

**Exploring the Feasibility of Colouring Mandalas in Daily Life Targeting Stress and Mindfulness of University Students**

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July 5<sup>th</sup>, 2023

### **Abstract**

This study aimed to assess the feasibility and acceptability of colouring mandalas in daily life of university students targeting the variables stress and mindfulness. Prior research indicates that mindfulness and healthy coping strategies, like art interventions can reduce stress and anxiety among university students. Although some studies have explored the impact of art interventions on stress and mindfulness, they often neglect to assess feasibility. Therefore, this study controls for feasibility regarding categories like Ease of usage, Time effort, Satisfaction, and Future Implementation as well as the effect colouring mandalas has on stress and mindfulness. This study comprises a sample of ten university students. Before the intervention, the participants will complete two questionnaires that measure stress and mindfulness. Next, for three weeks, students will colour mandalas twice a week. They are required to do a one-minute breathing exercise before each colouring session. After three weeks, students are asked to complete a second questionnaire that assesses the feasibility and acceptability of the intervention as well as stress and mindfulness levels.

The outcomes reveal that colouring mandalas has no significant effect on perceived stress or mindfulness. However, as the sample is relatively small a bigger sample should be used to control for reliable effects. In addition, it was found that the intervention is feasible, nevertheless, many limitations could be identified that need to be taken into account for future implementation. Namely, the practicality of the breathing exercise, the absence of internal motivation on the part of participants, and the inability of participants to share their finished mandalas with others. Last, an RCT should be undertaken in order to effectively explore the variables stress and mindfulness.

*Keywords:* feasibility, stress, university students, mindfulness, art-interventions, mandalas, colouring

## **Exploring the Feasibility of Colouring Mandalas in Daily Life Targeting Stress and Mindfulness of University Students**

Almost everyone faces stress on a daily basis (Asselmann et al., 2017). Particularly university students deal with everyday stress in their life (Bai et al., 2020). Being a university student comes with a lot of stress since it requires adjusting to an unfamiliar and new environment, taking on greater responsibility for oneself, and performing well academically (Bai et al., 2020). Hence, introducing students to interventions, and applying healthy coping mechanisms which they can incorporate into their daily life can be helpful to reduce their stress.

### **Perceived stress and coping**

Exploring healthy coping mechanisms to reduce the negative effects of stress, art interventions have become a promising strategy, shown to positively influence perceived stress levels and increase mindfulness, ultimately reducing overall stress (Martin et al., 2018; Gambrel et al., 2020; Bishop et al., 2004). There are different ways of defining stress in psychology because the concept of stress is constantly changing and multidimensional (Wong et al., 2007). Yet, stress is a state in which a person is stirred and experiences anxiety by an uncomfortable circumstance over which they have no control (Fink, 2016). This description applies to many human circumstances. As defined by Selye (1936), as cited in (Fink, 2016, p. 5), "Stress is the nonspecific response of the body to any demand,". The term "stress," however, is misleading since it can refer to either stressors or the stress reaction. External influences, such as life events that take place suddenly or gradually, constitute stressors. An organism is strained and under tension as a result of them (Harkness & Hayden, 2020). Contrarily, a stress response is an intrinsic reaction to a stressor. Personal aspects of an individual, such as mental health, personality, coping mechanisms, and thinking styles, affect how they respond to stress (Harkness & Hayden, 2020). So, it is essential that a stressor occurs, but it also depends on an individual's inherent qualities on how the stress reaction develops (Harkness & Hayden, 2020).

A prolonged time of exposure to stress can have detrimental effects on both physical and mental health. Anxiety, schizophrenia, various phobias, and post-traumatic stress disorder are conditions that are linked to higher stress exposure (Fink, 2016). Stressors can harm general health, which includes the cardiovascular system and other organs, in addition to mental health problems (Fink, 2016). To handle this stress, attempting to avoid these negative consequences, students are more receptive to using drugs and alcohol as coping techniques,

endangering their mental health because they are frequently exposed to these drugs in their surroundings (Bai et al., 2020). It is crucial that students utilize healthy coping mechanisms to offset the stress of daily living to prevent these types of maladaptive coping behaviours (Bai et al., 2020).

