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Should I Write or Should I Not? The Investigation of the Short- and Medium-term Effects of an Expressive Writing Intervention in Reducing Depressive Symptoms, Rumination, and Intolerance of Uncertainty in College Students. A Pilot Study

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ABSTRACT. Given the rising mental health concerns in the student population, especially regarding depression and emotion regulation difficulties, cost-effective and accessible interventions are urgently needed.

Thus, the current study investigated the short- and long-term effects of an expressive writing (EW) intervention on subclinical depressive symptoms, rumination, and intolerance of uncertainty on a sample of female Transylvanian Hungarian university students. Participants engaged in a standard EW protocol, writing about distressing experiences for 15–30 minutes over four consecutive days. Outcomes were measured at baseline (T0), immediately post-intervention (T1), and at a six-week follow-up (T2).

Results revealed a significant reduction in depressive symptoms from T0 to T1 and T2, with large and moderate-to-large effect sizes, respectively. While prospective anxiety (IUS-PA) decreased immediately post-intervention, it returned to baseline levels at follow-up. Inhibitory anxiety (IUS-IA) initially increased but decreased significantly by T2. Rumination showed a delayed yet significant reduction from T0 to T2. Cognitive strategies such as self-blame and acceptance improved post-intervention, while behavioral strategies showed mixed results: withdrawal decreased over time, whereas ignoring decreased initially but rebounded by T2.

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These findings suggest EW may be an effective short-term intervention for reducing depressive symptoms and enhancing emotion regulation. However, some benefits diminished over time, highlighting the potential need for reinforcement or complementary interventions.

Keywords: depressive symptoms, rumination, intolerance of uncertainty, expressive writing

INTRODUCTION

The transition from high school to university is a major life shift accompanied by a range of challenges and uncertainties. In order to manage the demands of academic life, students must adequately respond to these pressures. Adjustment to university life refers to the capacity to navigate among academic expectations, managing financial stress, adapting to shared living spaces, and handling the pressure to succeed (Robertson et al., 2020).

A substantial body of epidemiological research shows that, over the first two decades of the 21st century, major depressive disorder (MDD) has become a pressing global health concern, affecting individuals across diverse demographic groups and regions (Vos et al., 2015; Cuijpers et al., 2020). Not surprisingly, in recent years, mental health challenges among young people (particularly college students) have become a growing public health issue, with depression standing out as one of the most urgent (Mercadal, 2021). This trend is also reflected in the rising prevalence of depression among university students (Li et al., 2021). Beneath the surface of academic pursuits and social milestones, many students face a silent struggle shaped by a complex interplay of demographic, environmental, and psychological factors. This unique combination of stressors places college students at increased risk for mental health disorders, especially depressive disorders. In the United States, the National Institute of Mental Health (2023) reports that the prevalence of major depressive disorders (MDD) is 18.6% among individuals aged 18-25 years, with the highest prevalence observed among the female population. Additionally, research by Lee (2023) indicates that depression is more prevalent among women and younger adults (18-34 years) and among adults with lower levels of education. Among the age groups surveyed, young adults, particularly those aged 18-24 years, exhibited the highest prevalence of ever having been diagnosed with depression by a health professional (Lee, 2023). In Eastern Europe, the global prevalence of depressive symptoms during the COVID-19 pandemic was 27% in the general population, while in the student population the prevalence of anxiety and

depression was 31% (Zhang et al., 2022). The implications are profound. Depression among university students has been on a steady rise, severely impacting their academic, social, and emotional functioning. Both in the short- and long- term, students may struggle with fatigue, low motivation, difficulty concentrating, and social withdrawal, all of which in time hinder academic success (APA, 2022). Disrupted sleep, appetite changes, and emotional turmoil further contribute to these challenges (Li et al., 2021). Left unaddressed, depression can lead to long-term consequences such as academic failure, delayed graduation, or dropping out, all of which impact future career prospects. The risk of substance use, persistent mood disorders, strained relationships, and reduced life satisfaction also increases. Alarmingly, untreated depression significantly raises the risk of suicidal ideation and behaviors (APA, 2022).

Research highlights several key contributors to this heightened vulnerability of students to mental ill health. External factors such as adverse childhood experiences (Ngin et al., 2018), inadequate family support (Liu et al., 2021), and family dysfunction (Li et al., 2021) significantly increase the risk of developing depression. On an individual level, traits like neuroticism (Wang et al., 2020), dysfunctional emotion regulation strategies (Wan et al., 2024), psychological distress (Zhang et al., 2020), low self-efficacy (Volken et al., 2021), loneliness (Vanhalst et al., 2012), and especially intolerance of uncertainty (Wan et al., 2024) have all been strongly associated with depressive symptoms in college students. Additionally, demographic factors also play a significant role, with students from ethnic minority backgrounds (Lu et al., 2015) and international students (Liu et al., 2022) facing specific stressors that can further exacerbate mental health challenges.

Given the significant increase in stressors and uncertainty worldwide in recent years, the inability to tolerate ambiguous life conditions (Moscone, Tosetti, & Vittadini, 2016; Tavares, 2017), known as **intolerance of uncertainty** (IU) has attracted growing attention as a key cognitive vulnerability linked to depression and rumination. IU, defined as a tendency to perceive uncertain situations as threatening, which negatively shapes emotional, behavioral, and cognitive responses (Dugas et al., 2004) has been identified as a significant risk factor for both the development of mental health issues and the likelihood of school dropout among college students. Recent findings identify IU as a transdiagnostic factor underlying various emotional disorders, including anxiety and depression (Andrews et al., 2023; Carleton et al., 2012; Gu et al., 2020). Its strong positive association with depressive symptoms has been consistently demonstrated in empirical studies (McEvoy et al., 2019; Ruchensky et al., 2020). In a study focused on university students, Zhuo et al. (2021) found that higher levels of IU were significantly related to increased symptoms of depression, anxiety, and insomnia. This study also

revealed that social support can buffer the impact of IU on depressive symptoms, highlighting its moderating role. According to the diathesis-stress model (Colodro-Conde et al., 2018), the interaction between underlying vulnerabilities and external stressors—like uncertainty—can trigger depressive episodes. IU not only amplifies these risks but also reinforces negative thought patterns, particularly when students lack adaptive coping mechanisms (Wan et al., 2024; Zhuo et al., 2021).

