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Research Article

Guided Mindfulness-Acceptance Self-Help Intervention for Dysphoric Students: Preliminary Findings

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ABSTRACT

The purpose of this pilot study was to test the efficacy of a novel self-help program called Attention training (AT) based on the mindfulness-acceptance principles in a sample of dysphoric students. We tried to determine if the program: a) contributed to immediate and follow-up changes in the presumed components and mechanisms of mindfulness-acceptance - psychological flexibility, attention control (switching and updating), and rumination; b) was followed by a reduction in dysphoric symptoms; c) had different effects depending on a different order of exercises within AT. The final sample consists of 18 students from the University of Novi Sad, 19-29 years old with mild and moderate depression (selected through pre-screening procedure). Data were collected at 4 measurement occasions: before the first group meeting (pretest), right after completion of all exercises (posttest), and two follow-ups - one and three months post-treatment. AT consisted of 8 small-group, weekly meetings (up to 5 persons and < 90 minutes of overall therapist support). Participants listened to the audio-recorded exercises that targeted the somatic, emotional, and cognitive domains. The sample was randomly split into two groups with a different order of the emotional and cognitive exercises. We found that AT, as a self-help intervention, can potentially lead to improvements in the mindfulness components and mechanisms, even though an increase in the depressive symptoms was noticed. Different explanations were provided for such findings, including suggestions for further optimization of the program and recommendations for further research.

Keywords: self-help, attention training, mindfulness-acceptance, ruminations, dysphoric symptoms

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Introduction

According to the WHO reports, depression contributes largely to the overall burden of disease in a number of countries across the globe (https://www.who.int/news-room/fact-sheets/detail/depression). Depression is a heterogeneous mental condition symptom-wise and regarding its age at onset. It can start in childhood, adolescence, or different adulthood periods (Zisook et al., 2007). Earlier age at onset is associated with a number of clinical indicators such as severity, chronicity, mental and physical co-morbidity, suicide risk, and dysfunctionality (Zisook et al., 2007). Hence, early intervention might preclude development of more serious, clinical types of depression. Addressing depression in a timely manner is particularly important given the fact that the rates of depression in young people, such as students, tend to be high (e.g., 24.4%; Akhtar et al., 2020). A number of evidence-based therapies exist currently that can ameliorate this condition. Within the past two decades so called third wave of behavior and cognitive therapies have been popularized owing to their scientific background and empirical support. For example, Mindfulness-based cognitive therapy (MBCT; Segal et al., 2013) and Acceptance and commitment therapy (ACT; Hayes et al., 1999) are examples of therapies that emphasize mindfulness and acceptance, respectively. Both therapies are multi-component interventions that require substantial resources in terms of education of therapists, their availability, and affordability (Cavanagh et al., 2014). It has been suggested that provision of mindfulness and acceptance interventions in a self-help format (e.g., via books, audio-visual material) could be an effective way to address the problem of insufficient resources (Cavanagh et al., 2014). Also, research results suggest larger effects for guided (some contact with a therapist) than unguided self-help interventions (e.g., Cavanagh et al., 2014; Gellately et al., 2007). Hence, self-help seems an attractive option, especially for low- and middle-income countries (Novović et al., 2019), and for those people whose symptoms have not yet reached the alarming threshold. One challenge while adopting any multi-component therapy to a self-help format is what component(s) to select and in what order to provide these components in order

to assure efficacy of the self-help format. Hence, the main focus of the current study was creation of mindfulness-acceptance self-help intervention targeting young people with mild to moderate depression symptoms. By reviewing what is known currently about the components and mechanisms of mindfulness and acceptance interventions, we wanted to select the components that were deemed both suitable for self-help format and empirically supported so far.

Mindfulness/acceptance: definition and components

Mindfulness is defined as "paying attention in a particular way, on purpose, non-judgmentally, to the present moment" (Kabat-Zinn, 1994, pp. 4). This particular way of paying attention to the present moment is fostered through various exercises including meditation, body scanning, and breathing (Kabat-Zinn, 1994). In order to attain beneficial effects, a person doing mindfulness exercise needs to bring another component into play, an attitude of openness and acceptance even when facing uncomfortable internal events (Bishop et al., 2004). The person learns to be a non-judgmental observer of inner experiences rather than his/her own harsh critic (Kabat-Zinn, 1990). Mindfulness, defined in this manner, is a crucial component of MBCT. During the initial stages of this structured group therapy, individuals learn to observe their "automatic pilot" i.e., a tendency to follow their wandering mind unquestionably and respond automatically without considering a possibility that there is another, more functional response (Segal et al., 2013). In order to switch from this automatic to a new, so-called, "being" mode of functioning, during initial phases of the treatment, MBCT participants are taught various exercises such as body scan, yoga, breathing space, and acting mindfully during everyday activities (Segal et al., 2013).