However, positive psychology studied many healthy coping mechanisms that can be used to reduce stress in everyday life. One method that can be used is the activity of doing or creating art. Creative art therapies (CATs) and art interventions are found to have a positive effect on perceived stress, meaning preventing stress as well as promoting health (Martin et al., 2018). Research also shows that doing art increases mindfulness (Gambrel et al., 2020), which is associated with reducing stress (Bishop et al., 2004). Hence, art interventions positively influence perceived stress and increase mindfulness, consequently lowering stress.

### **Mindfulness and Art Interventions as coping strategies in positive psychology**

Mindfulness, defined as paying attention in a certain manner, has gained significant interest as a strategy to reduce cognitive sensitivity to stress and emotional suffering. Because of its stress-reducing effects potentially explained on a biological level, mindfulness can be considered a valuable approach in modern psychology (Bishop et al., 2004; Creswell & Lindsay, 2014). One of the key pioneers in the area, Dr John Kabat-Zinn defined mindfulness as “paying attention in a particular way: on purpose, in the present moment, and nonjudgementally” (Black, 2011). Mindfulness can be seen as a method of controlling attention that results in a quality of unelaborated awareness of one's current experience and a quality of responding to one's experience while maintaining an attitude of inquiry, experiential openness, and acknowledgement. Moreover, mindfulness can be viewed as a method for understanding one's mental aptitude and acquiring a decentred viewpoint on ideas and emotions (Bishop et al., 2004).

Modern psychology has embraced mindfulness as a method for raising awareness and effectively addressing mental processes that cause emotional suffering and unhelpful behaviour (Bishop et al., 2004). The stress and anxiety-reducing effect of mindfulness can be explained on a biological level (Creswell & Lindsay, 2014). Mindfulness improves the regulatory activity of areas in the prefrontal cortex. Hence, mindfulness is thought to lessen the activation of the HPA axis caused by stress, which in turn prevents the adrenal cortex's release of the stress hormone cortisol (Creswell & Lindsay, 2014). For example, a study by Decker et al. (2019) found that mindfulness-based interventions decrease stress and anxiety. Breathing exercises in particular increase mindfulness by concentrating one's attention on the breath's effects. Integrating deep breathing into mindfulness has been shown to have a

substantial psychological impact on the advancement of emotions, cognitive regulation, positive effects experienced, and stress (Decker et al., 2019).

In addition, there is an important connection between the activity of creating art and increased mindfulness (Gambrel et al., 2020). Research has found that mindfulness is inherently encouraged by art because focusing on the artistic mediums and being physically centred are essential for creating art (Gambrel et al., 2020). Because high levels of mindfulness are found to decrease perceived stress art interventions are popular methods to encourage mindfulness and at the same time decrease stress (Gambrel et al., 2020). Research has shown that art interventions can affect well-being and mental health in a positive way. By considering the oneness of the body, intellect, action, and perception, targeting creativity, physical experience, and expression to uncover emotions and alter behaviour (embodied evaluation), art interventions encourage mental health (Martin et al., 2018). Furthermore, the study of flow has significance for art therapy research and practice since the sense of flow has been scientifically connected to creativity and increased well-being. By assisting people to achieve and sustain a condition of flow while creating art, art therapists may promote personal growth (Chilton, 2013). While in flow, people are frequently so absorbed in the action that they are unaware of their emotional state till the task is almost over and pleasant emotions like joy or satisfaction start to surface. The flow state of producing art may be therapeutic by reducing anxiety and boosting engagement, both of which may result in feelings of self-expression, mastery, and success (Chilton, 2013).

Especially colouring mandalas was found to have a positive effect in reducing anxiety (Curry & Kasser, 2005). Because mandalas have designs with circular or repeated patterns, they aim to encourage mindfulness and reduce stress (McDougall, 2020). According to research by Curry and Kasser (2005), colouring mandalas significantly lowered participants' anxiety levels compared to unstructured colouring or colouring of another geometric pattern. For example, the study conducted by Apriyana et al. (2020) examined what effect therapeutic colouring on mandala designs has on first-year nursing students' levels of academic stress. They used a sample of 60 first-year nursing students executing a pre and post-test. The participants had to colour the mandala pattern in three encounters. The results indicated that Mandala colouring has a stress-reducing effect on first-year students' levels of academic stress. While mandala colouring reduces anxiety through the process of mindfulness, there has been little empirical research that has specifically examined the direct relationship between colouring mandalas and mindfulness (Campenni & Hartman, 2019).