Closely tied to IU is the tendency to engage in **rumination**, commonly defined as a repetitive, passive focus on one's negative emotions, their causes, and consequences (Nolen-Hoeksema, 1991; Rusting & Nolen-Hoeksema, 1998). It is widely recognized as a cognitive vulnerability and significant risk factor for mental illness, particularly major depressive disorder (Papageorgiou & Siegle, 2003). Rumination is typically associated with impairments in cognitive functioning and emotional regulation. However, some studies have explored potential benefits of positive rumination (e.g., enhanced problem-solving or cognitive reappraisal) (Cann et al., 2011; Cano-López et al., 2021; Martin & Tesser, 1996). Nolen-Hoeksema's (1991) *Response Styles Theory* suggests that rumination exacerbates and prolongs depressive symptoms by reinforcing negative thought patterns and hindering problem-solving (Nolen-Hoeksema, 2008; Smith & Alloy, 2009). Expanding on this, the metacognitive model of rumination (Papageorgiou & Wells, 2003; Wells, 2019) proposes that beliefs about one's own thinking (metacognitive beliefs) play a central role in the development and persistence of rumination. These beliefs can be both positive (e.g., "*rumination helps me solve problems*") and negative (e.g., "*I can't stop ruminating, and it's harmful*"), and they significantly influence emotional and interpersonal outcomes (Cano-López et al., 2021; Wells et al., 2009). Empirical studies support the notion that individuals who view their rumination as uncontrollable or socially damaging are more likely to experience intensified depressive symptoms (Cano-López et al., 2021; Yang et al., 2020). Chronic rumination may also erode social support, which can further worsen depression (Nolen-Hoeksema & Davis, 1999). In sum, the metacognitive model offers valuable insight into how rumination contributes to depression, both by shaping internal beliefs and by impacting cognitive and social functioning. This framework has practical clinical relevance, informing interventions that aim to reshape maladaptive beliefs about rumination and enhance emotional regulation strategies (Cano-López et al., 2021).

Since depression and anxiety contribute to a growing global public health and economic crisis (Chisholm et al., 2016), supporting the mental health of college students is not only an ethical imperative but also a strategic investment in the well-being of future leaders and the resilience of our societies. The National Institute for Health and Clinical Excellence (NICE, 2002) recommended various psychotherapeutic interventions to support adaptation after severe stress.

Considering the available evidence, both scientific research and clinical practice recommend that cost-effective and easily accessible psychological interventions be implemented to reduce depressive symptoms and enhance mental health among students (Lee et al., 2016; Le et al., 2021). The current gold standard for treating depression is cognitive-behavioral therapy (CBT) (David et al., 2018). In addition to individual and group CBT, most international clinical guidelines (e.g., NICE, 2022) recommend interpersonal psychotherapy, short-term psychodynamic psychotherapy, and other psychosocial interventions such as guided self-help, behavioral activation (individual or group-based), mindfulness, and meditation (National Institute for Health and Care Excellence, 2022).

Despite their proven effectiveness, access to these treatments remains limited due to barriers such as cost, limited availability of trained therapists, stigma, and logistical challenges (Amstadter et al., 2009; Klein et al., 2009; Przeworski & Newman, 2006). These obstacles highlight the need to develop more accessible and cost-effective therapeutic alternatives (L'Abate, 2007). University students often encounter unique difficulties in accessing psychotherapeutic services. Therefore, it is crucial to offer self-help techniques that facilitate cognitive restructuring and empower students to effectively manage and challenge negative thought patterns.

In times of intense emotional turmoil, individuals naturally seek empathy, comfort, and both emotional and practical support. The need to share emotional experiences (extraordinary or everyday events) is a fundamental human inclination, unaffected by education or cultural background (Rimé, 2007). Although recalling emotionally charged memories through expression can temporarily intensify distress, individuals often continue to feel compelled to articulate and share their experiences (Rimé, Herbette, & Corsini, 2004). Research has shown that those who engage in such expression benefit from improved psychological and physiological functioning, enhanced emotional processing, and strengthened social bonds (Pennebaker & Chung, 2007; Rimé, 2007). However, sharing experiences involving shame or morally sensitive content may exacerbate negative emotions and hinder adaptation (Rimé et al., 2004).

This innate drive for emotional expression underpins the development of **Expressive Writing** (**EW**), a method grounded in research that emphasizes the psychological and physiological benefits of verbal emotional disclosure (Pennebaker, 2007; Pennebaker & Chung, 2007).

To mitigate the potential social risks of verbal sharing, Pennebaker and colleagues introduced Expressive Writing as a private and structured alternative. In their seminal study, participants who wrote about their most distressing experiences for 15 minutes over four consecutive days demonstrated improved long-term health outcomes compared to those who wrote about neutral topics (Pennebaker & Beall, 1986). Standard EW procedures typically involve writing about a traumatic or stressful experience for 15–30 minutes per session, over

three to five consecutive days within a two-week period. Participants are encouraged to explore their deepest thoughts and feelings, often disclosing aspects they have not previously shared with others (Frattaroli, 2006; Pennebaker & Beall, 1986). Importantly, this exercise does not require adherence to grammar or spelling norms, which fosters freedom of expression. Numerous studies (Baikie et al., 2012; Cayubit et al., 2021; Daya & Princely, 2016; Gortner et al., 2006; Krpan et al., 2013; Robertson et al., 2020), as well as meta-analyses (Guo et al., 2023; Reinhold et al., 2017; Travagin et al., 2015), have explored the effectiveness of EW in promoting mental health among adolescents and university students.

Several theoretical models have been proposed to explain the psychological mechanisms underlying the effectiveness of EW. Among the most prominent are the ***emotional inhibition model***, the ***cognitive adaptation model***, and ***exposure theory***.

