Research Articles // Artículos de investigación

Notes and Editorial Information // Avisos e información editorial

ISSN 1577-7057

IJP&PT
25 YEARS ANNIVERSARY
2001-2025

Volume 25, number 3 October 2025
Volumen 25, número 3 Octubre 2025

ISSN: 1577-7057

IJP&PT

International Journal of Psychology & Psychological Therapy

IJP&PT
25 YEARS ANNIVERSARY
2001-2025

https://www.ijpsy.com

IJP&PT IS INCLUDED IN THE FOLLOWING INDEXING AND DOCUMENTATION CENTERS:

Scopus · Web of Science · Google Scholar Metrics · PsycINFO · ProQuest PRISMA® Database · EBSCO Information Services

PubMed · zpid PSYNDEX · Embase · Pub Psych · Pascal Francis · ERIC · CAIRE

Dialnet · Journal Scholar Metrics: Arts, Humanities, and Social Sciences · CABELLS Scholarly Analytics

Academic Search Complete · REBIUN Red de Bibliotecas Universitarias · Psicodoc · DICE Difusión y Calidad Editorial de las Revistas Españolas de Humanidades y Ciencias Sociales y Jurídicas CSIC · IBECS

rësh Revistas Españolas de Ciencias Sociales y Humanidades · MIAR Matriz de Información para el Análisis de Revistas · DOAJ Directory of Open Access Journals

University Grants Commission
Bahadur Shah Zafar Marg, New Delhi-110002
Website: www.ugc.ac.in

CARE Academic Research and Ethics · Government Of India

International Journal of Psychology & Psychological Therapy, 2025, 25, 3, 309-320

Acceptance and Commitment Therapy Group Intervention on Anxiety Sensitivity, Worry Severity and Intolerance of Uncertainty in Patients with Generalized Anxiety Disorder

Nastaran Otared, Mohammadparsa Khoshsohbatyazdi, Ardavan Ghalamkari

Cyprus International University, Nicosia, Northern Cyprus

Abstract

This study aimed to examine the efficacy of Acceptance and Commitment Therapy in reducing anxiety sensitivity, worry severity, and intolerance of uncertainty in individuals with Generalized Anxiety Disorder. Excessive and uncontrollable concern is a hallmark of generalized anxiety disorder which causes severe distress and impairment. Anxiety sensitivity, worry severity, and intolerance of uncertainty are some of the most common cognitive vulnerabilities linked to the onset of Generalized Anxiety Disorder. Acceptance and Commitment Therapy is an evidence-based intervention that has been shown effective in treating a wide range of anxiety disorders by improving psychological flexibility. For this study, 30 individuals with Generalized Anxiety Disorder were selected and randomly assigned to two groups of 15 participants (experimental and control groups). All participants were administrated by validated measures including the Intolerance of Uncertainty Scale-12, the Penn State Worry Questionnaire, and the Anxiety Sensitivity Index-3 at three different points in time: pre-treatment, post-treatment, and a three-month follow-up. According to an ANCOVA analysis, the Acceptance and Commitment Therapy group indicated a significant decrease in anxiety sensitivity, worry severity, and intolerance of uncertainty variables after treatment (p <.05) in comparison to the control group, and these improvements continued at follow-up phase. The results of this study indicated that Acceptance and Commitment Therapy is an effective treatment for Generalized Anxiety Disorder symptoms. The findings suggest that Acceptance and Commitment Therapy can be a viable alternative to traditional psychotherapy approaches.

Key words: ACT, Generalized Anxiety Disorder, intolerance of uncertainty, anxiety sensitivity, worry severity.

How to cite this paper: Otared N, Khoshsohbatyazdi M, & Ghalamkari A (2025). Acceptance and Commitment Therapy Group Intervention on Anxiety Sensitivity, Worry Severity and Intolerance of Uncertainty in Patients with Generalized Anxiety Disorder. *International Journal of Psychology & Psychological Therapy, 25,* 3, 309-320.

Novelty and Significance

What is already known about the topic?

- Generalized Anxiety Disorder is characterized by excessive worry, anxiety sensitivity, and intolerance of uncertainty that can result in a significant distress.
- Psychological inflexibility is a key factor in maintaining anxiety and mood disorders, and therapies that enhance psychological flexibility have gained attention as promising alternatives.
- The effects of group-based Generalized Anxiety Disorder in anxiety sensitivity, worry severity, and intolerance of uncertainty in individuals with Generalized Anxiety Disorder require further investigation.

What this paper adds?

- This study provides additional evidence of effectiveness of group-based Generalized Anxiety Disorder on anxiety sensitivity, worry severity, and intolerance of uncertainty.
- This study supports the potential of Acceptance and Commitment Therapy as a scalable and affordable intervention using a structured group therapy format.

Generalized Anxiety Disorder (GAD) is essentially a condition with excessive and uncontrollable worry accompanied by distressing cognitive rumination. Due to its high prevalence, comorbidity with other mood and anxiety disorders is common; Major Depressive Disorder is present in 63% of cases, and other anxiety-related disorders appear in 51.7% of cases (American Psychiatric Association, 2013; Ruscio *et alii*, 2017). Many people with GAD develop symptoms within two years, and those who are diagnosed continue to have difficulty accessing treatment centers due to an ostensibly

* *Correspondence*: Nastaran Otared, Faculty of Arts and Sciences, Office: EH108, Cyprus International University. Email: notared@ciu.edu.tr

lengthy waiting list that can last up to eighteen weeks (Baldwin, Allgulander, Bandelow, Ferre, & Pallanti, 2011; NHS England & NHS Improvement, 2020). Besides, previous findings have identified attentional biases and deficits in the control of attention as important processes in the cognitive and attentional maintenance of GAD (Hirsch & Mathews, 2012).