In addition, most research only focuses on the effects the intervention has on the variables that are being examined. According to Morris & Rosenbloom (2017), research often neglects to analyse the feasibility of the intervention. Feasibility studies are not often done because they often comprise a small sample size, therefore not, permitting clear implications regarding the effectiveness of the outcomes (Morris & Rosenbloom, 2017). Yet, when feasibility has been shown and measured, it allows one to test how likely it is to adapt this type of intervention in the context of universities. Because by conducting feasibility studies the viability of the design can be evaluated and supported before larger investigations are being conducted (Morris & Rosenbloom, 2017). So far art interventions have not focused on university students and their stress and mindfulness levels (Leckey, 2011).

Hence, in order to measure how feasible, the intervention of colouring mandalas in the daily life of university students is and what effect colouring mandalas have on the stress levels of university students it is important to specifically use a sample of only university students.

### **The present study**

The current study is going to examine the feasibility of the art intervention regarding the influence of colouring mandalas on perceived and observed stress levels and mindfulness in university students. The purpose of this study is to determine whether an art intervention is feasible and acceptable to university students before undertaking a formal trial and attempting implementation. To do so the research specifically focuses on university students in general as well as the effect of colouring mandalas on perceived stress and mindfulness independent from stress and anxiety. The participants will fill out two questionnaires before the intervention, assessing the variables stress and mindfulness. Next, Students are going to colour mandalas twice a week over a period of three weeks. Before every colour session, they are asked to perform a one-minute breathing exercise. After three weeks students are asked to fill out a second questionnaire, which evaluates stress and mindfulness for a second time and examines the feasibility and acceptability of the intervention. Thus, the two research questions: “How feasible is an art intervention of colouring mandalas in the daily life of university students?” and “Do university students experience lower stress levels and higher mindfulness after the art intervention?” are posed.

## **Methods**

### **Design**

This study is a small-scale feasibility study with a duration of 3 weeks. The collected data is self-reported and comprises a one-time assessment questionnaire about the feasibility

of the intervention after the study. In addition, the study assesses the variables stress and mindfulness two times, before and after the intervention.

### **Participants**

A sample of 10 voluntarily participating people was utilized for this study. The University of Twente's Test Subject Pool served as the recruiting of the participants. The researcher also used social media sites to advertise. The 10 participants' (Mage= 21.2, SDage= 1.14; 100% female, 0 % male) nationalities were German (60%), Dutch (20%), and Bulgarian (20%). Eight out of ten students are Bachelor students in Psychology, one is studying education and another participant is studying police work.

All participants provided written informed consent before participating in the study, which was approved by the University of Twente Ethics Committee and followed all University of Twente guidelines (see Appendix A). The inclusion criteria encompass that participants were university students between the ages of 18 and 35. Participants were excluded if they did not have access to a printer or did not have a sufficient understanding of English. Lastly, participants were excluded if they were diagnosed with any mental illness.

### **Intervention**

The intervention consists of two questionnaires. The first questionnaire assesses stress and mindfulness scores. The second questionnaire after the intervention evaluates the variables stress and mindfulness for a second time and analyses the feasibility of the intervention. The university students are colouring two mandalas each week for three weeks. Before colouring every mandala they are asked to perform a one-minute breathing exercise.

#### ***Notifications***

The students got 3 notifications, each including instructions and a link to the two mandala patterns for the corresponding week (see Appendix B). Within the notification, the participant was also informed in which week of the study they currently are as well as what the next week holds. Further, the participants were expected to colour each mandala for at least 15 minutes. However, they were informed that they can colour the mandala as long as they like. The time duration of 15 minutes was chosen based on existing research by Curry & Kasser (2005), which found that colouring mandalas for 20 minutes reduce anxiety effectively. In addition, the researchers themselves coloured one of the mandalas to find out what an appropriate time dosage is. Because after 15 minutes the motivation slightly decreased it was decided to not add additional 5 minutes because this could lead to pressure or demotivation.