The ***emotional inhibition model*** (Pennebaker & Beall, 1986) posits that suppressing emotions is cognitively demanding and contributes to chronic stress, ultimately impairing both physical and mental health. According to this view, EW offers individuals the opportunity to release these suppressed emotions, thus reducing stress and improving well-being (Pennebaker, 1990).

The ***cognitive adaptation model***, also known as the cognitive processing model, is rooted in cognitive psychology and explains how individuals incorporate distressing experiences into their broader self-concept and worldview (Boals & Klein, 2005; Sloan & Marx, 2004). When life events challenge a person's core beliefs or schemas, psychological adaptation requires reconciling this mismatch. Expressive writing supports this by enabling the creation of a coherent narrative, which promotes understanding, integration, and ultimately psychological adjustment. Boals and Klein (2005) suggest that changes in how individuals describe their experiences reflect a cognitive shift in the way the event is understood.

Exposure theory builds on elements of both emotional and cognitive processing. It views EW as a form of imaginary exposure that can activate key mechanisms such as habituation, extinction, and emotional processing (Foa et al., 2007; LeDoux, 2015; Moscovitch et al., 2008). In this framework, writing about a traumatic event helps break the association between trauma-related triggers and the intense emotional responses they provoke (Rose, 2019). This is achieved through *stimulus-related habituation* (repeated exposure to the traumatic content itself) and *response-related habituation* (exposure to the emotional and physiological reactions the trauma elicits) (Lepore et al., 2002). For habituation to be effective, the writing must fully engage with the original traumatic memory (Moscovitch et al., 2009).

Together, these three models offer a comprehensive understanding of how expressive writing may promote healing: by reducing emotional inhibition, facilitating cognitive restructuring, and desensitizing traumatic responses

through exposure. Although the exact mechanisms remain subject to ongoing investigation, these frameworks align closely with those used to explain other evidence-based interventions, such as trauma-focused cognitive behavioral therapy (TF-CBT) (Cohen et al., 2000) and exposure-based cognitive therapy for depression (Hayes et al., 2007).

Briefly put, EW is considered a cost-effective psychotherapeutic technique that facilitates internal dialogue and self-reflection (Wong et al., 2021). It offers a safe space for introspection and emotional release without fear of judgment. Additionally, this method engages intrinsic psychological resources such as imagination and creativity, supporting the integration of emotional and cognitive aspects of experience (Wong et al., 2021).

Overall, research indicates that expressive writing (EW) may serve as an effective intervention for promoting mental health among young people (Cayubit et al., 2021; Baikie et al., 2012). Several meta-analyses report modest but meaningful improvements in general well-being (Travagin et al., 2015; Guo et al., 2023). However, findings related to its effect on depressive symptoms remain inconsistent. While Reinhold et al. (2017) argue that EW should not be viewed as a stand-alone treatment for depression, other studies have found moderate yet significant reductions in depression, anxiety, and stress (Guo, 2023). Despite these mixed results, evidence suggests that EW can help reduce depressive symptoms and rumination among college students, both in the short and long term (Gortner et al., 2006; Niles et al., 2014).

OBJECTIVES

The major aim of the present study was to investigate the potential benefits of an expressive writing intervention in reducing subclinical depressive symptoms, rumination, and intolerance of uncertainty among female Transylvanian Hungarian students. A second objective was to evaluate the short-term (immediately after the fourth day of the intervention) and long-term (six weeks post-intervention) efficacy of expressive writing on depressive symptoms, rumination, and intolerance of uncertainty among students. The third objective was to investigate possible changes in the use of conscious and behavioral emotion-regulation strategies pre- and post-intervention.

HYPOTHESES

H1. We expect that participants engaged in the EW intervention will show a significant reduction in subclinical depressive symptoms, and intolerance of uncertainty at post-intervention measures (T1) compared to baseline measures (T0).

H2. We expect that the effects of the EW intervention on depressive symptoms and intolerance of uncertainty will be improved or maintained at the six weeks post-intervention (T1 to T2) as well.

H3. We expect that participants engaged in the expressive writing (EW) intervention will show a significant increase in the use of adaptive, and a decrease in the use of maladaptive emotion- and behavior-regulation strategies, as measured by the CERQ and BERQ, from T0 to T1 and T2. Regarding Ruminative Response, we expect significant increase in Reflective Rumination and decrease in Brooding, from T0 to T1 to T2.

STUDY

Participants

Given that previous research suggests female students tend to adapt more slowly to academic life and report higher levels of depressive symptoms than their male counterparts, the present study focused on a sample of 15 female students aged 19 to 21 (M = 19.60, SD = 0.828) from the Faculty of Psychology in Romania. Among the participants, 33% were single and 64% were in a relationship. Additionally, 34% resided in urban areas and 66% in rural areas of Transylvania. Regarding financial satisfaction, 60% of the participants reported being content or very content with their financial status.

Instruments

The questionnaire began with an information section outlining the purpose and details of the study, followed by items assessing the participants' sociodemographic characteristics. Data were collected on participants' age, gender, educational level, academic or professional background, financial status, marital status, place of work (if applicable), year of study, and field of specialization.

Depressive symptoms were measured using the 21-item Beck Depression Inventory (BDI-21; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI-21 is a self-report multiple-choice questionnaire developed to assess the severity of depressive symptoms in adolescents and adults. Each item targets a specific symptom or attitude associated with depression, covering somatic, cognitive, and behavioural dimensions. Scores range from 0 to 63, with higher scores indicating greater severity of depressive symptoms. According to established guidelines, scores of 0–9 indicate minimal depression, 10–19 mild to moderate depression, 20–29 moderate to severe depression, and 30 or above signify severe

depression. The BDI has consistently demonstrated strong internal consistency (typically > .90); in the present study, the scale exhibited good internal consistency (Cronbach's α = .83).