Anxiety sensitivity (AS), worry severity (WS), and intolerance of uncertainty (IU) are some of the most common cognitive vulnerabilities linked to the onset of GAD. Anxiety sensitivity represents the fear of sensations associated with arousal, due to catastrophic misinterpretation of those sensations (Reiss, 1991). The sensation of a racing heart, for example, may be misinterpreted as an indication of a possible imminent heart attack. Studies have demonstrated already that AS is a relatively stable predictor of anxiety across various age groups (Schmidt, Zvolensky, & Maner, 2006; Schmidt *et alii*, 2010). However, adolescents are significantly at a notably high risk; the growth period represents the prevalence rate of GAD and other anxiety related disorders at the highest point (Beesdo, Knappe & Pine, 2009).

Another hallmark feature of GAD is the severity of worry, described as a chain of negative thoughts about uncertain future events (Sibrava & Borkovec, 2006). Worry in this context acts as a type of cognitive rumination, maintaining heightened anxiety and impeding emotional regulation (Dugas, Gosselin, & Ladouceur, 2001). The metacognitive model of GAD identifies maladaptive self-focused attention and negative beliefs about worry as important factors in chronic anxiety (Wells, 2009).

IU is a cognitive bias representing individual perceptions, interpretations, and responses in light of uncertain situations (Dugas, Schwartz, & Francis, 2004). IU has been postulated to be an important cognitive vulnerability factor contributing to excessive worry and anxiety within the context of GAD (Dugas & Koerner, 2005). This suggests a kind of difficulty with regard to tolerance of ambiguity that presents as heightened anxiety given uncertainty of outcomes.

More traditional psychological treatments for GAD, such as Cognitive Behavioral Therapy (CBT), have found some moderate efficacy in diminishing these cognitive vulnerabilities. Nevertheless, standalone interventions targeting such crucial constructs as AS, WS, and IU remain understudied (Hoge *et alii*, 2013; Wells, 2009). Thus, Acceptance and Commitment Therapy (ACT) came out as a promising technique in this background of limitations. ACT focuses on psychological flexibility, or the ability to remain in the present time, being committed to values that lead to action in the presence of distressing situations (Hayes, Strosahl, & Wilson, 2016). On the other hand, research has shown that it is psychological inflexibility and/or the interaction of unhelpful cognitive and behavioral processes that gives rise to anxiety and other psychopathologies (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

ACT embraces six core processes that are organized across two dimensions: first, mindfulness and acceptance, aiming for cognitive defusion and obtaining self-as-context perspective; second, commitment and behavior change dimension aims to keep contact with the present moment, clarify one's values, and maintain one's commitment to action (Hayes *et alii*, 2006). Overall, these processes are geared toward reducing cognitive fusion and avoidance behaviors, which in turn enable individuals to interact or make contact with their values in a meaningful way. Group-based ACT has various advantages to these groups, including cost-efficiency and possibilities for shared learning (Kalodner & Hanus, 2011; Rath, Bertisch, & Elliott, 2014). Recent meta-analyses have also verified that group-based ACT is effective in anxiety symptoms reduction, showing

further declines over time (Christodoulou, Flaxman, & Lloyd, 2021; Clarke, Kingston, James, Bolderston, & Remington, 2014; Ferreira, Mariano, De Rezende, Caramelli, & Kishita, 2022).

Individual ACT has shown similar results with lower dropout rates compared to individual CBT for anxiety and depressive disorders (A-Tjak, Davis, Morina, Powers, Smits, & Emmelkamp, 2014; Ong, Lee, & Twohig, 2018). Moreover, group ACT was effective, as compared to non-active controls, in reducing symptoms of anxiety; versus active controls, in group-based CBT intervention, demonstrating similar outcomes (Hoge *et alii*, 2013). Yet, the utility of this therapy for the specific cognitive vulnerabilities represented by AS, IU, and WS remains understudied. Digital interventions, such as smartphone-based ACT applications, have also made a promising start to improving accessibility and maintaining treatment gains. This finding provides new support for the role that could be played by digital ACT interventions in tackling the treatment gap for GAD (Hemmings *et alii*, 2021; Dindo, Van Liew, & Arch, 2017). Despite this progress, additional research is still required to establish the efficacy of ACT, including group formats, in targeting cognitive vulnerabilities in GAD.

All in all, this study examines the efficacy of a group-based ACT intervention in reducing AS, WS, and IU in patients with GAD. By integrating recent findings and addressing critical gaps, this research aspires to be added to the growing body of evidence supporting ACT as a viable alternative to traditional therapies for GAD.

Method

Participants

The study sample consisted of all patients with symptoms of Generalized Anxiety Disorder (GAD) who sought treatment in Tabriz City psychotherapy clinics during the first three months of 2024. Psychiatric semi-structured diagnostic interviews were used to choose participants for the treatment and control groups. They received comprehensive information regarding the therapy approach and the study's overarching objective during the recruitment process. The intervention then got underway. As part of the control group, 15 individuals were randomly allocated to an online group-based ACT (Acceptance and Commitment Therapy) treatment, while 15 more were put on a waiting list and did not get any treatment.

Convenience sampling was used to choose the participants, who were then split into the experimental and control groups at random. Fifteen participants in the experimental group received group treatment based on ACT, while fifteen participants in the control group received no intervention. The following were the requirements for participation: 1) a clinical interview-based diagnosis of Generalized Anxiety Disorder (GAD); 2) a high degree of anxiety and worry-related distress or dysfunctionality; 3) no history of substance abuse, personality disorders, bipolar disorder, or schizophrenia; 4) a willingness to attend all therapy sessions; and 5) no recent changes in psychiatric medication for at least one month prior to the study.