#### ***Breathing exercise***

Participants were asked to perform a one-minute mindful breathing exercise. The time of one minute was chosen because existing research by Norouzi (2019), found that a one-minute breathing exercise increases attention to the present moment, including sensations, emotions, and mind-wandering as well as increased focus. The study instructed the participants to focus on their breathing and keep their attention on their bodily sensations (Norouzi, 2019). To combine and incorporate these two focuses the researcher came up with the following breathing exercise. The written description was as follows: “Sit down (anywhere that feels comfortable to you) and set a timer to 1 minute. Now you breathe in and out. When you inhale through your nose you are going to focus on how your chest rises by placing one hand on the upper chest. When you exhale through your mouth you focus on how your chest lowers by placing your other hand just below your ribcage. Continue following this procedure for 1 minute.” The students were instructed to perform the exercise before every colouring session.

### ***Mandalas***

The mandala templates were retrieved from an online website called “mandala-bilder.de” (see Appendix C). The website offers users to download the mandala pattern as a pdf for free to then later print it on paper. The six mandala patterns were chosen from different categories including the category special mandalas, relaxing mandalas, and mandalas for adults. All mandalas were selected based on the same difficulty level to ensure that the participants do not feel any additional pressure and can complete the mandalas in the given time. To create an environment in which the participant feels comfortable and can experience increased mindfulness the student was asked to execute a one-minute breathing exercise before every session of colouring.

### **Materials and Measures**

#### ***Demographic questions***

Participants were asked several demographic questions at the beginning of the research, including their age, gender, nationality, level of education (Bachelor or master student), study programme and marital status.

#### ***Stress***

To measure the students' stress levels, the Perceived Stress Scale (PSS) was applied. PSS is an often-used psychological tool for assessing stress perception (Cohen, 1994). It is an estimate of how stressful a person perceives their life's circumstances to be. Items were created to capture how unpredictably chaotic and overburdened respondents perceive their lives to be. Furthermore, several direct questions concerning current levels of experienced



stress are included in the scale (Cohen, 1994). Within the PSS participants were asked to indicate how often they felt or thought a certain way about the following 10 items. The scale ranges from 0 to 4, with 0 being “Never” and 4 being “Very often”. Participants select a number that represents their current stress level to indicate how stressed they are. The Cronbach’s alpha was  $>.79$  in the current study, indicating high test reliability.

### ***Mindfulness***

The mindfulness of participants was assessed through the Five Facet Mindfulness Questionnaire (FFMQ) which evaluates the five aspects of a general inclination to be mindful in daily life: describing, observing, acting with awareness, not reacting to inner experience, and not evaluating inner experience (Shallcross et al., 2020). A 5-point Likert-type scale was used to score each item, with 1 being “Never or very rarely true” and 5 being “Very often or always true”. The participants chose the number that best applies to their current opinion on what is generally true for them.

The questionnaire which includes 39 items demonstrates adequate to good internal consistency (0.82), and good test-retest reliability with alpha coefficients ranging from .75 to .93. (Shallcross et al., 2020). With a Cronbach’s alpha  $>.91$ , in the present study, the test reliability of this scale has been demonstrated to be high.

### ***Feasibility & Acceptability***

To assess the feasibility and acceptability of the intervention a questionnaire was created by the researchers. The questionnaire was constructed by looking at already existing questionnaires of feasibility studies (c.f. Carswell et al., 2020; Schmaderer et al., 2022), as well as formulating questions that were specifically of interest to the present intervention. The questionnaire comprises 20 items, 11 items having preselected answer possibilities (multiple choice), and 9 items being open questions. The items are asking questions about different categories. The domains include ease of usage, time effort, satisfaction, effects of the intervention (in mood and motivation), future implementation, and effect of the breathing exercise. For example, the question “Did you experience any obstacles when colouring the mandalas and why?” (see Appendix D) asks about the ease of usage. Another question that takes into account the time effort asks how the participants experienced the number of mandalas per week. To control for the domain of satisfaction one example question that was asked is if they have been satisfied with the process (patterns, colors, fulfilment) of colouring the mandalas. Next, the question “Did you notice an increase in mood throughout the study as a consequence of colouring the mandalas regularly?” (see Appendix D) asks about the effect of the intervention regarding changes in mood. To give an example for the category future

implementation it is asked if the students would like to implement colouring mandalas in their daily life in the future. Lastly, the question “If you were instructed to perform the breathing exercise did it help you to be more mindful” (see appendix) asks about the effect of the breathing exercise participants were instructed to perform.