Intolerance of uncertainty was measured using the 12-item version of the Intolerance of Uncertainty Scale (IUS-12; Carleton, Norton, & Asmundson, 2007), which was translated and adapted for the Hungarian population by Zsidó et al. (2021). The IUS-12 yields a total score, as well as scores for two subscales: **Prospective Anxiety** (reflecting fear and concern about future events) and **Inhibitory Anxiety** (reflecting behavioural inhibition in uncertain situations), higher scores indicating higher levels of intolerance of uncertainty. Participants rated each item on a five-point Likert scale, ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). In the current study, the scale demonstrated good internal consistency, with a Cronbach's alpha of .88 for the total score, .78 for the Prospective Anxiety subscale, and .71 for the Inhibitory Anxiety subscale.

Rumination was assessed using the 10-item version of the Rumination Response Scale (RRS; Nolen-Hoeksema et al., 1999; Treynor et al., 2003), which focuses on two subcomponents of rumination: Brooding and Reflection. This version was developed to exclude items overlapping with depressive symptomatology and was translated into Hungarian as part of the NewMood study (Lazáry et al., 2011). Participants responded to each item on a four-point Likert scale ranging from 1 (never) to 4 (always), indicating how often they engage in specific thought patterns when feeling sad or down. The Brooding subscale captures passive and judgmental self-focused thinking, while the Reflection subscale reflects purposeful self-examination aimed at understanding one's mood. The scale contains no reverse-coded items. In the current study, internal consistency was acceptable, with Cronbach's α = .71 for the Brooding subscale, and α = .73 for the Reflection subscale.

Conscious cognitive emotion regulation strategies were assessed with the 36-item Cognitive Emotion Regulation Questionnaire (CERQ) (Garnefski et al., 2002). The CERQ is a multidimensional self-report instrument designed to assess the cognitive strategies individuals use to manage negative emotions following adverse or stressful events. The CERQ scale was also adapted for the Hungarian population by Miklósi et al. (2011). Each item of the CERQ is rated on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always), measuring the frequency with which individuals engage in specific cognitive strategies to regulate their emotional responses. The scale captures nine distinct subscales (self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, and other-blame), which can be comprised in adaptive (e.g., positive reappraisal,

acceptance) and mal-adaptive (e.g., rumination, catastrophizing) strategies. The Hungarian version of the CERQ demonstrated good internal consistency in this sample (Cronbach's α = .77) and the subscales demonstrated good internal consistency sample (Cronbach's α = .73 to .83)

Behavioral emotion regulation was assessed using the 20-item Behavioral Emotion Regulation Questionnaire (BERQ; Kraaij & Garnefski, 2019), translated into Hungarian by the authors in 2021. The BERQ measures five distinct behavioral strategies used in response to negative emotions: seeking distraction, withdrawal, active approach, seeking social support, and ignoring, each represented by four items. Participants rated the frequency of their use of each strategy on a five-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). In the original validation study, the subscales demonstrated high internal consistency (Cronbach's α = .86–.93). In the current student sample, internal consistency ranged from α = .71 to .78 across subscales.

Research design

The present study employed a single-group, repeated-measures experimental design to examine the effects of classic expressive writing (EW) on various psychological outcomes. The design included one experimental group, which received the intervention, and three measurement time points: pretest (baseline), posttest (immediately after the intervention), and follow-up (six weeks after the posttest).

The dependent variables assessed at all three time points were: depressive symptoms (BDI), cognitive emotion regulation strategies (CERQ), behavioral emotion regulation strategies (BERQ), intolerance of uncertainty (IUS-12), and ruminative response (RRS).

Considering the initial relatively small number of participants and the high levels of participant attrition specific to the EW procedure, we decided not to include a control group; instead, participants served as their own controls, with pretest scores providing a baseline for comparison.

Procedure

Ethical Considerations and Participant Selection

The protocol of the present study was approved by the Ethics Committee of the Babes-Bolyai University, Cluj-Napoca, Romania [Research Ethics Approval No. 15.939/08.11.2023). Participants were selected through a multi-stage process.

Initial Assessment and Pretest

The present study which begun in November 2023 and ended in January 2024, aimed to involve individuals exhibiting subclinical depressive symptoms, as determined by the Beck Depression Inventory (BDI), with scores ranging between 9 and 29. Initially, a Google Form containing all questionnaires was distributed to 250 Hungarian students enrolled to Babes-Bolyai University, Cluj-Napoca, Romania. Those who met the eligibility criteria based on their responses were contacted via email and invited to attend a face-to-face group meeting.

Following this, BDI scores were computed, and 50 students meeting the subclinical depression criteria were invited to participate in the intervention. These students were assigned to an experimental group of expressive writing. Of the 50 students agreeing to participate in the study only 29 participated at the first writing session, and the ***participant attrition*** grew with each day of intervention [a frequent challenge in EW studies, often due to the emotional intensity of writing about distressing experiences and the multi-day commitment involved (Baikie & Wilhelm, 2005; Smyth & Pennebaker, 2008)]. On the first day of the intervention, all participants were asked to respond to the complete set of pretest questionnaires, measuring all demographic and dependent variables (depressive symptoms, cognitive and behavioral emotion regulation strategies, intolerance of uncertainty, and ruminative response).

Experimental Procedure

The expressive writing interventions were conducted over four consecutive days, each intervention lasting 20 minutes, following the guidelines outlined by Pennebaker and Chung (2007). Before the writing sessions, participants received standardized instructions in Hungarian, as follows:

> "*For the next four days, I would like you to write about your most profound thoughts and feelings regarding any challenging or emotionally distressing events you are currently experiencing. Additionally, you may connect your topic to any past stressful or traumatic experiences you have had. In your writing, it is my expectation that you will allow yourself to fully express your most profound emotions and thoughts. The topic may be linked to your relationships with others, including parents, partners, friends, or relatives. Additionally, you may choose to link your experience to their past, present, or future or to their identity as it has been, as you would like it to be, or as it currently is. You may choose to address the same general issues or experiences on each day of writing or, alternatively, to focus on different experiences each day. It is not necessary to concern yourself with grammatical or spelling errors, as these are of no consequence. All of the information provided will be kept strictly confidential."*

Posttest and Follow-Up

On the final day of the intervention, all participants completed a posttest questionnaire identical to the pretest. Six weeks later, a follow-up assessment was conducted using the same questionnaire package.