Mindfulness has been an integral part of ACT from its inception, even though the creators of this therapeutic approach used different terminology to describe it. Namely, the main goal of ACT is to build psychological flexibility (PF) (Hayes et al., 1999; Hayes et al., 2004). PF is defined as "the ability to fully contact the present moment and the psychological reactions it produces as a conscious

person and to persist or change behavior in the situation in the service of chosen values" (Fletcher & Hayes, p. 319). According to Hayes et al. (1999), PF is a result of activation of the following processes: acceptance, defusion, contact with the present moment, self-as-context, values, and committed action. The first four components are actually mindfulness components (Fletcher & Hayes, 2005). Hence, mindfulness, according to ACT, encompasses the following abilities: to observe internal events as passing objects in our awareness without a need to struggle with them, to be willing to accept own experience as it is without a need to change it, to focus attention to the present moment, and to change a self- perspective (i.e., to free oneself from learned conceptualizations about the self which are often highly evaluative) (Fletcher & Hayes, 2005). Different from MBCT which is fairly structured and begins by teaching people how to focus attention to the present moment through more formal mindfulness practice, ACT relies more on shorter and less formal mindfulness exercises including an abundant use of metaphors (Segal et al., 2013; Hayes et al., 2004). Additionally, ACT is more flexible in terms of order of interventions and argues that therapeutic work can start from any component constituting psychological flexibility, depending on the actual client (Hayes et al., 2004). However, both therapies have a solid evidence base for their efficacy in currently depressed individuals (for meta-analytic reviews see Goldberg et al., 2019 and Gloster et al., 2021).

Ruminations as a mechanism of action

One unresolved question in the literature is via which mechanisms the different components of mindfulness-acceptance lead to better subjective well-being (Shapiro et al., 2006; Wolkin, 2015). It seems that the proponents of MBCT and ACT converge in their thinking about this issue. They seem to argue that being caught in a web of one's own thinking leads to an unhealthy habit of our mind called ruminations (Segal et al., 2013; Hayes & Smith, 2005). Hence, in addition to fostering mindfulness-acceptance skills as a way of alleviation of human suffering, MBCT and ACT rely on the assumption that they exert their effects, at least partly, by decreasing depressive ruminations (Desrosiers et al.,

2013; Perestelo-Perez et al., 2017; Ruiz et al., 2016; Segal et al., 2013; van der Velden et al., 2015; Wolkin, 2015). Depressive ruminations represent a form of cognitive overinvolvement i.e., a form of repetitive thinking about the possible causes and consequences of one's negative mood (Nolen-Hoeksema, 1991). The deleterious effects of depressive ruminations on mood stem not so much from a focus on the negative affect (Lyubomirsky & Nolen-Hoeksema, 1995), but from the judgmental and evaluative nature of self-focused attention (Rude et al., 2007).

Components and mechanisms of the self-help program

MBCT and ACT served as the main forms of the mindfulness-acceptance interventions from which we wanted to build a self-help program targeting dysphoric students. Even though the descriptions of the main processes in these two approaches differ, it seems that both emphasize, at least, the following components of mindfulness-acceptance: attentional skills, body awareness, emotional regulation (e.g., exposure, non-avoidance), and adopting a stance of an impartial observer of one's inner experiences as passing mental events (Hölzel et al., 2011). According to some authors, building attentional skills is a starting point which fuels and propagates other mindfulness-acceptance components (Carmody, 2009; Chiesa & Malinowski, 2011; Hölzel et al., 2011). So, focusing attention on a particular stimulus and re-focusing it when it wanders away could be a prerequisite for further change. Also, research supports the view that attentional skills are one important component of mindfulness (Brown & Ryan, 2003; Hölzel et al., 2011; Lutz et al., 2008; Malinowski, 2013; Verhaeghen, 2021). In accordance with this literature and views, the initial phase in our self-help program included exercises that required focusing attention on one's body and its sensations. Participants were asked to focus on their breath, then they were guided to expand their awareness to include the whole body. Hence, this type of exercise requires a combination of attentional faculties: ability to focus on a particular object, ability to redirect attention once it wanders, and ability to notice all internal experiences as they appear (Sumantry & Steward, 2021; Wolkin, 2015). Given the complexity of the attentional skills and the type of mindfulness exercises our participants practiced, we expected to find effects on updating

and switching (Huizinga et al., 2006; Miyake et al., 2000; Miyake & Friedman, 2012). Updating and switching represent those aspects of executive control responsible for constant updating of working memory for relevant information and shifting from one stimulus to the next (Miyake et al., 2000). Additional components of the mindfulness-acceptance interventions that were included in the self-help program included emotional regulation (acceptance, exposure) and the cognitive component (decentering or defusion). Acceptance represents an emotional regulation strategy and willingness to experience internal events, as they appear and when they appear, without a need to avoid or modify them in the service of valued life (Hayes et al., 1999). Others defined non-acceptance as having negative reactions to negative emotions (Gratz & Roemer, 2004). Decentering and defusion are the constructs developed within MBCT and ACT, respectively. A common theme for these two constructs is the ability to observe one's own thoughts as passing mental events which can free a person from an unhealthy habit of identification with thought content (Hayes et al., 2004).

Although there is some agreement on what components constitute mindfulness-acceptance, we still do not know much about their interaction, if there is a particularly effective order of their implementation, generalizability, cost-effectiveness, and optimization. Other than the suggestion that the first step during practice should be cultivating attentional skills, it is an open question what component should come next. Hence, we wanted to check whether the order of exercises (emotion-focused followed by cognitive exercises, or vice versa) matters in terms of the size of effects and sustainability of the effects. If we knew in more detail how mindfulness works, we would be closer to targeted interventions and could provide better training program optimization. This is especially important when it comes to self-help programs, which are economical forms of assistance that could be effective surrogates for longer-term programs.