### **Procedure**

First, the participants were asked to participate in the study via the Test Subject Pool of the University of Twente or they were contacted via social media advertising through sharing the Qualtrics link to the study. The students from the University of Twente that applied for the study via the Sona system received 1 credit point when completing the study. Within the three-week intervention, the participants started at different times depending on the time they applied for the study.

The participant was informed about the content and inclusion criteria of the study before starting the actual participation. Additionally, they were provided with information on the research's duration which is overall 3 weeks, the participant's ability to withdraw their participation at any moment throughout the study, its process, and how their data will be used. When the applicant decided to be part of the study the participant needed to give informed consent to continue with answering the following questionnaires. First, the participant was asked to answer some demographic questions. Further, the participant needed to complete the stress questionnaire (PSS), the depression questionnaire (PHQ), and the mindfulness questionnaire (FFMQ). However, this research only focuses on the variables of mindfulness and stress. Therefore, the data regarding depression are excluded from the analysis. The first questionnaire took on average about 12 minutes. Lastly, the student was informed that the first part of the study is completed and that the participant will receive a notification with further instructions about the upcoming part.

The second part consisted of the intervention. At the start of each of the three weeks, the participants received notifications about instructions on mandala colouring via e-mail. Within the notification, the student was also asked to perform a one-minute breathing exercise before colouring each mandala. The notifications including the link to the two mandala patterns were sent via the contact option of the Sona system to ensure anonymity.

After finishing colouring all six mandalas by hand on paper for three weeks, the participants had to fill out the stress, depression and mindfulness questionnaire for a second time. Next, the students had to give consent that they understood that participation in this questionnaire is still voluntary and can be stopped at any time. Lastly, the students were asked

to answer questions about the feasibility and acceptability of the intervention. This questionnaire took on average 20 minutes.

### **Data analysis**

The collected data was cleared according to the completeness of finishing the study. Next, the data was imported into Excel to delete irrelevant information for the data analysis. Then this data was transferred into Rstudio, R version 4.1.2 (2021-11-01) (The R Foundation, n.d.) was used to analyze the data. The demographics were analyzed and then the mean age and standard deviation, as well as all frequencies of nationality and gender and study programme were calculated. Next, the total stress and mindfulness scores were estimated for each participant. However, as one question was missing in the PSS questionnaire assessing the scores before the intervention, this question was also left out assessing the post-scores of stress. Further, the pre-and post-mean, standard deviation (SD), and range were calculated. After that, the Cronbach's alpha was estimated for both questionnaires. Furthermore, the Wilcoxon's signed rank was conducted to assess whether there is a difference between the pre and post-mean scores for the variables stress and mindfulness. For the qualitative data on the feasibility and acceptability of the intervention, a content analysis of the participants' answers was executed. Every question was assigned to one of the feasibility categories mentioned above with the help of creating tables (see Appendix D). The answers to every question were reported in written form in the table and reviewed based on the key domains of interest (ease of usage, effects on mood/motivation, stress, mindfulness, time effort, satisfaction, and future implementation), to have a more organized overview. Thus, aiming to develop a range of topics for every key aspect. For example, when time planning was answered for the question asking about helping factors to colour the mandalas, the code "time planning" was created as a relevant code for the category "Ease of usage". Hence, in the end, many codes were gathered to support the analysis of the different parts of feasibility.

## **Results**

### **Research question I**

Table 1 summarizes the descriptive statistics of scores before and after the intervention for the variables Stress and Mindfulness of the 10 participants. For the FFMQ, higher mindfulness scores imply being more mindful in everyday life. For the PSS higher scores indicate higher perceived stress. The results in the table indicate that the mean scores for mindfulness increased very slightly and the mean scores for stress decreased very slightly after the intervention.