In accordance with the Declaration of Helsinki (2013), the study was carried out ethically, and participants gave their informed consent before to taking part. Pre-test, post-test, and a three-month follow-up were the three phases at which the assessments were carried out. A planned therapeutic plan was followed during the in-person ACT-based group therapy sessions.

Instruments and Measures

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990): The PSWQ is a self-report questionnaire consisting of 16 items, to assess the extent to which an individual worry. The participants can give a score between the range of 1 through 5, with a score of 1 being "Not at all typical of me" while a score of 5 results in a value of "Very typical of me". This allows for a score range of 16 through to 80. Higher total score indicates higher level of pathological worry. The process of translating and validating the questionnaire to Farsi involved translation and back translation by bilingual scholars to ensure that the Farsi version retained its content equivalence. The total scale of the study was found to be internally consistent with a score of alpha= 0.88. The internal consistency for the sub scales that constituted worry engagement was 0.90 and absence of worry was found to be 0.60. The test re-test reliability after a period of one month was 0.80, which provides evidence for stability. It was possible to confirm convergent validity, as there were strong correlations with a measure of trait anxiety and depression (Dehshiri, Golzari, Borjali, & Sohrabi, 2010).

Anxiety Sensitivity Index-3 (ASI-3; Taylor *et alii*, 2007): This is a questionnaire based on the 36-item ASI-Revised, the 18-item Anxiety Sensitivity Index-3 (ASI-3) measures anxiety sensitivity in three domains: social ("It's important for me not to seem nervous"), cognitive ("When I cannot keep my mind on a task, I worry that I might be going crazy"), and physical ("It scares me when my heart beats rapidly"). With subscale scores of 0.79-0.84 (Physical Concerns), 0.84-0.91 (Cognitive Concerns), and 0.78-0.86 (Social Concerns) across samples, Cronbach's alpha showed reliability and, in most cases, exceeded the original ASI (Taylor *et alii*, 2007). Each item is rated on a 5-point Likert scale ranging from 0 (very little) to 4 (very much), with subscale scores ranging from 0 to 24 and a total score from 0 to 72 (Taylor *et alii*, 2007). The ASI-3 is regarded as a psychological tool that has the required credibility since it is often utilized in both clinical and research settings, examining anxiety and mood disorders. The original ASI-3 was translated from English into Farsi by a team of clinical psychology professors and specialists at the doctoral level. By consensus, any disagreements were settled. Two other mental health professionals independently back-translated from Farsi into English. The original text was compared with the translated version, and its shortcomings were investigated. To determine whether 20 Persian students from Kermanshah University of Medical Sciences considered the ASI-3 acceptable and comprehensible, a pilot study was carried out with the sample (Foroughi, Iranmanesh, & Hyun, 2019).

Intolerance Uncertainty Scale-12 (IUS-12; Carleton, Norton, & Asmundson, 2006): The IUS-12 is a self-report tool used to assess intolerance of uncertainty. It was created as a concise version of the IUS-27. It consists of two subscales: inhibitory IU, measuring avoiding behavior in ambiguous circumstances, and prospective IU, which evaluates the necessity for predictability. A 5-point Likert scale is utilized to rate the items. When compared to the IUS-27, the IUS-12 possesses significant criterion validity, test-retest reliability, and satisfactory internal consistency (Cronbach's alpha= 0.93 in a combined sample). With an optimal cut-off score of 28, this measure has demonstrated efficacy in differentiating between people with GAD and non-clinical instances regarded as a reliable tool for both research and therapy since it is sensitive to changes in treatment and has been validated for both clinical and non-clinical populations (Wilson, Stapinski, Dueber, Rapee, Burton, & Abbott, 2020). A comprehensive procedure was followed regarding the translation and cross validation of Intolerance of Uncertainty Scale-12 (IUS-12) for Farsi translation and validation. To ensure semantic equivalence, a clinical psychology faculty member undertook the task of translating the scale into Farsi while a Farsi correction expert translated it back into English. Data was collected from two samples of 1210 students from three institutions located in Zanjan, Iran, and other students *n*= 228 from the University of Medical Sciences situated in Zanjan. Psychometric measures were then conducted using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) confirming the presence of a strong two-factor structure that was in accordance with the original scale. The Farsi version was found to have strong internal consistency as reflected by the Cronbach's alpha of 0.89. (Rashtbari, Diba, Sharaf, Zolghadriha, & Saed, 2022).

Procedure and Intervention

In terms of the treatment group, they were subject to a total of eight sessions of group-based therapy in an online setting, where each individual session had a duration of 75 minutes. Regarding the multi-protocol ACT used, it had as a basis the protocol provided by Hayes *et alii* (2016). Pre-test and post-test questionnaires were filled by both groups' participants in the following respective order: A week prior to the beginning of the intervention session and after the end of the eight intervention sessions. The analysis of the collected data on both groups was conducted throughout the usage of the software program SPSS (version 27).

In the first session and after the initial acquaintance with the group members, the members were provided with an overview of the principles and rules pertaining to group-based therapy as well as an explanation of the ACT foundations. In this phase, we focused on creative hopelessness and establishing a therapeutic alliance.

During the second session, a clarification of the anxiety terminology was offered on the basis of the ACT frame. Participants were asked to reflect on the different strategies they had used in the past to control or avoid painful internal experiences (e.g., worry, anxiety, or negative self-thoughts), and to evaluate the long-term functions of those strategies. To help clients see the pointlessness of constant struggle and to create room for healthy strategies, we used the metaphors of "Man in the Hole" and "Tug-of-War with a Monster."