Purpose of the study

In order to start answering some of these questions, we designed a guided mindfulness-acceptance self-help program termed “Attention training”

(AT). Even though the program included exercises focusing on the body, emotions, and cognition, the term AT was used to highlight the importance of a non-judgmental kind of attention while focusing on different domains (body, emotions, or cognition). We examined whether significant changes could be achieved with a minimum participation of trainers, in a sample of dysphoric students. We explored if AT has positive effects on the processes of attention (switching and updating) and psychological flexibility, on the one hand, and ameliorating effects on ruminative thinking and the symptoms of depression, on the other. Changes were explored immediately upon completion of the program and at two follow-ups. In order to gain an insight into the question of whether the order of different mindfulness-acceptance components matters, two groups of students were recruited receiving a different order of exercises (body, emotion, cognition vs. body, cognition, emotion). Finally, this study can be considered a pilot study. It is a recommendation that this type of study is conducted first, as an initial step, while testing the efficacy of new interventions or while assessing a possibility for a successful implementation of a novel program despite a small number of subjects (e.g., Leon et al., 2011; Tickle-Degnen, 2013).

Methods

Sample

The initial sample consisted of 22 participants, but after the exclusion of those with incomplete data, 18 were kept for further analyses. All participants were students from the University of Novi Sad, 19-29 old (M_{age} = 22. 95; SD = 3.06; 59% males) who were selected based on a pre-screening with the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The students were invited via online posts that were shared across various social groups. The students that scored over the cut-off 4 and under 15 (mild and moderate depression; Kroenke et al., 2001) were invited for further evaluation. Two clinical psychologists interviewed 60 preselected participants using the DIAMOND - a semi-structured diagnostic interview for the DSM-5 psychiatric disorders (Tolin et al., 2013) to

exclude those that had other disorders and suicidal ideation and tendencies. The excluded participants were informed about other treatment options. This study was approved by the Ethical Board of the Faculty of Philosophy, University of Novi Sad. All participants signed informed consents and received feedback upon completion of the study.

Materials

All instruments were administered 4 times: just before the first group meeting (pretest), following completion of all exercises (retest), one- and three-months post-treatment. A depression screening instrument was used during recruitment, one month before the program commenced. Its subsequent administrations followed the same timing as the rest of the instruments.

Mindfulness-acceptance scales:

The Acceptance and Action Questionnaire (AAQ; Bond et al., 2011) is a self-report measure of psychological inflexibility or the tendency to avoid distressing internal experiences (e.g., thoughts, emotions, somatic symptoms), and to become entangled with the web of own thoughts. We used an 8-item version of the instrument because it was successfully used in previous research with different Serbian populations - Cronbach α = .82 - .85 (Kovač, 2014; Lazić et al., 2013; Stamenić, 2013). A higher score indicates greater inflexibility.

The Ruminative Thought Style Questionnaire (RTSQ; Brinker & Dozois, 2009) is a 20-item measure describing positive, negative, and neutral facets of global rumination. Respondents rated each statement on a 7-point Likert scale. In the previous studies, the RTSQ demonstrated high internal consistency of .94 (Mihić et al., 2019).

Two cognitive control tasks, adapted from Miyake et al. (2000), measuring switching (Local-global) and updating (Letter memory) were used (Purić, 2013):

In the *Local-global task* Navon figures, consisting of larger, global geometric figures made of the same smaller ones, were presented in three blocks. Figures in black and red were depicted in the first and second blocks,

respectively. Participants were asked about the number of lines that constitute a bigger shape in the first and a smaller one in the second block. In the third block, red and black figures were presented interchangeably, and the task was to indicate the number of lines in local or global shapes depending on the color. The deterioration of performance in the third block in regard to the average of the first two blocks represents the cost of switching. It is presented in seconds, and lower results indicate poorer switching.

The *Letter memory task* consists of 12 lists of letters of different lengths while the task was to reproduce the last four presented letters in each list. The measure of updating is the proportion of correctly reproduced letters in all lists. Better updating goes with higher results.

Depression - The Patient Health Questionnaire - 9 (PHQ-9; Kroenke et al., 2001)

The Patient Health Questionnaire - 9 (PHQ-9; Kroenke et al., 2001) is a 9-item measure designed to assess the symptoms of depression according to DSM-IV criteria. Respondents were asked to rate how often they were bothered by each symptom over the past 2 weeks on a scale from 0 (*almost never*) to 3 (*almost every day*). Cronbach's α in Kroenke et al.'s study was 0.89 (2001).

Procedure

The self-help program commenced one month following the initial screening. The training consisted of 8 small-group weekly meetings (up to 5 persons and < 90 minutes of overall therapist support) during which participants listened to the audio-recorded exercises. The program was delivered within one month, after which participants were contacted one month and three months for follow-ups. The sessions were followed by brief instructions related to practice and potential obstacles during home-based training. There were three sets of exercises that targeted somatic, emotional, and cognitive domains, and each set was covered by two exercises. The final two exercises represented an integration of previously practiced components. The sample was randomly split into two groups in which the order of emotional and cognitive exercises was reversed, while the somatic and integration parts were fixed as the first and last

tasks, respectively. Therefore, we had an Emotion-first group (n = 8) (body-emotion-cognition-integration order), and a Cognition-first group (n = 10) (body-cognition-emotion-integration order) (Figure 1).