**Table 1**

*Pre and post-scores for the variables Stress and Mindfulness (N=10)*

Scale	<i>Pre-measure</i>			<i>Post-measure</i>		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
FFMQ	131.2	12.23	114-146	136.9	10.69	115-148
PSS	17.1	5.78	8-26	17	5.85	5-25

### ***Wilcoxon's signed-rank test***

Because the sample size is rather small, the criteria of linear models cannot be entirely met, therefore the Wilcoxon's signed-rank test was conducted. The Wilcoxon's signed-rank test was used to conduct a paired difference test of the repeated measurements for the two variables Stress and Mindfulness on the single sample to answer the research question: "How do university students perceive their stress level and mindfulness after the art intervention?". With this test, it can be examined if there are differences between the pre and post-measures and whether the test outcomes substantially deviate from zero. For the variable Stress, the test shows a p-value of 1, meaning that there is no effect. The p-value for the variable Mindfulness shows a value of 0.36, indicating that there is no effect.

### ***Perceived Stress***

For the closed question: "Did you perceive the intervention as stressful?", there were three possible answer choices, namely "Yes", "No", and "Sometimes" (see Table 2). None of the participants answered this question with yes. Six of the students indicated not perceiving the intervention as stressful, whereas four students reported perceiving the intervention as stressful sometimes. Thus, the majority did not experience perceived stress from the intervention.

### ***Mindful Breathing Exercise***

Half of the students answered the open question: "If you were instructed to perform the breathing exercise, did it help you to be more mindful?", with "yes", one participant specified that it also helped them to concentrate more on the next step of colouring the mandala. Two participants reported feeling a little more mindful after the breathing exercise and three students did not perceive any change in their state of mindfulness.

### ***Effect on Mood/Motivation***

Four participants indicated that they probably noticed an increase in motivation throughout the study. One student reports to might or might not experience increased motivation, three students did probably not perceive an increase in motivation whereas two participants did definitely not notice an increase in motivation (see Table 2).

The answers to the open question asking about in which way participants noticed a change in motivation throughout the study one of the participants that did not experience a change in motivation, reasoned that “I am usually pretty motivated, so no change”. The four participants that noticed an increase in motivation, report looking forward to the colouring sessions. Two of these participants gave the reason that they had time for themselves. To give an example answer one participant answered, “I often looked forward to having time for myself in a quiet and safe space to calm down after the first week” (see Appendix D).

For the question “In which way did you notice a change in your mood throughout the study?” three students answered to not experience any change in mood. Four participants are not sure if they noticed an increase in mood. The other participants indicated noticing a change in their state of mood (see Table 2). The majority specifies the changes in mood as feeling more relaxed and calmer for example: “I enjoyed colouring the mandalas. For me it felt relaxing.” Others point out to feel more present, light-hearted, satisfied and happy. To better illustrate this one participant said: “I felt a bit more light-hearted” (see Appendix D)

**Table 2**Effect Questions – Closed-Ended ( $N=10$ )

Item	<i>n</i>	%
<b>Did you perceive the intervention as stressful?</b>		
Yes	0	0%
Sometimes	4	40%
No	6	60%
<b>Did you notice an increase in motivation as a consequence of colouring mandalas regularly?</b>		
Definitely not	2	20%
Probably not	3	30%
Might or might not	1	10%
Probably yes	4	40%
Definitely yes	0	0%
<b>Did you notice an increase in mood as a consequence of colouring mandalas regularly?</b>		
Definitely not	0	0%
Probably not	3	30%
Might or might not	4	40%
Probably yes	3	30%
Definitely yes	0	0%

**Research Question II****Ease of Usage**

The majority of the participants did not experience any obstacles when colouring the mandalas. However, three of the students reported encountering obstacles when colouring the mandalas. Each of the three students gave a different reason: One participant had technical issues with their printer, while one of the two reported forgetting to colouring mandalas because of distractions happening around, and the other students encountered daily stressors.

When asked about what helped them to engage in the mandala painting, different facilitators were given. Most of the participants said it helped to take enough time as well as to have enough free time and to plan beforehand when to colour the mandalas. To give an example one student mentioned: “Enough freetime, so I could really focus on colouring the mandalas.” Further, having a quiet and comfortable environment was mentioned twice as a

helpful condition. Two students gave the factors of fun and relaxation as two helpful reasons to do the mandalas.

When asked about how the students perceive the difficulty level of the chosen mandala pattern, four participants experienced the mandala pattern as too easy, whereas six students point out that the mandala patterns were suitable (see Table 3).

All ten students liked to receive their mandalas each week via e-mail.