In the third session, the focus was on experiential avoidance and acceptance where the former brings about psychological rigidity whereas the latter fosters flexibility. Instead of avoiding difficult emotions, we introduced the concept of acceptance -the practice of making room for uncomfortable feelings rather than fighting them. In one exercise, for example, participants were invited to name their emotions without trying to change them. Then they were asked that "What might you be doing if you weren't working so hard to avoid this feeling?" This simple shift in perspective helped many begin to see how being honest with themselves, rather than staying in control mode, could actually lead to a more meaningful and satisfying life.

The fourth session was centered around the present-moment processes where contact with the present time was encouraged, foundational skills pertaining to the allocation of attention intentionally that give way to present-moment awareness were taught, and the disruptions and failures of the present-moment processes were also addressed and worked on as they caused interference in living in the present moment. Participants were guided through mindfulness practices such as "Body scan" and "Mindful breathing". Throughout the fifth session, fusion and diffusion concepts were underlined while continuing the mindfulness practice. Further discussions about fusion were conducted where the highlight was on how fusion with verbal content has the potential of cause suffering. Besides, in order foster and promote diffusion, non-verbal and experiential exercises were also introduced. For example, clients were encouraged to repeat their anxious thoughts -saying a worry like "What if something bad happens?" in a funny voice or singing it to a simple tune. In another exercise, they practiced adding the phrase "I'm having the thought that…" before their worries -like "I'm having the thought that I'll embarrass myself." This small shift helped them take a step back and see their thoughts as just thoughts- not facts or predictions. During the sixth session, ten life values present in the ACT were communicated to the participants which can aid the creation of the meaning and direction of life. In addition, the distinction between life objectives and values was discussed where we also emphasized how the choosing act is different from the decision taking act. A discussion took place about how crucial a life lived based on values. The group members were asked to think about their own

goals and how they may be based on what was most important to them. After identifying personal values, clients were encouraged to set short-term behavioral goals aligned with those values. For example, one participant who said that "family" was a core value decided to start spending tech-free time with their children twice a week.

Amid the seventh session, the group members proceeded to practice acceptance, mindfulness and acting while aiming towards life values. This led to the introduction of the main three aspects of self-experience and the concept of self as a background, where the three aspects were discussed as follows: the method of diminishing attachment to the conceptualized self, the encouragement of contact with self as a way to gain a deeper connection with the part of self who is responsible for taking in different perspectives, and differentiating between the client and their self-story was also touched upon. Finally, during the last session of the group therapy, which was the eighth session, the review of the totality of the self-therapy techniques communicated to the group members was conducted. A careful check of all the inquiries of the participants, worries and crucial strategies was also carried out. By the end of the eighth sessions, the participants of both groups completed the post-treatment assessments which wrapped up the group-based therapy.

RESULTS

In this study, ACT-based group therapy was considered the independent variable, while anxiety sensitivity, worry severity, and intolerance of uncertainty were considered dependent variables. To this end, 30 individuals with GAD were selected through convenience sampling and randomly assigned to two groups of 15 participants each (experimental and control groups). Assessments were conducted in three stages: pre-test, post-test, and a three-month follow-up. In the experimental group, there were 15 participants with a *M* age of 34.50 years (*SD*= 3.36), and in the control group, there were 15 participants with a *M* age of 35.25 years (*SD*= 4.05). Table 1 presents the mean and standard deviation of scores for anxiety sensitivity, worry severity, and intolerance of uncertainty, categorized by groups and stages.

The results in Table 1 indicate that the mean scores of all three variables -anxiety sensitivity, worry severity, and intolerance of uncertainty- decreased in the experimental group during the post-test. Meanwhile, the mean scores for these variables in the control group showed no significant changes. Subsequently, analysis of covariance (ANCOVA) was used to evaluate the effectiveness of ACT group therapy on anxiety sensitivity, worry severity, and intolerance of uncertainty while controlling for the effect of the pre-test. The impact of ACT group therapy on anxiety sensitivity, worry intensity, and intolerance of uncertainty was then assessed using analysis of covariance (ANCOVA), which controlled for the pre-test effect.

Table 1. Mean (*M*) and Standard Deviation (*SD*) of Dependent Variables Scores.

Variables	Stages	Intervention Group		Control Group	
		M	*SD*	*M*	*SD*
Anxiety Sensitivity	Pre-test	53.26	5.34	52.00	5.26
	Post-test	34.53	5.37	50.73	5.25
	Follow-up	35.00	5.64	50.73	5.12
Worry Severity	Pre-test	62.13	6.75	59.86	4.99
	Post-test	42.66	4.30	59.26	4.02
	Follow-up	42.40	4.55	57.93	4.25
Intolerance of Uncertainty	Pre-test	48.86	5.49	48.40	4.53
	Post-test	29.33	4.62	48.13	5.12
	Follow-up	28.93	4.25	47.73	5.19

In addition to comparing the means of one or more groups and calculating the impact of one or more independent variables, analysis of covariance (ANCOVA) is a thorough type of analysis of variance (ANOVA) that removes the influence of one or more control, intervening, or covariate variables from the equation. Pre-test scores are used as the auxiliary random variable in this instance, and ANCOVA reduces the impact of the auxiliary random variable. Stated differently, ANCOVA aids in the removal of the intervening variable's effects. An increase in the F-value is the outcome of this operation, which also reduces variance error. In essence, the total variation of post-test scores is divided by the percentage of post-test score variance that can be attributed to pre-test variance.

