3.53
Willingness to Experience	Pretest	6.20	1.36	6.81	1.64
	Posttest	7.55	1.09	6.25	1.57

Negative emotions and cognitive flexibility met the assumptions of normal distribution, linearity between

covariate and dependent variable, and homogeneity of regression slopes in both pretest and posttest stages. Table

below presents the ANCOVA results for negative emotions and cognitive flexibility.

Table 2

ANCOVA Results for Negative Emotions and Cognitive Flexibility

Variable	Source	df	Mean Square	F	Sig.	η^2
Depression	Pretest	1	222.072	15.897	.000	.325
	Group	1	59.133	4.252	.047	.114
	Error	33	13.907			
Stress	Pretest	1	583.039	63.350	.000	.658
	Group	1	102.004	11.083	.002	.251
	Error	33	9.203			
Anxiety	Pretest	1	371.383	60.282	.000	.646
	Group	1	50.810	8.247	.007	.200
	Error	33	6.161			
Cognitive Flexibility	Pretest	1	599.039	133.650	.000	.802
	Group	1	515.348	114.978	.000	.777
	Error	33	4.482			
Perceived Control	Pretest	1	263.321	87.494	.000	.726
	Group	1	75.561	25.107	.000	.432
	Error	33	3.010			
Alternative Thinking	Pretest	1	372.672	129.026	.000	.796
	Group	1	71.551	24.772	.000	.429
	Error	33	2.888			
Willingness to Experience	Pretest	1	15.782	11.791	.002	.263
	Group	1	21.247	15.875	.000	.325
	Error	33	1.338			

As observed, the F values controlling for pretest scores were significant for depression ($F = 4.252, p < .05$), stress ($F = 11.083, p < .05$), and anxiety ($F = 8.247, p < .05$). Therefore, posttest scores for negative emotions (depression, stress, and anxiety) significantly differed between the intervention and control groups after adjusting for pretest scores. It can be concluded that negative emotions

significantly decreased in the intervention group following the intervention compared to the control group.

The results also demonstrated that the effect of Lyubomirsky's happiness training on cognitive flexibility was significant ($F = 114.978, p < .05$). The subscales of perceived control ($F = 25.107, p < .05$), alternative thinking ($F = 24.772, p < .05$), and willingness to experience ($F = 15.875, p < .05$) also showed significant improvements.

Table 3

Test of Between-Subjects Effects on Depression, Stress, Anxiety, and Cognitive Flexibility

Source	Variable	SS	df	MS	F	P	η^2
Intervention	Depression	59.133	1	59.133	4.252	.047	.114
	Stress	102.004	1	102.004	11.083	.002	.251
	Anxiety	50.810	1	50.810	8.247	.007	.200
	Cognitive Flexibility	515.348	1	515.348	114.978	.000	.777
Error	Depression	458.928	33	13.907			
	Stress	303.711	33	9.203			
	Anxiety	203.305	33	6.161			
	Cognitive Flexibility	147.911	33	4.482			

Based on the results, after controlling for the covariate, significant differences were observed between the intervention and control groups regarding both negative emotions (depression, stress, and anxiety) and cognitive

flexibility. The intervention group demonstrated higher posttest mean scores in cognitive flexibility and lower scores in negative emotions compared to the control group.

Effect size values indicate that Lyubomirsky's happiness training package had the greatest impact on cognitive flexibility ($\eta^2 = .777$), followed by stress ($\eta^2 = .251$), anxiety ($\eta^2 = .200$), and finally depression ($\eta^2 = .114$).

4. Discussion and Conclusion

This study aimed to evaluate the effectiveness of Lyubomirsky's happiness training package on negative emotions (depression, stress, and anxiety) and cognitive flexibility in mothers of children with autism spectrum disorder. The results indicated that the intervention led to an improvement in life satisfaction and hopefulness. Data analysis revealed significant differences in the mean scores of negative emotions and cognitive flexibility between the experimental and control groups post-intervention, with the greatest effectiveness observed in cognitive flexibility. These findings align with previous research (Azad & Aleyasin, 2023; Çomaklı Duvar et al., 2025; Faraji Amiri et al., 2022; Garcia & et al., 2022; Martinez, 2024).

The significant reduction in depression observed among mothers following happiness training is theoretically and empirically justifiable. Depression in this group is often rooted in chronic despair, diminished self-worth, disrupted social relationships, and a negative outlook on the child's and their own future (Elemo & Can, 2024, 2025). Positive psychology interventions, particularly Lyubomirsky's training package, with exercises such as daily gratitude, meaning-making, mindfulness, altruistic behavior, and rewriting negative personal narratives, activate positive cognitive and emotional pathways capable of disrupting depressive cycles (Lyubomirsky, 2008). In this context, the reduction in depression is not merely symptomatic but reflects a deeper transformation in emotional-cognitive structure, where the mother no longer sees herself as a passive victim but as an active agent in creating positive experiences. This is consistent with the findings of Zu et al. (2019), who showed that increasing positive emotions through daily practices enhances cognitive performance and weakens maladaptive beliefs in individuals with depression (Zu et al., 2019). Neuroimaging evidence further supports that purposeful enjoyable experiences can increase activation in reward-related brain areas and reduce activity in regions associated with rumination among depressed individuals. These explanations underscore that happiness is not a superficial emotional construct but a pivotal factor in the psychological reconstruction of mothers under specific

stressors, with both preventive and therapeutic value in reducing depression.