Overall, the ease of usage can be rated as good. Because only a few students experienced obstacles and also the chosen mandala pattern was perceived as suitable for the majority.

### **Time Effort**

**Mandalas.** The closed question “How many of the 6 mandalas did you actually do?” was asked. One participant indicated colouring two out of the 6 mandalas. The other two students said they did three mandalas. Three participants coloured four mandalas, the other two students did five mandalas and the last two coloured all six mandalas (see Table 3). The majority of the students experienced the number of mandalas per week as appropriate. As shown in Table 3, two participants think the number of mandalas was too much and one reported the number as too little.

Half of the students indicate that 2-3 times a week is an appropriate time dosage to engage in mandala painting, whereas the other half think that once a week is an appropriate time dosage (see Table 3). Because most of the students experienced the number of mandalas as appropriate it can be said that painting mandalas 2-3 times a week is suitable.

**Breathing exercise.** The students were asked how often they performed the breathing exercise. One participant said to have done the breathing exercise once and another student twice. Two said they did the exercise three times, and the majority executed the exercise 4 times. Another two students performed the breathing exercise 5 times and one participant all 6 times (see Table 3). Therefore, it would be better to decrease the number of times the students should do the breathing exercise or the breathing exercise should be adapted to be more engaging.

### **Satisfaction**

The students were asked to describe what they liked about the intervention. Most of the students mentioned that the activity itself was fun as it was creative, and they like to paint and draw in general. To illustrate this a bit more one student said: “I generally like painting and drawing so this was fun for me.” Four participants liked the relaxing and calming effect the colouring had on them. To give an example one participant answered, “It reminded me to really take some time just for myself, where I had the chance to calm down.” Another student

liked that they could decide for themselves what day in the week they want to colour the mandalas. It was also mentioned that they enjoyed taking time for themselves and just focus on the colouring activity.

When asked the opposite, what they did not like about the intervention three students did not answer this open question and one answered “nothing” to the question. Two people reported that the number of mandalas was too much. Other things that students dislike were the breathing exercise, not being able to show their finished mandalas, not having enough time for the mandalas because of external stressors in the day, and not being able to decide for themselves when they want to do the mandalas. To give an example for the last complaint the participant answered: “I disliked that you were not able to decide for yourself when you would start on the new mandala.”

The question “Have you been satisfied with the process (patterns, colors, fulfilment) of coloring your mandalas?” has been answered with “Yes” by seven participants, three students answered with “Sometimes”. Concludingly, most of the participants were satisfied with the intervention, however, some reported disliking factors that need to be taken into account.

### **Future Implementation**

The students were asked if they want to want to implement colouring mandalas in their daily life in the future. One student answered the question with “No”. Two participants indicated that they would implement colouring mandalas in their daily life in the future. The rest of the students answered with “Maybe” (see Table 3).

The reasons why participants would implement colouring mandalas in the future were mostly the feeling of relaxation and calming down and taking time for themselves, to illustrate this one student answered the questions with: “Because it is a relaxing feeling for me and it made me feel better about caring for my mental health”. In addition, it was reported that “It was fun, it’s a good me-time activity, it’s satisfying” as well as “It really reminds me of a little passion, I normally do not take time for”. The reasons for not implementing it in the future were that “It felt like a chore- maybe because it is a study” as well as having other more important things to do in daily life. Ultimately, the majority is not sure if they would implement colouring mandalas in their daily life in the future.



**Table 3**Feasibility Questions – Closed-Ended (*N=10*)

Item	<i>n</i>	%
<b>How did you perceive the difficulty level of the chosen mandala pattern?</b>		
Too easy	4	40%
Suitable	6	60%
Difficult	0	0%
<b>Did you like receiving the mandalas via e-mail?</b>		
Yes	10	100%
No	0	0%
<b>How many of the 6 mandalas did you actually do?</b>		
1	0	0%
2	1	10%
3	2	20%
4	3	30%
5	2	20%
6	2	20%
<b>How did you experience the number of mandalas per week?</b>		
Too little	1	10%
Appropriate	7	70%
Too many	2	20%
<b>What is an appropriate time dosage to engage in mandala painting?</b>		
Once a week	5	50%
2-3 times a week	5	50%
Every two weeks	0	0%
Once a month	0	0%
<b>If you were asked to perform the breathing exercise in the instructions, how often did you perform the breathing exercise actually?</b>		
1	1	10%
2	1	10%
3	2	20%