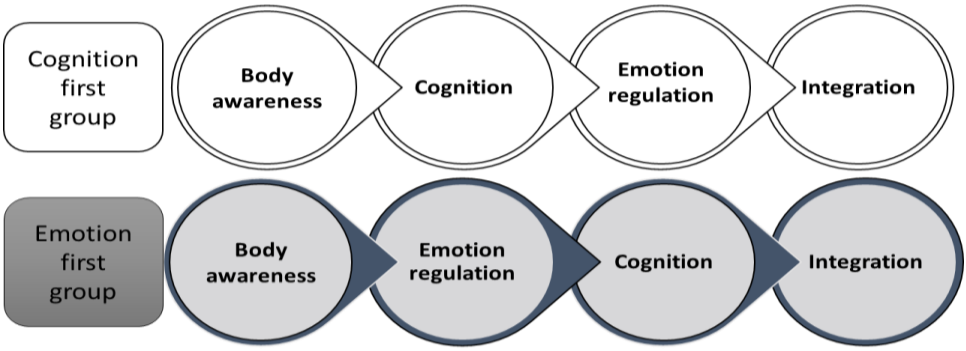

Figure 1. The order of exercise domains in the two groups.

The body awareness part consisted of initial mindfulness exercises where participants learned how to focus on their body, body sensations, and sensory experiences of breathing. The idea was to develop an awareness of what is happening to them in the present moment and to slowly return attention to their body and breathing if their attention wandered.

The emotional part consisted of emotional regulation exercises. Participants were instructed to focus on their strong emotions and approach them in a non-judgmental and accepting way. The goal of these exercises was not to free a person from some emotions but to let them into the field of consciousness without fighting and resisting, with a stance of openness and interest.

The goal of exercises in *the cognitive part* was to observe thought contents in a particular way. A person learned to treat his/her thoughts as transient contents within a larger context of awareness, without attachment or resistance (like leaves floating down a river).

The integrative part included a combination of exposure to different sensations, emotions, and thoughts that were present in the field of

consciousness. Participants were encouraged to remain curious and open to everything they experienced, whether it was a pleasant or an unpleasant experience. The idea was to take that openness (mindfulness) and transfer it to other situations in life.

Analyses

Five profile analyses were used to assess immediate and follow-up changes due to our program on a set of dependent measures. The two groups with different exercise orders represented an independent variable. Profile analysis was chosen because it enabled us to test the following:

1. Whether psychological inflexibility, rumination, executive functioning, and depression symptoms changed from one measurement occasion to the next, independent of the groups. In profile analysis, this is known as the "flatness hypothesis" (i.e., were the profiles flat or were there differences from one time-point to the other). A significant multivariate test of the within-subjects effect suggests that a profile was not flat.
2. Whether, on average, the two groups differed in their overall achievements on each dependent measure, which is known as the "levels hypothesis". A significant between-subjects effect would suggest that the groups differed.
3. Whether the groups had a similar or different pattern of changes on a set of dependent measures over the course of the training and follow-ups. This is known as the test of "parallelism". A significant multivariate effect of the time x group interaction would indicate that the profiles were not parallel.

A rejection of the flatness hypothesis was followed by the t-tests with Bonferroni correction to reveal if the differences between the first and the three after-treatment measurements were significantly different and whether the changes were sustained during follow-ups. A significant test of the parallelism was followed by the tests of the simple main effects.

Our data met all assumptions necessary for profile analysis. First of all, there were more participants in the smallest cell than dependent variables, so although the sample was small, we didn't violate the recommended rule. As can be seen in Table 1, skewness and kurtosis for all variables were within the appropriate range (skewness between -2 to + 2 and kurtosis between -7 to + 7) (Byrne, 2010; Hair et al., 2010). The skewness value for Switching was slightly above the threshold, which can be considered a mild departure from normality. None of the Box`s M tests was significant at $p < .001$ (Tabachnick & Fidell, 2007).

Results

Descriptive statistics

The two groups did not differ in their initial levels of depression, ruminations, psychological flexibility, updating, switching, and overall home practice after each session (Table 1). As can be seen, participants in both groups experienced mild depressive symptoms at the beginning of the program. A table of correlations among the measures across four measurements can be found in Appendix A. As can be seen, the majority of variables displayed an expected pattern of correlations given the previously cited literature. Also, increases in the correlations were observed at three-month follow-up probably due to an increase in the level of depression and its variability.

After the training, during debriefing, a majority of participants reported that involvement in the program was a pleasant experience (95%) and that they mostly did not experience a decrease in mood (73%). Out of those who experienced mood worsening, only 1 participant attributed these changes to the program. All participants declared that they would recommend the training to their friends and acquaintances, and 83% accepted participating in a group therapy that was offered after AT to those who were willing to continue their self-exploration.