Before using this test, its assumptions must be examined, and it can only be applied if these assumptions are met. One of the assumptions of this test is the normal distribution of scores, which was assessed using the Kolmogorov-Smirnov test. The results of this test indicate that the *z*-statistics from the nonparametric Kolmogorov-Smirnov test for the variables of anxiety sensitivity (z= 0.112), worry severity (z= 0.50), and intolerance of uncertainty (z= 0.12) were not significant at the .05 level. Therefore, the null hypothesis, which suggests that the data follows a normal distribution, is confirmed. Another assumption of ANCOVA is the homogeneity of regression coefficients. The results of the regression coefficient homogeneity test for anxiety sensitivity (F= 0.24), worry severity (F= 3.79), and intolerance of uncertainty (F= 3.095) for the interaction between group and pre-test were not significant at the .05 level. Thus, the data supports the assumption of homogeneous regression slopes, and this assumption is satisfied. Another assumption that must be met for ANCOVA is the homogeneity of variances, which was tested using Levene's test. The results of Levene's test for anxiety sensitivity (F= 3.04), worry severity (F= 7.25), and intolerance of uncertainty (F= 0.08) show that the significance levels were greater than .05. Therefore, the assumption of homogeneity of variances is met for all three variables. Since all three assumptions for conducting ANCOVA are confirmed, ANCOVA is applied in the subsequent analysis.

The covariance analysis table for post-test scores (see Table 2) shows that ACT group therapy has a significant effect on anxiety sensitivity (F= 223.15, p <.05), worry severity (F= 275.08, p <.05), and intolerance of uncertainty (F= 521.92, p <.05) in people with GAD. The therapy's effect on the variables under study is acceptable.

Table 2: Results of Covariance Analysis for Post-test Scores.

Variables	Source of Effect	*SS*	*DF*	*MS*	*F*	*p*	*ES*	*SP*
Anxiety Sensitivity	Pre-test	525.17	1	525.17	53.41	.001	0.66	1.00
	Group	2194.23	1	2194.23	223.15	.001	0.89	1.00
Worry Severity	Pre-test	262.57	1	262.57	31.69	.001	0.54	1.00
	Group	2279.05	1	2279.05	275.08	.001	0.91	1.00
Intolerance of Uncertainty	Pre-test	524.35	1	524.35	99.20	.001	0.78	1.00
	Group	2758.80	1	2758.80	521.92	.001	0.95	1.00

Notes: DF= Degrees of Freedom; *ES*= Effect Size; *MS*= Mean Squares; *SP*= Statistical Power; *SS*= Sum of Squares.

Furthermore, to examine the stability of the treatment effects after three months, the dependent variables (anxiety sensitivity, worry severity, and intolerance of uncertainty) were assessed. Then, a paired *t*-test was used to compare the post-test and follow-up scores, the results of which are presented in the table below (see Table 3).

The results show there is no statistically significant difference between the post-test and follow-up periods of the effect of ACT group therapy on anxiety sensitivity (t=

-0.432), worry severity (t= 1.60), and intolerance of uncertainty (t= 1.21). Therefore, we can conclude that the effects of the treatment were maintained over time (The negative sign also shows that the mean score in the follow-up stage was slightly lower than in the post-test stage, but the difference was not substantial).

Table 3. Results of the Paired *t*-Test Comparing Post-Test and Follow-Up Scores in the Experimental Group.

Variable	*MD*	*SD*	*t*	*DF*	*p*
Anxiety Sensitivity	-0.23	2.95	-0.432	14	.67
Worry Severity	0.80	2.73	1.60	14	.12
Intolerance of Uncertainty	0.40	1.81	1.21	14	.23

Notes: MD= Mean Difference; *SD*= Standard Deviation; *t*= Paired *t*-Test; *DF*= Degrees of Freedom.

DISCUSSION

Anxiety disorders are complicated and closely related to other psychiatric disorders, as evidenced by their frequent co-occurrence with other mental health conditions. This shows the basic psychopathological mechanisms in the field of mental health. By offering empirical support for the efficacy of Acceptance and Commitment Therapy (ACT) for common cognitive vulnerabilities -Anxiety Sensitivity (AS), Worry Severity (WS), and Intolerance of Uncertainty (IU)- among individuals with Generalized Anxiety Disorder (GAU), our study adds to the body of research on transdiagnostic approaches.

ACT helps the patients regain their psychological flexibility over time, encouraging openness to experiences, cognitive defusion, and acceptance of maladaptive and rigid cognitions rather than attempting to change them. This finding is in line with previous research that has already proved the efficacy of ACT in alleviating anxiety symptoms (Christodoulou *et alii*, 2021; Clarke *et alii*, 2014; Hayes *et alii*, 1999; Roemer, Lee, Salters-Pedneault, Erisman, Orsillo, & Mennin, 2009).

The decrease in AS is expected as ACT encourages cognitive defusion, which helps individuals detach from negative interpretations of bodily sensations rather than modifying them. Cognitive defusion, according to Hayes, Strosahl, and Wilson (2012), reduces the mental impact and credibility of thoughts by altering the relationship humans have with them rather than the thoughts themselves. Cognitive defusion allows people to view their thoughts as transient mental phenomena rather than unchangeable realities, which lessens emotional pain and upsetting nature of their thoughts (Hayes *et alii*, 2012).