RESULTS

Data were analyzed using IBM SPSS Statistics (Version 26) (IBM Corp, 2019). Descriptive statistics are presented first to summarize the characteristics of the sample (see Table 1).

Table 1. *Descriptive statistics*

Scale	Mean	SD	Min	Max
T0-BDI-TOT	18.93	4.46	11	26
T1-BDI-TOT	13.33	6.33	7	26
T2-BDI-TOT	14.33	6.17	6	25
T0-IUS-Prospective-Anxiety	24.73	4.83	16	32
T1-IUS-Prospective-Anxiety	17.20	4.69	8	23
T2-IUS-Prospective-Anxiety	23.26	5.96	13	31
T0- IUS-Inhibitory-Anxiety	18.26	3.75	10	24
T1-IUS-Inhibitory-Anxiety	22.66	4.54	16	32
T2-IUS-Inhibitory-Anxiety	17.73	4.77	8	24
T0-CERQ-Self-Blame	14.40	2.13	11	18
T1-CERQ-Self-Blame	13.20	2.27	10	18
T2-CERQ-Self-Blame	13.33	2.49	9	17
T0-CERQ-Acceptance	14.46	2.35	9	18
T1-CERQ-Acceptance	13.33	2.02	10	16
T2-CERQ-Acceptance	13.66	1.91	10	17
T0-CERQ-Rumination	17.06	2.12	13	20
T1-CERQ-Rumination	16.53	2.92	12	20
T2-CERQ-Rumination	15.20	2.78	9	20
T0-CERQ-Positive-Refocusing	9.13	3.87	4	17
T1-CERQ-Positive-Refocusing	11.06	3.73	5	17
T2-CERQ-Positive-Refocusing	9.53	3.56	4	16
T0-CERQ-Refocus-on-Planning	14.80	2.51	10	18
T1-CERQ-Refocus-on-Planning	14.66	2.87	10	20
T2-CERQ-Refocus-on-Planning	14.06	3.30	10	19
T0-CERQ-Positive-Reappraisal	12.13	3.41	6	19
T1-CERQ-Positive-Reappraisal	12.53	3.22	7	19
T2-CERQ-Positive-Reappraisal	12.33	2.71	8	18
T0-CERQ-Putting-into-Perspective	12.46	2.87	8	17

Scale	Mean	SD	Min	Max
T1-CERQ-Putting-into-Perspective	13.06	2.49	7	16
T2-CERQ-Putting-into-Perspective	12.40	2.94	5	16
T0-CERQ-Catastrophizing	10.06	2.84	4	13
T1-CERQ-Catastrophizing	9.40	2.92	5	15
T2-CERQ-Catastrophizing	9.13	2.35	4	14
T0-CERQ-Other-Blame	8.86	1.92	5	12
T1-CERQ-Other-Blame	9.60	2.84	6	17
T2-CERQ-Other-Blame	8.93	3.45	5	16
T0-BERQ-Seeking-Distractions	13.13	2.35	10	18
T1-BERQ-Seeking-Distractions	13.26	2.93	7	17
T2-BERQ-Seeking-Distractions	13.00	2.61	9	19
T0-BERQ-Withdrawal	13.80	3.60	8	19
T1-BERQ-Withdrawal	14.33	4.27	6	20
T2-BERQ-Withdrawal	12.73	3.97	4	18
T0-BERQ-Actively-Approaching	13.00	2.87	8	17
T1-BERQ-Actively-Approaching	13.26	2.37	10	17
T2-BERQ-Actively-Approaching	12.33	2.22	9	16
T0-BERQ-Seeking-Social-Support	15.80	2.78	10	20
T1-BERQ-Seeking-Social-Support	15.93	3.30	9	19
T2-BERQ-Seeking-Social-Support	16.00	3.42	9	20
T0-BERQ-Ignoring	8.80	3.36	4	15
T1-BERQ-Ignoring	6.53	2.58	3	12
T2-BERQ-Ignoring	9.26	3.78	4	14
T0-RRS-Brooding	13.73	3.21	8	20
T1-RRS-Brooding	14.33	2.46	11	20
T2-RRS-Brooding	13.73	3.23	9	19
T0-RRS-Reflection	12.80	1.97	10	17
T1-RRS-Reflection	13.40	2.50	9	17
T2-RRS-Reflection	13.40	2.06	10	18

Note:
N=15
BDI= Beck Depression Inventory, IUS-12=Intolerance of Uncertainty,
CERQ=Conscious Cognitive Emotion Regulation Questionnaire,
BERQ=Behavior Emotion Regulation Questionnaire, RRS= Rumination Response Scale

Next, we intended to investigate possible differences in the assessed dependent variables (depressive symptoms, intolerance of uncertainty, cognitive and behavior emotion regulation strategies, ruminative response) from pre-test (T0) to four-day (T1) and six-week (T2) post-intervention scores. Since the number of participants who completed all four days of intervention and participated at the six-week post-intervention assessment was low (N=15), we

conducted repeated measures nonparametric t-tests. Effect sizes were calculated based on the following formula: **$r = (Z/\sqrt{N})$.** Results are presented in Table 2. Significant changes are also presented graphically in Figure 1.