Table 1

Descriptive statistics for two groups and the total sample: pretreatment values

	Emotion *M (SD)*	Cognition *M*(*SD*)	Total M(SD)	*t*(16)	*p*	*Sk*	*Ku*
Depression	7.25 (1.83)	8.10 (2.88)	7.72 (2.44)	0.72	.48	1.15	1.43
Ruminations	72.50 (18.36)	71.30 (18.81)	71.83 (18.07)	0.14	.89	0.19	-1.13
Psy. inflexibility	31.25 (8.71)	29.70 (8.56)	30.39 (8.41)	0.38	.71	0.64	-0.66
Updating	.73 (.09)	.65 (.12)	.69 (.11)	1.49	.16	-0.14	-0.59
Switching	580.76 (362.31)	-576.23 (200.97)	-578.24 (274.32)	0.03	.97	-2.57	6.81
Home practice*	28.37 (16.13)	23.10 (13.78)	25.44 (14.66)	0.75	.47	1.32	1.32

Note. * Home practice = overall time (hours) spent in home practice across the duration of Attention training; Emotion = Emotion-first group; Cognition = Cognition-first group.

Did the participants improve on a set of dependent measures after the treatment - flatness analysis?

In Table 2 one can see that all variables departed from the flatness hypothesis suggesting that there were changes across different time points, independently of the group effects (large effects). The profiles of these variables across time are presented in Figures 2-6, solid lines. Their means are given in Appendix B (rows titled Total $_{C+E}$).

The tests of flatness were followed by the t-tests with Bonferroni corrections (Appendix B), which suggested that from the pre-test to the post-test, the participants' scores on inflexibility and ruminations decreased (Cohen's d = 0.84 and Cohen's d = 0.91, respectively), whereas their scores on switching and updating increased (Cohen's d = 0.53 and Cohen's d = 0.48, respectively).

These changes remained at one-month and three-month follow-ups. On the other hand, the depression scores increased at the post-test (Cohen 's d = 1.78) and remained such at the follow-ups.

Table 2

Results of profile analyses for all dependent variables

	Flatness Within-subjects effects				Levels Between-subjects effects			Parallelism Main interaction effects			
	F(3,14)	p	Hott. T	η^2	F(1,16)	p	η^2	F(3,14)	p	W. Λ	η^2
Inflexibility	6.62	.01	1.42	.59	2.66	.12	.14	2.34	.33	.67	.33
Rumination	4.71	.02	1.01	.50	1.97	.18	.11	4.73	.02	.50	.50
Switching	7.55	.00	1.62	.62	0.03	.85	.00	0.17	.92	.97	.04
Updating	4.30	.02	0.92	.48	1.56	.23	.09	1.28	.41	.82	.18
Depression	14.94	.00	3.20	.76	6.64	.02	.29	1.40	.28	.77	.23

Did the two treatment groups differ in their overall levels of the dependent measures?

From Table 2 (Levels column) and Appendix B (column Total 1-4) one can see that the Cognition-first group had higher overall depression symptoms, averaging across the four measurement occasions, compared to the Emotion-first group (large effect). From Figure 6, it can also be seen that this difference was mainly due to an additional rise of the symptoms in the Cognition-first group after three months from the end of the program. There were no additional differences between the two groups.

Is there a different pattern of changes across four measurements between the two treatment groups?

The Time x Group interaction effect was significant only for ruminations (Table 2, parallelism column). As can be seen in Figure 3, there was a different

pattern of changes in ruminations over time between the two groups. The tests of simple main effects revealed that within the Emotion-first group, at one-month and three-month follow-ups there were significant drops in ruminations compared to pre-test (mean differences =27.5 for both comparisons, *SE* = 7.71 and *SE* = 7.95 respectively, 95% [*CI*]4.06-50.44, and [3.31-51.19], respectively, *p* = .02 for both comparisons; Cohen's *d* = 1.20). In the Cognition-first group, the levels of rumination remained stable across the four time points.

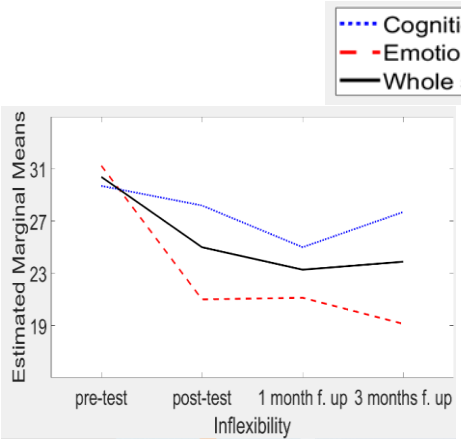

Figure 2. Inflexibility means at 4 time-points in groups with different order and in the whole sample.

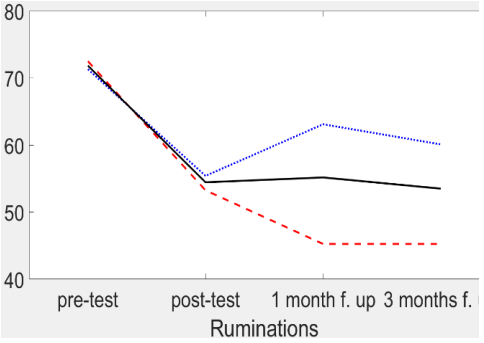

Figure 3. Rumination means at 4 time-points in groups with different order and in the whole sample.