The effectiveness of happiness training in reducing stress among mothers of children with autism can be explained through theoretical foundations of positive psychology and biopsychosocial models of stress. Stress in this population commonly results from chronic caregiving demands, unmet expectations, lack of support resources, and discrepancies between perceived demands and personal capacities (Bee Wah et al., 2024). Happiness training, with its focus on practices such as mindfulness, meaning-making in challenges, appreciation of small moments, and positive communication exercises, can alter the individual's cognitive appraisal of internal and external resources. This aligns with Lazarus's theory of cognitive reappraisal, a core strategy in reducing subjective stress experience (Lyubomirsky, 2008). In essence, happiness training helps mothers shift from a threat-based response to a growth-oriented mindset, transforming from reactive to proactive agents. Neurobiological evidence suggests that the increase in positive emotions elicited by such practices modulates the activity of brain regions involved in stress regulation, including the prefrontal cortex and amygdala (Martinez, 2024). Collectively, this intervention not only reduces the intensity of perceived stress but also strengthens mothers' ability to manage stressful situations through cognitive, emotional, and spiritual reappraisal.

The effectiveness of happiness training in reducing anxiety among mothers of children with autism can be understood through the lens of cognitive psychology and emotion-focused theories. Anxiety in this group often stems from chronic worries about their child's future, feelings of helplessness in managing the situation, and prior negative experiences within the healthcare or educational systems (Al-Graiti & Seki Öz, 2024). By providing a structured environment for regular positive emotional experiences—such as calmness, hope, satisfaction, and connectedness—happiness training fosters belief in personal efficacy and reduces catastrophic thinking. According to Feldman Barrett's dual-process emotional model, an increase in positive emotions enhances activity in the prefrontal network while inhibiting hyperactive amygdala responses to perceived threats, a hallmark of anxiety (Azad & Aleyasin, 2023). Additionally, happiness exercises that emphasize present-moment focus and mindfulness can mitigate future-oriented negative thoughts and rumination, which are central to anxiety maintenance. Recent studies have also shown that positive psychology interventions improve the use of

adaptive coping strategies—both problem-focused and emotion-focused—resulting in reduced anxiety among parents of children with special needs (Garcia & et al., 2022). Overall, the happiness intervention supports top-down emotional regulation through activation of positive cognitive patterns, thereby reducing anxiety at both the symptomatic and mechanistic levels.

The significant increase in cognitive flexibility among mothers in the experimental group, particularly in the subcomponents of “perceived control,” “alternative thinking,” and “willingness to experience,” illustrates the multi-dimensional effectiveness of happiness training on emotional-cognitive functioning. Lyubomirsky’s training package, through exercises such as gratitude, goal setting, meaning-making, and rewriting personal narratives, helps reconstruct fundamental beliefs about the self and the environment, including the belief that one can make meaningful and impactful choices despite external circumstances (Azad & Aleyasin, 2023). This cognitive shift directly supports the “perceived control” component, which is typically weakened in high-stress mothers. Meanwhile, practices such as present-moment awareness, acceptance, and seeing situations from multiple angles enhance “alternative thinking,” a crucial factor in reducing rumination and maladaptive reactions (Martinez, 2024). Lastly, the “willingness to experience” component is promoted through behavioral exercises like altruistic actions, savoring daily joys, and active engagement in social relationships. These effects are supported by findings from Kiye and Çiçek Habeş (2024), who reported a positive correlation between cognitive flexibility and adaptive positive emotions (Kiye & Çiçek Habeş, 2024). Altogether, these results suggest that happiness training not only generates emotional positivity but also reconstructs the underlying cognitive mechanisms involved in psychological regulation.

5. Suggestions and Limitations

In summary, the findings of this study demonstrate that Lyubomirsky’s happiness training can serve as an effective intervention for reducing negative emotions (depression, anxiety, and stress) and enhancing cognitive flexibility in mothers of children with autism spectrum disorder. The intervention’s emphasis on positive emotions, cognitive restructuring, and meaning-making provides a pathway for mothers to move away from maladaptive cognitive patterns and adopt more adaptive strategies. However, this study is

not without limitations. These include a small sample size, absence of a long-term follow-up, and geographical restriction to a single city, which may limit the generalizability of the findings. Future studies are recommended to employ longitudinal designs, include culturally diverse groups, and compare this intervention with other psychological interventions. Additionally, assessing mediating variables such as self-efficacy, parenting competence, and social support may help clarify the mechanisms of this training package. On a practical level, it is recommended that counseling centers, special education schools, and support organizations utilize happiness training as a psychological empowerment tool for mothers, aiming to enhance their emotional and cognitive resources and thereby improve individual and family quality of life.

Authors’ Contributions

Conceptualization: Fatemeh Mahjour and Alireza Fazeli Mehrabadi; Methodology, original draft writing, review and editing, funding, and resources: Fatemeh Mahjour.

Declaration

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

Transparency Statement

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

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study was conducted with the approval of the Ethics Committee of Islamic Azad University, Arak Branch (Ethics Code: IR.IAU.ARAK.REC.1403.001), and it was registered in the Iranian Clinical Trial Registry (IRCT Code: IRCT20240212060980N1).

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