Table 2. *Non-Parametric Repeated Measures Test Results for depressive symptoms, conscious cognitive and behavior emotion regulation, ruminative response and intolerance of uncertainty from T0 to T1 and T2 time points.*

T0-T1-T2	Z	sign	Effect size (*r*)
T0-T1-BDI-Total	**-2.59**	**.010**	**-.67**
T0-T2-BDI-Total	**-2.23**	**.026**	**-.57**
T1-T2-BDI-Total	-.68	*p* > .05	
T0-T1-IUS-Prospective-Anxiety	**-3.27**	**.001**	**-.84**
T0-T2-IUS-Prospective-Anxiety	-.57	p > .05	
T1-T2-IUS-Prospective-Anxiety	**-2.67**	**.008**	**-.69**
T0-T1- IUS-Inhibitory-Anxiety	**-2.95**	**.003**	**-.76**
T0-T2-IUS-Inhibitory-Anxiety	-.59	p > .05	
T1-T2-IUS-Inhibitory-Anxiety	**-2.70**	**.007**	**-.51**
T0-T1-CERQ-Self-Blame	**-2.04**	**.041**	**-.53**
T0-T2-CERQ-Self-Blame	-1.62	*p* > .05	
T1-T2-CERQ-Self-Blame	-.22	*p* > .05	
T0-T1-CERQ-Acceptance	**-2.10**	**.036**	**-.54**
T0-T2-CERQ-Acceptance	-1.81	*p* > .05	
T1-T2-CERQ-Acceptance	-.08	*p* > .05	
T0-T1-CERQ-Rumination	-1.28	*p* > .05	
T0-T2-CERQ-Rumination	**-2.46**	**.014**	**-.63**
T1-T2-CERQ-Rumination	**-2.27**	**.023**	**-.58**
T0-T1-CERQ-Positive-Refocusing	-1.83	*p* > .05	
T0-T2-CERQ-Positive-Refocusing	-.11	*p* > .05	
T1-T2-CERQ-Positive-Refocusing	-1.51	*p* > .05	
T0-T1-CERQ-Refocus-on-Planning	-.31	*p* > .05	
T0-T2-CERQ-Refocus-on-Planning	-1.26	*p* > .05	
T1-T2-CERQ-Refocus-on-Planning	-.89	*p* > .05	
T0-T1-CERQ-Positive-Reappraisal	-.56	*p* > .05	
T0-T2-CERQ-Positive-Reappraisal	-.57	*p* > .05	
T1-T2-CERQ-Positive-Reappraisal	-.44	*p* > .05	
T0-T1-CERQ-Putting-into-Perspective	-1.01	*p* > .05	
T0-T2-CERQ-Putting-into-Perspective	-.23	*p* > .05	
T1-T2-CERQ-Putting-into-Perspective	-.85	*p* > .05	
T0-T1-CERQ-Catastrophizing	-1.19	*p* > .05	
T0-T2-CERQ-Catastrophizing	-1.39	*p* > .05	
T1-T2-CERQ-Catastrophizing	-.31	*p* > .05	
T0-T1-CERQ-Other-Blame	-.79	*p* > .05	
T0-T2-CERQ-Other-Blame	-.09	*p* > .05	

T0-T1-T2	Z	sign	Effect size (*r*)
T1-T2-CERQ-Other-Blame	-.54	*p* > .05	
T0-T1-BERQ-Seeking-Distractions	-.36	*p* > .05	
T0-T2-BERQ-Seeking-Distractions	-.57	*p* > .05	
T1-T2-BERQ-Seeking-Distractions	-.70	*p* > .05	
T0-T1-BERQ-Withdrawal	-.84	*p* > .05	
T0-T2-BERQ-Withdrawal	-1.26	*p* > .05	
T1-T2-BERQ-Withdrawal	**-2.10**	**.036**	**-.54**
T0-T1-BERQ-Actively-Approaching	-1.05	*p* > .05	
T0-T2-BERQ-Actively-Approaching	-.98	*p* > .05	
T1-T2-BERQ-Actively-Approaching	-1.23	*p* > .05	
T0-T1-BERQ-Seeking-Social-Support	-.31	*p* > .05	
T0-T2-BERQ-Seeking-Social-Support	-.07	*p* > .05	
T1-T2-BERQ-Seeking-Social-Support	-.05	*p* > .05	
T0-T1-BERQ-Ignoring	**-3.20**	**.001**	**-.82**
T0-T2-BERQ-Ignoring	-.89	*p* > .05	
T1-T2-BERQ-Ignoring	**-3.03**	**.002**	**-.78**
T0-T1-RRS-Brooding	-.71	*p* > .05	
T0-T2-RRS-Brooding	-.36	*p* > .05	
T1-T2-RRS-Brooding	-.58	*p* > .05	
T0-T1-RRS-Reflection	-1.22	*p* > .05	
T0-T2-RRS-Reflection	-1.76	*p* > .05	
T1-T2-RRS-Reflection	-.18	*p* > .05	

Regarding **depressive symptoms** (BDI), the Wilcoxon signed-rank tests indicated a significant reduction in BDI-Total scores from T0 to T1 (Z = -2.59, p = .010), with a large effect size (r = .67). From T0 to T2, the decrease in BDI-Total scores remained significant (Z = -2.23, p = .026), with a moderate-to-large effect size (r = .57). No significant change was found between T1 and T2 (Z = -0.68, p > .05). Investigating the descriptive statistics and graphic representation, one can observe that the most substantial reduction in depressive symptoms occurred between the initial assessment and the first follow-up, with little change observed thereafter.

In case of the **Prospective Anxiety** component of **Intolerance of Uncertainty** (IUS-PA), our results indicate an initial significant decrease in prospective anxiety (IUS-PA) from baseline (T0) to four-day post-intervention (T1) (Z = -3.27, p = .001) with a large effect size (r = .84). However, the difference between baseline (T0) and six-week follow-up (T2) was not statistically significant (Z = -0.57, p > .05). Moreover, a significant increase in prospective anxiety (IUS-PA) was found between four-days post-intervention (T1) and sex-week post-intervention follow-up (T2) (Z = -2.67, p = .008) with a large effects size (r = .69).

Regarding the **Inhibitory Anxiety** component of Intolerance of Uncertainty (IUS-IA)scores significantly increased from baseline (T0) to four-day post-intervention (T1) (Z = -2.95, *p* = .003) with a large effect size (r = .76). A significant decrease in Inhibitory Anxiety (IUS-IA) was observed from post-intervention (T1) to follow-up (T2) (Z = -2.70, p = .007) with a moderate to large effect size (r = .51). No significant difference was found between baseline (T0) and follow-up (T2) (Z = -0.59, p > .05, even if means of T2 compared to T1 are slightly lower. These results suggest that even if the EW intervention initially reduced prospective (IUS-PA) and increased inhibitory anxiety (IUS-IA), with effects in both cases diminishing over time, even if the initial (T0) levels were not attained in either cases.