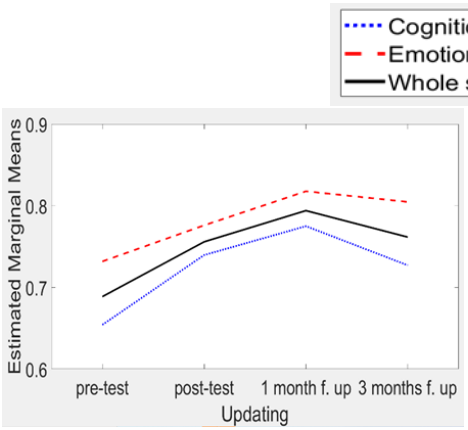

Figure 4. Updating means at 4 time-points in groups with different order and in the whole sample.

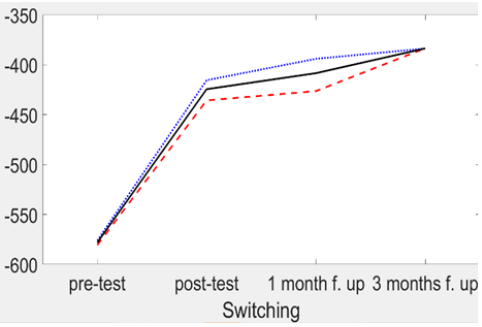

Figure 5. Switching means at 4 time-points in groups with different order and in the whole sample.

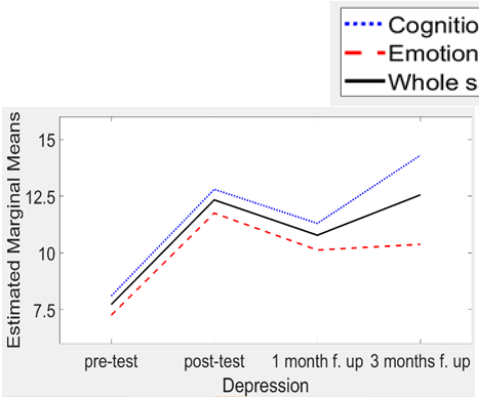

Figure 6. Depression means at 4 time-points in groups with different order and in the whole sample.

Discussion and conclusion

The aim of the present study was to test the efficacy of the novel self-help Attention Training (AT) program based on the acceptance/mindfulness principles. This program was created with an aim to help dysphoric students to improve their attention and to accept their unpleasant thoughts and emotions

in a non-judgmental way. We wanted to determine whether the program targets and changes basic components and processes considered to underlie mindfulness - psychological flexibility, rumination tendencies, and executive functions (e.g., Hölzel et al., 2011; Levin et al., 2012; Lutz et al. 2008; Malinowski, 2013). We also followed these processes one and three months after finishing AT.

The second goal of our study was to explore whether the order of different types of exercises mattered. Previous research suggested that directing attention to the body is an important introductory component of attention training (e.g., Verhaeghen, 2021; Hölzel et al., 2011), but we were interested in seeing what happens next while practicing emotional and cognitive exercises in a different order. In particular, we wanted to see if accepting emotions, as a first step, can help one to deal better with ruminations and to become less entangled in negative thinking. If, on the other hand, the reversed order would be more effective, one could argue that decentering, defusion, and other cognitive changes should take precedence over emotional regulation. Finally, we were interested in the sustainability of the changes three months after the end of the program.

Did the participants improve on a set of dependent measures after the treatment?

Regarding our first question about efficacy, overall, our participants over time demonstrated improvements on all dependent measures, with the exception of the depression symptoms. They became more psychologically flexible, less prone to ruminative thinking, and became more flexible in their attentional capacities over the course of the program. These positive changes were relatively stable showing that participants accepted the trained virtues of regulating their inner contents, thoughts, and emotions. The changes observed on psychological flexibility, ruminations, and attentional skills are in accordance with other research findings (Hayes et al., 2006; Jain et al., 2007; Verhaeghen, 2021), suggesting that practicing mindfulness-acceptance in a self-help form can increase acceptance, distancing from one's own biased thinking, and attentional

skills. There was a possibility that the improvement on attentional tasks, such as Navon's test, was a result of repeated testing rather than being a substantial effect of the exercises that were practiced in AT. Because we did not have a control group, we could not have excluded this possibility. On the other hand, we observed that the pattern of changes may allow for additional explanations. Namely, the largest change was between the pretest and posttest, which were one month apart. The scores from the two follow-ups were relatively unchanged compared to the second testing. One would expect greater improvements during the follow-ups due to practice.

What happened with the depression symptoms? These symptoms showed an increase over the course of the program and one and three months after the program as measured by the PHQ-9. Different explanations can be offered for this finding. One plausible explanation is that participants became better at accepting and regulating their moods, which resulted in easier and more honest reporting of inner states. According to the ACT theory, the reduction of symptoms is not the basic goal and necessary effect of the applied interventions, but the acceptance of one's sensations, emotions, and thoughts. It is possible that the increase in the symptoms is an expression of increased emotional acceptance and cognitive defusion instead of earlier emotional and cognitive control. Some unpleasant feelings or symptoms may be present (non-reduced), but their presence does not have a negative impact on general improvement (Hayes et al., 2004).