This finding is additionally supported by previously published research suggesting that AS is an important construct within the anxiety development framework and can be managed through targeted interventions (Schmidt *et alii*, 2006; Schmidt *et alii*, 2010). Moreover, the decrease in WS and IU aligns with the metacognitive model of GAD, which stresses the importance of counterproductive ruminative thinking and excessive worrying by means of acceptance and strategies that encourage mindfulness acceptance (Wells, 2009). The substantial decline in IU also highlights the power of ACT in increasing psychological coping skills because participants were trained to deal with accepting the unknown in non-anxiety-provoking ways. This is consistent with the framework proposed by Dugas and Koerner (2005), which identifies IU as a core feature of GAD.

The role of worry in cognitive performance significantly affects the functioning of people diagnosed with GAD. It is put forward that verbal thoughts dominate, and mental images are inhibited, which leads to emotional processing impairment (East &

Watts, 1994; Freeston, Dugas, & Ladouceur, 1996; Hirsch & Mathews, 2012; Levine, Fleming, Piedmont, Cain, & Chen, 2016). GAD causes an individual to be in a state of constant worrying which serves as a means for cognitive avoidance that increases distress (Stavropoulos, Cooper, Champion, Keevers, Newby, & Grisham, 2024). This is consistent with the Contrast Avoidance Model of CAM, which states that anxiety is a mechanism to reduce pain and prevent abrupt shifts in emotion (Baik & Newman, 2023). ACT encourages people to confront their challenging thoughts openly rather than avoiding them. According to Hayes, Strosahl, & Wilson (2012), they therefore learn to recognize and accept upsetting thoughts without getting lost in them. Worry is therefore viewed as a fleeting thought rather than something that dictates their behavior.

In terms of methodology, our study benefitted from the culturally adapted and validated measures that included the Penn State Worry Questionnaire, Anxiety Sensitivity Index-3, and Intolerance of Uncertainty Scale-12. These measures had demonstrated high internal consistency and test-retest reliability, which means that changes could be attributed to the intervention rather than to artifacts of measurement. Similarly, the thoughtful adaptation of the tools for the Farsi-speaking population increases the relevance of the results. The use of validated measures allows us to increase cross-cultural research on ACT and its applications. The group-based format of ACT utilized in this research offered certain benefits such as the development of peer support and joint learning. This was shown in other studies which claimed that group approached interventions served to enhance the feeling of participation and enable joint problem solving (Kalodner & Hanus, 2011; Rath *et alii*, 2017).

Moreover, group therapy is beneficial for GAD in particular because it is very cost-effective, which is an advantage in underfunded areas. In agreement with other research, our findings align with those of Afshar, Hatami, Ahadi, and Maddahi (2016) and Forouzanfar, Lavasani, and Kazemi (2018), which indicate that ACT is effective in lowering AS and its subscales, such as fears related to somatic symptoms, cognitive control, or negative evaluations. Similarly, the lowered WS is justified by the evidence that ACT changes the pattern of worrying by active and value-oriented mindfulness (Hayes, Strosahl, & Wilson,1999; MirMoeini, Bayazi, & Khlatbari, 2022). These findings relate to the effectiveness of ACT in enhancing psychological flexibility and reducing the use of avoidant thinking and negative cognitive coping strategies. The experimental group maintained the reductions in anxiety sensitivity, worry severity, and intolerance of uncertainty which were recorded in the follow up assessment done three months after the intervention. These findings suggest that ACT-based group therapy has a durable effect on managing symptoms of GAD.

Meta-analytic evidence backs the efficacy of ACT in cases where traditional CBT may not be particularly effective, such as older adult populations with treatment-resistant GAD (Kishita & Laidlaw, 2017). ACT is effective as it improves psychological flexibility, reduces anxiety and depressive symptoms, and increases quality of life in older populations (Gould *et alii*, 2021).

Even with these promising findings, this study has several limitations that must be recognized. First, not having a comparison group that received cognitive-behavioral therapy (CBT) makes it difficult to determine if ACT is more effective or equally effective compared to other well-established therapies for GAD. Further studies need to add direct comparisons between ACT and CBT for more robust conclusions. Second, the study's reliance entirely on self-reported data is an issue as responses could be biased because of social desirability or inaccurate self-perception. Third, the small sample size

and its recruitment from a single clinical setting diminishes the representativeness of the result to larger and more diverse population.

The present study concludes by establishing that group-based ACT is an impressively effective intervention in the reduction of AS, WS, and IU in individuals diagnosed with GAD. The follow-up results showed that the positive effects of ACT-based group therapy on anxiety sensitivity, worry severity, and intolerance of uncertainty were continued over a three-month period. Our findings are also further strengthened by culturally adapted measures and validated tools. These outcomes not only remind us that ACT can be utilized in the treatment of anxiety, but that ACT's application can also close treatment gaps for underserved populations. Future research should be done regarding long-term efficacy, integration into digital platforms, and application across diverse cultural settings. In this way, accessibility, treatment adherence, and the impact of ACT on psychological well-being will be further improved.

REFERENCES

Afshar EK, Hatami M, Ahadi H, & Maddahi ME (2016). Efficacy of treatment acceptance and commitment and emotion regulation strategies on anxiety sensitivity, excitement irregularities and self-efficacy. *International Journal of Medical Research and Health Sciences*, 5, 294-300.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington DC: American Psychiatric Association Publishing.

A-Tjak JG, Davis ML, Morina N, Powers MB, Smits JA, & Emmelkamp PM (2014). A meta-analysis of the efficacy of acceptance and commitment therapy for clinically relevant mental and physical health problems. *Psychotherapy and Psychosomatics*, *84*, 30-36. Doi: 10.1159/000365764.

Baik SY & Newman MG (2023). The transdiagnostic use of worry and rumination to avoid negative emotional contrasts following negative events: A momentary assessment study. *Journal of Anxiety Disorders*, *95*, 102679. Doi: 10.1016/j.janxdis.2023.102679.