In the aftermath of EW intervention, our results indicate the following significant changes in conscious cognitive and behavior emotion regulation strategies. **Self-blame** (CERQ) decreased significantly from T0 to T1 (Z = -2.048, *p* = .041) with a moderate effect size (r = -.53). At T2, scores increased slightly compared to T1, nevertheless non-significantly.

Acceptance of the confronted stressful events also presented a decreasing pattern from T0 to T1 (Z = -2.10, *p* = .036) with a moderate effect size (r = -.54). Scores slightly, though non-significantly increased from T1 to T2.

The conscious cognitive emotion regulation strategy of **rumination** presented a non-significant decrease from T0 to T1, followed by significant decrease from T0 to T2 (Z = -2.46, *p* = .014) with a large effect size (r =- .63), and from T1 to T2 (Z = -2.27, *p* = .023) with a medium to large effect size (r = 0.58).

In the case of behavior emotion regulation strategies, the applied EW intervention produced significant changes in two major strategies. **Withdrawal** has initially non-significantly increased from T0 to T1, but then significantly decreased from T1 to T2 (Z = -2.10, *p* = .036) with a moderate effect size (r =- .54) to a level lower compared to T0 (though non-significant).

Ignoring has significantly decreased from T0 to T1 (Z = -3.20, *p* = .001) with a large effect size (r =-.82), and significantly increased at the six-week follow-up to a level higher than that measured at baseline (T0) (Z = -3.03, *p* = .002) with a large effect size (r =-.78).

Interestingly, our results presented no statistically significant changes in the two components of the Rumination Response Scale (RRS), namely brooding and reflection. This may be due either to the low number of participants, the lack of a second, e.g., six-month follow-up, or slightly problematic psychometric properties of the scale on the investigated population (Cronbach alphas around .70). These aspects should be addressed in future studies.

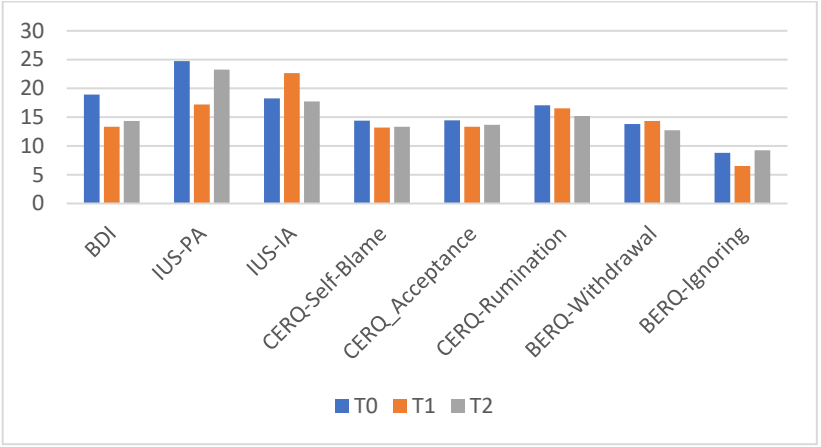

Figure 1. *Changes in scores of depressive symptoms, CERQ-Rumination, BERQ-Ignoring, and Intolerance of Uncertainty (Prospective Anxiety and Inhibitory Anxiety) from T0 to T1 to T2*

CONCLUSIONS AND DISCUSSIONS

In recent decades, rapid life changes—both positive and negative—have significantly impacted individuals' psychological functioning. Technological advancements have greatly enhanced quality of life, yet they have also introduced a host of unprecedented challenges and pressures (Cuijpers et al., 2020; Vos et al., 2015). As a result, the number of individuals experiencing various mental health difficulties has steadily increased (Twenge et al., 2019; WHO, 2023). This trend is particularly evident among young people and university students (Li et al., 2021). Among the most prevalent and concerning psychological issues in this population are rising levels of depressive symptoms and a diminished ability to tolerate uncertainty—both of which have become significant public health concerns (Li et al., 2021; Tavares, 2017; Zhuo et al., 2021). These mental health challenges can have serious short- and long-term personal (e.g., reduced energy, impaired concentration, emotional distress, social isolation, integration issues, poor academic performance), and societal economic consequences. If left unaddressed, they may contribute to increased rates of academic attrition, the worsening of mental health conditions, engagement in risky behaviors, and even long-term impairment in functioning.

Given current evidence, both research and clinical guidelines emphasize the need for cost-effective and accessible interventions to reduce depressive symptoms among students (Lee et al., 2016; Le et al., 2021). While CBT is

considered the golden standard (David et al., 2018), other evidence-based interventions are also recommended (NICE, 2022). Unfortunately, barriers such as high treatment costs and possible stigmatization (perceived and self), may limit students' access to professional assistance (Klein et al., 2009). However, the need for efficient and cost-effective psychological interventions persist (L'Abate, 2007).

The human capacity to share emotionally laden experiences proved to be a very important means that supports psychological, physical, and social well-being (Pennebaker & Chung, 2007). In order to reduce the possible risks of verbal disclosure, Pennebaker proposed a new type of method for processing distressing experiences, namely the Expressive Writing (EW) technique. The standard EW intervention invites participants to writing about stressful or traumatic experiences for 15–30 minutes over three to five consecutive days, encouraging deep emotional disclosure without concern for grammar or spelling (Pennebaker & Beall, 1986; Frattaroli, 2006). A plethora of research indicates that EW has significant mental health benefits, in student populations as well (Guo et al., 2023; Travagin et al., 2015).

The major aim of the present study was to examine the short- and long-term effects of a standard EW intervention on subclinical depressive symptoms, rumination, and intolerance of uncertainty among female Transylvanian Hungarian students. It also explored changes in cognitive and behavioral emotion regulation strategies before and after the intervention.