The data that are in line with this explanation were obtained during feedback from the participants. Namely, with only one exception, the participants stated that the program was a useful experience for them, and 83% expressed a desire to continue personal progress through an additional group training program that was offered to them in the end. These findings could reflect their openness to experience and acceptance, which includes even unpleasant emotions. For example, in one study with individuals with panic disorder, people who practiced acceptance, as opposed to suppression, demonstrated a greater acceptance of unpleasant panic sensations and greater

willingness to repeat the unpleasant situation of panic induction even though the level of their panic symptoms remained unchanged and high (Levitt et al., 2004). However, we can also speculate that some systematic factors, which were not controlled in this study, had influenced the mood of students, especially at two follow-ups which happened in the autumn (e.g., the beginning of the semester, exam deadlines, the end of summer, etc.).

In contrast to the results of the PHQ-9, all participants, except one, did not endorse that they felt more depressed when they were asked about their mood during debriefing sessions right after the program. This contradicting results from two self-reports about mood may be a consequence of the fact that some symptoms as measured by the PHQ-9 (e.g., problems with concentration, fatigue, sleep problems) could be an expression of students' lifestyle rather than depression symptoms (Novović et al., 2011; Janičić et al., 2019). Also, we should take into consideration the possible adverse effects of mindfulness. Namely, some authors previously reported mood worsening in some participants and have suggested that we need to identify those individuals at risk of experiencing adverse effects (Britton, 2019). In our study, we also had one reported case of mood worsening attributed to the mindfulness-acceptance exercises.

Overall, our preliminary findings seem to suggest that the components of AT training can have positive effects on the mindfulness-acceptance variables and process, however, a better understanding of its effect on depression is needed. Given inconsistent findings on two self-reports, future work on optimization of this training should consider additional components that would address even more emotional regulation. Also, more suitable instruments targeting negative mood in the student population are recommended as well as those tapping functionality, quality of life, and well-being.

Did the two treatment groups differ in their overall levels of the dependent measures?

The two examined groups, Emotion-first, and Cognition-first groups did not differ in their overall levels of psychological flexibility, ruminations, and

attentional capacities, but only in their levels of depression (Figures 2-6). The Cognition-first group, when considering all four measurement occasions, demonstrated larger depression scores. It is noteworthy that in this group the largest increase in the depressive symptoms was three months after the program, which is probably attributed to some external factors not related to the program. Unfortunately, we did not measure life events during and after the training, and also we did not have a control group which could have served as a baseline for comparison. Hence, future research, by addressing these limitations, will be in a better position to explore whether the observed changes in depressive symptoms in these types of programs result from a less avoidant attitude towards emotions, whether they are prerequisites of change, or are the results of life events unrelated to the self-help interventions. Even though the only significant difference between the two groups was on the measure of depression, one can see that the Emotion-first group performed better on all mindfulness/ acceptance measures. If we had a larger sample size, these differences could have become significant, and one could claim with more certainty that emotional regulation (acceptance of negative emotions) should precede cognitive interventions within the AT program intended for dysphoric students. Also, the finding that the Emotion-first group over treatment experienced greater decreases in ruminations compared to the Cognition-first group might explain lower depression symptoms in this group.

Is there a different pattern of changes across four measurements between the two treatment groups?

Finely, we revealed that there was a different pattern of changes at four time points in the Emotion-first and Cognition-first groups regarding ruminations. Although both profiles had a downward trend, only the Emotion-first group really benefited from the training, especially at follow-ups, achieving better improvement one and three months after the AT program. This result can be seen as an indication of different change patterns or pathways of improvement during AT. It seems that emotional change takes precedence: first

emotional acceptance, then cognitive change. Combined, our results suggest that practicing emotional regulation earlier in this treatment might have contributed to the development of greater acceptance and less entanglement with inner experiences through exposure and decreased reactivity to feelings. It seems that thought patterns (the process of cognitive defusion) are more susceptible to change if the barrier of emotional avoidance or emotional control is removed.

Limitations

The major limitations of this study were a lack of a control group, a small sample size, and unavailability of information regarding life events during the training and follow-ups. Also, it would be useful to have a more detailed record of daily practice which would include not only an overall estimate of daily practice but what specific exercise was practiced in a given time period. We did not have information about the amount of practice after the program ended. We recognize that one important factor in maintaining the effects of the program is the persistence of respondents in practicing the learned exercises, and it would be important to monitor how long and how often program participants continued to apply exercises after the program.

Strengths and directions for future research

This pilot study was the initial step in exploring AT as an efficient self-help intervention for dysphoric students. It provided us with an insight into how to optimize its delivery in terms of the order of interventions. One strength of our study was a very careful selection of participants using a structured clinical interview so that those with subthreshold depression symptoms could be detected and invited to participate. It is known that such symptoms often go unrecognized even though they can significantly affect the academic achievement and quality of life of students. Also, we ruled out the possibility that our findings were confounded by the effects of previous depressive episodes and other comorbid diagnoses (e.g., personality pathology, psychosis,

bipolar disorder). An additional strength of the study was the inclusion of one- and three-month follow-ups which allowed us to gain a more detailed insight into the maintenance of the achieved effects. We can also formulate recommendations for further research. For example, how lasting are the changes, and what factors contribute to their maintenance? The answer to this question requires longer monitoring of study participants with control of factors that could contribute to the permanence of the effects.