Baldwin DS, Allgulander C, Bandelow B, Ferre F, & Pallanti S (2011). An international survey of reported prescribing practice in the treatment of patients with generalised anxiety disorder. *World Journal of Biological Psychiatry*, *13*, 510-516. Doi: 10.3109/15622975.2011.624548

Beesdo K, Knappe S, & Pine DS (2009). Anxiety and anxiety disorders in children and adolescents: Developmental issues and implications for DSM-V. *Psychiatric Clinics of North America*, *32*, 483-524. Doi: 10.1016/j.psc.2009.06.002

Carleton RN, Norton MPJ, & Asmundson GJ (2006). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, *21*, 105-117. Doi: 10.1016/j.janxdis.2006.03.014.

Christodoulou V, Flaxman PE, & Lloyd J (2021). Acceptance and commitment therapy in group format for college students. *Journal of College Counseling*, *24*, 210-223. Doi: 10.1002/jocc.12192.

Clarke S, Kingston J, James K, Bolderston H, & Remington B (2014). Acceptance and commitment therapy group for treatment-resistant participants: A randomized controlled trial. *Journal of Contextual Behavioral Science*, *3*, 179-188. Doi: 10.1016/j.jcbs.2014.04.005.

Dehshiri G, Golzari M, Borjali A, & Sohrabi F (2010). Psychometrics particularity of Farsi version of Pennsylvania State Worry Questionnaire for college students. *Journal of Clinical Psychology*, *1*, 67-75. Doi: 10.22075/jcp.2017.1988.

Dindo L, Van Liew JR, & Arch JJ (2017). Acceptance and commitment therapy: A transdiagnostic behavioral intervention for mental health and medical conditions. *Neurotherapeutics*, *14*, 546-553. Doi: 10.1007/s13311-017-0521-3.

Dugas MJ, Gosselin P, & Ladouceur R (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research*, *25*, 551-558. Doi: 10.1023/a:1005553414688.

Dugas MJ & Koerner N (2005). Cognitive-behavioral treatment for generalized anxiety disorder: Current status and future directions. *Journal of Cognitive Psychotherapy*, *19*, 61-81. Doi: 10.1891/jcop.19.1.61.66326.

Dugas MJ, Schwartz A, & Francis K (2004). Intolerance of uncertainty, worry, and depression. *Cognitive Therapy*

and Research, *28*, 835-842. Doi: 10.1007/s10608-004-0669-0.

East MP & Watts FN (1994). Worry and the suppression of imagery. *Behaviour Research and Therapy*, *32*, 851-855. Doi: 10.1016/0005-7967(94)90165-1.

Ferreira MG, Mariano LI, De Rezende JV, Caramelli P, & Kishita N (2022). Effects of group Acceptance and Commitment Therapy (ACT) on anxiety and depressive symptoms in adults: A meta-analysis. *Journal of Affective Disorders*, *309*, 297-308. Doi: 10.1016/j.jad.2022.04.134.

Foroughi B, Iranmanesh M, & Hyun SS (2019). Understanding the determinants of mobile banking continuance usage intention. *Journal of Enterprise Information Management*, *32*, 1015-1033. Doi: 10.1108/jeim-10-2018-0237.

Forouzanfar A, Lavasani MG, & Kazemi MS (2018). The effectiveness of group counselling based on acceptance and commitment therapy in distress tolerance and anxiety sensitivity among female substance abusers. *Research on Addiction, 11*, 135-154. Doi: 10.21859/jech.5.2.53

Freeston MH, Dugas MJ, & Ladouceur R (1996). Thoughts, images, worry, and anxiety. *Cognitive Therapy and Research*, *20*, 265-273. Doi: 10.1007/bf02229237.

Gould RL, Wetherell JL, Kimona K, Serfaty MA, Jones R, Graham CD, Lawrence V, Livingston G, Wilkinson P, Walters K, Novere ML, Leroi I, Barber R, Lee E, Cook J, Wuthrich VM, & Howard RJ (2021). Acceptance and commitment therapy for late-life treatment-resistant generalised anxiety disorder: A feasibility study. *Age and Ageing*, *50*, 1751-1761. Doi: 10.1093/ageing/afab059.

Hayes SC, Luoma JB, Bond FW, Masuda A, & Lillis J (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*, 1-25. Doi: 10.1016/j.brat.2005.06.006.

Hayes SC, Strosahl KD, & Wilson KG (1999). *Acceptance and Commitment Therapy: An Experiential Approach to Behavior Change*. Guilford Press.

Hayes SC, Strosahl KD, & Wilson KG (2012). *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change*. New York: Guilford Press.

Hayes SC, Strosahl KD, & Wilson KG (2016). *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change,* 2nd Ed. Guilford Press.

Hemmings NR, Kawadler JM, Whatmough R, Ponzo S, Rossi A, Morelli D, Bird G, & Plans D (2021). Development and feasibility of a digital Acceptance and Commitment Therapy-based intervention for generalized anxiety disorder: Pilot acceptability study. *JMIR Formative Research*, *5*, 2, e21737. Doi: 10.2196/21737.

Hirsch CR & Mathews A (2012). A cognitive model of pathological worry. *Behaviour Research and Therapy*, *50*, 10, 636-646. Doi: 10.1016/j.brat.2012.06.007.

Hoge EA, Bui E, Marques L, Metcalf CA, Morris LK, Robinaugh DJ, Worthington JJ, Pollack MH, & Simon NM (2013). Randomized controlled trial of mindfulness meditation for generalized anxiety disorder. *The Journal of Clinical Psychiatry*, *74,* 8, 786-792. Doi: 10.4088/jcp.12m08083.