The key results of this study indicate a significant reduction in depressive symptoms as measured with the BDI. The Wilcoxon signed-rank tests demonstrated a large effect size for the decrease from baseline (T0) to the four-day post-intervention assessment (T1), and a moderate-to-large effect size from T0 to the six-week follow-up (T2). Even if scores increased from T1 to T2, changes were not statistically significant between the last two measurements, indicating that the intervention's impact occurred rapidly and was largely sustained over the follow-up period. This pattern underscores the potential of EW as a brief, low-intensity intervention for alleviating subclinical depressive symptoms, with effects that endure for at least several weeks post-intervention.

The temporal dynamics of Intolerance of Uncertainty subcomponents revealed differential treatment response patterns. Analysis of Prospective Anxiety (IUS-PA), which captures anticipatory distress regarding future uncertainties, demonstrated significant reductions from baseline (T0) to immediate post-intervention (T1) with a large effect size. However, this therapeutic gain was not maintained, as IUS-PA scores significantly increased between T1 and six-week follow-up (T2), returning to approximate baseline levels. These findings suggest that while Expressive Writing may initially facilitate emotional processing mechanisms

that reduce anticipatory anxiety, the intervention's effects on this construct appear transient without additional reinforcement strategies to consolidate therapeutic gains over time.

Conversely, the Inhibitory Anxiety component of Intolerance of Uncertainty (including behavioral avoidance and action paralysis under uncertainty) significantly increased from baseline (T0) to immediate post-intervention (T1). This unexpected finding may reflect heightened internal focus and emotional activation immediately following the EW process, which could temporarily intensify avoidance-related behaviors. Furthermore, IUS-IA scores significantly decreased from T1 to six-weeks post-intervention (T2), returning to levels close to baseline. This pattern indicates that while EW may temporarily destabilize certain anxiety-related processes, these effects are not lasting and may resolve as emotional integration progresses.

Finally, our results indicate significant changes in both Conscious Cognitive and Behavioral Emotion Regulation Strategies. More specifically, the Cognitive emotion regulation strategies of Self-blame and Acceptance indicated a significant decrease from base-line (T0) to immediate post-intervention (T1), with moderate effect sizes, and slight, statistically non-significant increases at the six-week post-intervention assessment (T2), close to base-line values. These results indicate a partial maintenance of the intended therapeutic gains, suggesting that the EW technique may to some degree facilitate the development of adaptive self-evaluative cognitions and enhance the capacity to accept oneself and the stressful situation through collateral mechanisms, as the reconstruction of internal narratives.

Ruminative strategies characterized by repetitive, maladaptive cognitive mechanisms associated with increased vulnerability to depression and anxiety, demonstrated a particularly promising trajectory from baseline to the six-week follow-up. Although the decrease from baseline (T0) to the four-day immediate post-intervention assessment (T1) was not statistically significant, a significant and large reduction was observed between baseline (T0) and the six-week post-intervention assessment (T2), as well as between T1 and T2. These findings suggest a delayed yet substantial effect of EW in reducing ruminative tendencies. These results may indicate that a more complex cognitive restructuring may require more time to stabilize results.

Investigating the changes in behavioral emotion regulation strategies that occurred in the aftermath of the applied EW intervention revealed both immediate and delayed effects. In the case of withdrawal, even if at the four-day immediate post-intervention assessment (T1) scores seemed almost unaffected.

The analysis of behavioral emotion regulation strategies revealed both immediate and delayed effects. Withdrawal, initially unaffected by the intervention, significantly decreased between T1 and the six-week follow-up (T2), with scores falling below baseline levels. These results may suggest that behavioral disengagement may be more resistant to immediate change, nevertheless it may be positively influenced as cognitive and emotional processing changes over time.

In contrast, ignoring, a strategy which is indicative of emotional avoidance, showed a significant and large decrease from baseline (T0) to immediate post-intervention assessment (T1), indicating that EW initially promoted greater emotional engagement. However, this was followed by a significant increase from T1 to the six-week post-intervention follow-up (T2), with levels surpassing those at baseline. These changes may yield a reactivation of avoidant coping once the novelty or structured support of the intervention faded.

Summing up, our results indicate that on the sample investigated, the EW intervention may have an effective short-term effect for reducing depressive symptoms and modifying different emotion regulation strategies. The immediate post-intervention gains, particularly in depressive symptoms, prospective anxiety, and rumination, support the therapeutic potential of structured emotional disclosure. However, the re-activation of certain maladaptive behaviors (e.g., ignoring, prospective anxiety) at follow-up also highlights the potentially unstable, time-sensitive nature of these changes. Importantly, the delayed positive effects observed for rumination and withdrawal suggest that while some psychological processes benefit quickly from EW, others may require time for integration, or possibly need supplementary interventions (e.g., cognitive-behavioral strategies or follow-up sessions) to be sustained.

The results of our study have to be interpreted with caution due to the inherent limitations derived especially from methodological shortcomings. Firstly, the small sample size of our experimental group has limitation on the statistical power to identify subtle effects. A larger sample would offer chances to more robust, generalizable results (Fratarolli, 2006).

Also, the absence of a control group (e.g., no emotion-thought expression intervention) limits the interpretation of the results as being solely attributable to the EW intervention, since changes may to a certain degree be influenced by natural recovery over time, or other variables that occurred during the study period, but remained undetected (e.g., specific life-events).

Moreover, since variables were assessed with self-report measures, the responses may be subject to various biases, as social desirability, distorted recall, etc. The restriction to three assessments (T0-T1-T2) may further limit

the possibility to observe further effects in time of the emotional expression in writing. The processing of the written protocol through a qualitative approach may further offer more nuanced information regarding the individual patterns of change. We propose that these shortcomings be addressed in future investigations based on the EW protocol.

Overall, we may say that on the investigated student population the applied EW intervention proved its promise as a low-cost and minimally invasive intervention. However, there are chances that its benefits may be enhanced through continued engagement, booster sessions, or integration into broader therapeutic programs. Future research should explore such integrative approaches and assess long-term outcomes beyond six weeks to better understand the durability and generalizability of these effects.

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