The next research question refers to the possibility of applying AT in other problem areas and difficulties that are important for the student population. In particular, can the program have positive effects on the reduction of anxiety, which, in addition to depression, is a frequent disruptive factor in students' academic achievement and life satisfaction? Is there a specific impact on worry, somatic anxiety and social anxiety? The effect of the program on some behavioral problems, such as procrastination and other patterns of avoidant behavior typical of the student population, can also be examined. The question is whether the pattern of change (emotional change first followed by cognitive change) that we found in this study can generalize to other problem areas. Future research should include and monitor not only the symptom reduction measures, but also measures of subjective well-being, positive affectivity, and general functionality. It is necessary to include control measures such as significant life events, where it would be important to examine their possible impact, but also whether the impact of adverse life events can be lessened through the application of exercises learned during AT.

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Conflict of Interests

We have no conflicts of interest to disclose.

Data availability statement

Data is available from the authors upon request.

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Appendix A

Table A1

Correlations among DVs at the pre-test

	1	2	3	4	5
1. Psychological flexibility					
2. Ruminations	.421				
3. Depression	.165	.454			
4. Updating	.046	-.243	-.285		
5. Switching	-.260	-.317	.102	.117	

Table A2

Correlations among DVs in the post-test

	1	2	3	4	5
1. Psychological flexibility					
2. Ruminations	.371				
3. Depression	.351	.461			
4. Updating	-.254	.068	.130		
5. Switching	-.238	-.054	.056	.038	

Table A3

Correlations among DVs in 1 month follow up

	1	2	3	4	5
1. Psychological flexibility					
2. Ruminations	.491*				
3. Depression	.280	.246			
4. Updating	.214	.021	.151		
5. Switching	-.546*	-.240	.132	-.014	

Note. * – Correlation is significant at the 0.05 level (2-tailed).

Table A4

Correlations among DVs in 1 month follow up

	1	2	3	4	5
1. Psychological flexibility					
2. Ruminations	.627**				
3. Depression	.689**	.424			
4. Updating	-.033	-.102	-.046		
5. Switching	-.375	-.292	-.098	-.003	

Note. ** – Correlation is significant at the 0.01 level (2-tailed).

Appendix B

Table B

Means, standard deviations, and pairwise comparisons of measurements at four time points

		Total and group Ms and SEs at 4 measurements					Pairwise comparisons with Bonferroni correction					
						Total	1-2		1-3		1-4	
		1	2	3	4	1-4	*t*	*p*	*t*	*p*	*t*	*p*
Inflexibility	$Total_{C+E}$	30.38	25.00	23.28	23.89		3.58	.01	4.72	.001	2.68	.10
		(8.41)	(7.88)	(7.11)	(8.50)							
	Cognition	29.70	28.20	25.00	27.70	27.65						
	first	(8.56)	8.43	7.51	8.94							
	Emotion	31.25	21.00	21.12	19.12	23.12						
	first	8.71	5.15	6.38	5.11							
Rumination	$Total_{C+E}$	71.83	54.44	55.17	53.50		2.92	.05	3.03	.04	3.33	.02
		(18.07)	(15.45)	(18.84)	(16.58)							
	Cognition	71.30	55.40	63.10	60.10	62.48						
	first	(18.81)	(12.59)	(15.47)	(11.68)							
	Emotion	72.50	53.25	45.25	45.25	54.06						
	first	(18.36)	(19.32)	(18.76)	(18.76)							
Switching	$Total_{C+E}$	-578.24	-424.53	-408.48	-383.66		3.83	.008	5.07	.001	3.87	.008
		(274.31)	(154.28)	(181.58)	(108.43)							
	Cognition	-576.23	-415.56	-394.09	-383.79	-442.41						
	first	(200.07)	(166.84)	(126.28)	(126.76)							
	Emotion	-580.76	-435.77	-426.46	-383.50	-456.62						
	first	(362.31)	(147.52)	(242.70)	(88.84)							
Updating	$Total_{C+E}$	.69	.76	.79	.76		1.91	.08	3.22	.005	1.92	.07
		(.11)	(.13)	(.12)	(.14)							
	Cognition	.65	.74	.77	.73	.72						
	first	(.12)	(.13)	(.13)	(.14)							
	Emotion	.73	.78	.82	.80	.78						
	first	(.09)	(.13)	(.12)	(.15)							
Depression	$Total_{C+E}$	7.72	12.33	10.78	12.56		5.48	.000	3.61	.01	5.23	.000
		(2.88)	(2.28)	(1.90)	(3.81)							

	Cognition	8.10	12.80	11.30	14.30	11.63
	first	(2.88)	(2.74)	(2.26)	(4.37)	
	Emotion	7.25	11.75	10.12	10.37	9.87
	first	(1.83)	(1.49)	(1.13)	(0.92)	

Notes. 1 – pretest, 2 – posttest, 3 – one month follow-up, 4 – three months follow up. $Total_{C+E}$ = means for both groups at each time separately; $Total_{1-4}$ = means of each group separately for all time measurements.