Kalodner CR & Hanus AE (2011). *Groups across settings*. Oxford University Press eBooks.

Kishita N. & Laidlaw K. (2017). Cognitive behaviour therapy for generalized anxiety disorder: Is CBT equally efficacious in adults of working age and older adults? *Clinical Psychology Review*, *52*, 124-136. Doi: 10.1016/j.cpr.2017.01.003.

Levine JC., Fleming R., Piedmont JI., Cain SM., & Chen W. (2016). Heart rate variability and generalized anxiety disorder during laboratory-induced worry and aversive imagery. *Journal of Affective Disorders*, *205*, 207-215. Doi: 10.1016/j.jad.2016.07.019.

Meyer T, Miller M, Metzger R, & Borkovec TD (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *28*, 487-495. Doi: 10.1016/0005-7967(90)90135-6.

MirMoeini P, Bayazi MH, & Khlatbari J (2022). Comparing the effectiveness of acceptance and commitment therapy with Compassion-Focused therapy on the intensity of resiliency and worry in patients with multiple sclerosis. *Journal of Arak University of Medical Sciences*, *25*, 88-103. Doi: 10.32598/jams.25.1.6671.1.

NHS England & NHS Improvement (2020). NHS Performance Statistics. In NHS Performance Statistics (pp. 1-5) [Report]. Available at: https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2020/01/Combined-Performance-Summary-January-November-December-data-2020-c7d3g.pdf.

Ong CW, Lee EB, & Twohig MP (2018). A meta-analysis of dropout rates in acceptance and commitment therapy. *Behaviour Research and Therapy, 104*, 14-33. Doi: 10.1016/j.brat.2018.02.004.

Rashtbari A, Diba T, Sharaf FN, Zolghadriha A, & Saed O (2022). "I just want to be certain": Psychometric properties and predictive role of the Intolerance of Uncertainty Scale-12. *Shenakht Journal of Psychology and Psychiatry, 9*, 5, 101-114. Doi: 10.32598/shenakht.9.5.101.

Rath JF, Bertisch H, & Elliott TR (2017). *Groups in behavioral health settings*. *SAGE Publications, Inc*. *eBooks*.

Reiss S (1991). Expectancy model of fear, anxiety, and panic. *Clinical Psychology Review, 11*, 2, 141-153. Doi: 10.1016/0272-7358(91)90092-9.

Roemer L, Lee JK, Salters-Pedneault K, Erisman SM, Orsillo SM, & Mennin DS (2009). Mindfulness and emotion regulation difficulties in generalized anxiety disorder: Preliminary evidence for independent and overlapping contributions. *Behavior Therapy, 40*, 2, 142-154. Doi: 10.1016/j.beth.2008.04.001.

Ruscio AM, Hallion LS, Lim CCW, Aguilar-Gaxiola S, Al-Hamzawi A, Alonso J, Andrade LH, Borges G, Bromet EJ, Bunting B, Caldas de Almeida JM, Demyttenaere K, Florescu S, de Girolamo G, Gureje O, Haro JM, He Y, Hinkov H, Hu C, de Jonge P, Karam EG, Lee S, Lepine JP, Levinson D, Mneimneh Z, Navarro-Mateu F, Posada-Villa J, Slade T, Stein DJ, Torres Y, Uda H, Wojtyniak B, Kessler RC, Chatterji S, & Scott KM (2017). Cross-sectional comparison of the epidemiology of DSM-5 generalized anxiety disorder across the globe. *JAMA Psychiatry, 74*, 5, 465-475. Doi: 10.1001/jamapsychiatry.2017.0056.

Schmidt NB, Keough ME, Mitchell MA, Reynolds EK, MacPherson L, Zvolensky MJ, & Lejuez C (2010). Anxiety sensitivity: Prospective prediction of anxiety among early adolescents. *Journal of Anxiety Disorders, 24*, 5, 503-508. Doi: 10.1016/j.janxdis.2010.03.007.

Schmidt NB, Zvolensky MJ, & Maner JK (2006). Anxiety sensitivity: Prospective prediction of panic attacks and Axis I pathology. *Journal of Psychiatric Research, 40*, 8, 691-699. Doi: 10.1016/j.jpsychires.2006.07.009.

Sibrava NJ, & Borkovec TD (2006). The cognitive avoidance theory of worry. In GCL Davey & A Wells (Eds.), *Worry and its psychological disorders: Theory, assessment, and treatment* (pp. 217-237). Cambridge: Cambridge University Press.

Stavropoulos L, Cooper DD, Champion SM, Keevers L, Newby JM, & Grisham JR (2024). Basic processes and clinical applications of mental imagery in worry: A systematic review. *Clinical Psychology Review, 110*, 102427. Doi: 10.1016/j.cpr.2024.102427.

Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, Abramowitz JS, Holaway RM, Sandin B, Stewart SH, Coles M, Eng W, Daly ES, Arrindell WA, Bouvard M, & Cardenas SJ (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment, 19*, 2, 176-188. Doi: 10.1037/1040-3590.19.2.176.

Wells A (2009). *Metacognitive therapy for anxiety and depression*. New York: Guilford Press.

Wilson EJ, Stapinski L, Dueber DM, Rapee RM, Burton AL, & Abbott MJ (2020). Psychometric properties of the Intolerance of Uncertainty Scale-12 in generalized anxiety disorder: Assessment of factor structure, measurement properties and clinical utility. *Journal of Anxiety Disorders*, *76*, 102309. Doi: 10.1016/j.janxdis.2020.102309.

Received, March 5, 2025
Final Acceptance, June 8, 2025