4	3	30%
5	2	20%
6	1	10%
Never	0	0%

**Have you been satisfied with the process of coloring mandalas (patterns, color, fulfilment) of coloring mandalas?**

Yes	7	70%
Sometimes	3	30%
No	0	0%

**Do you want to implement coloring mandalas in your daily life in the future?**

Yes	2	20%
Maybe	7	70%
No	1	10%

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### **Gains from Mixed Methods Design**

Because this is a mixed method design the qualitative as well as quantitative data contributed to important insights. For example, the question asking about perceived stress revealed that the majority did not experience the intervention as stressful which is helpful, because controlling for observed effects of stress no effect was found. In addition, without the open questions asking more specifically about what change in mood was experienced (not only if a change in mood was experienced), it would also have not been found that for most students the colouring of mandalas had a relaxing and calming effect on their state of mood. Further, asking about why or why the participants would or would not implement colouring mandalas in their daily life in the future clarified some reasons that can be taken into account for future implementation of the intervention.

### **Discussion**

The study's primary aim was to investigate the feasibility and acceptability of the art intervention of coloring mandalas in the daily life of university students. After examining the feasibility, the research question: "How feasible is the art intervention of coloring mandalas in the daily life of university students?" can be answered as being feasible and acceptable according to the participants. However, the study still shows to have limitations that need to be considered for future research.

In addition, the study also aimed to assess if colouring mandalas has an effect on the perceived stress and mindfulness of university students. The first research question: “Do university students have lower stress levels and higher mindfulness after the art intervention?” can be answered with no as the results of the Wilcoxon’s signed rank test indicate no effect and the qualitative data asking about perceived stress reveal that the intervention was not experienced as stressful for most students.

## **Feasibility and Acceptability**

### ***Ease of usage***

First, the results imply that the ease of usage of the intervention is overall high. Most of the students did not experience any obstacles. and if they did experience obstacles it was because of daily stressors or technical problems with the printer. Therefore, it is important to consider the intervention as possibly inducing additional stress to the participants' daily stressors. The factors that were most often mentioned to be helpful to engage in the activity of colouring mandalas are to be able to plan themselves when they want to colour the mandalas within the week as well as being in a quiet and comfortable environment. Both of these instructions were communicated to the participants within the notifications (see Appendix B). Hence, it suggests that giving these instructions to the students is important in helping them to do the mandalas. Further, most of the students perceived the difficulty level of the chosen mandalas as suitable, meaning that for a replication of the study, it is advised to use the same difficulty level of the mandala pattern. Also providing the students with the notifications via email was perceived as feasible by the participants.

### ***Time Effort***

The overall time effort participants had to spend on the intervention was experienced as appropriate. Even though only two out of ten students coloured all six mandalas the majority reported to perceive the number of mandalas per week as appropriate. Thus, the dose of 2 mandalas per week for university students can be considered appropriate for future implementation. Additionally, the majority did not perform the breathing exercise every time before colouring the mandalas. This finding is not in line with previous research. For example, the study by Konrad et al. (2023) examined the feasibility of implementing short breathing practices for mindfulness in standard university courses and found that the use of a brief mindfulness exercise attracts students and has positive impacts on those who are interested. One reason why only a few students engaged in the breathing exercise continuously might be that students participating via the Sona system could perceive the intervention as something that needs to be finished to receive credits. Thus, the thought of

seeing something as a task motivated by external factors like credits might lead to less motivation, contributing to poor performance, which could include rushing or speeding up the process (*Overjustification Effect - the Decision Lab*, n.d.). Hence, not being motivated enough or forgetting to do the exercise. According to these results, it could be that the initial motivation was not high enough. That would mean that the intrinsic motivation of students needs to be high enough to participate in the intervention as well as continuously perform the activities of the intervention, like the breathing exercise (*Overjustification Effect - the Decision Lab*, n.d.). Because students would most likely have to sign up voluntarily without external rewards. To increase the motivation for and participation in the breathing exercise it could be helpful to provide a video to the written instructions that accompany the participant (Dixon et al., 2019). Also, the study was advertised as a mandala colouring intervention to the students, therefore it could be that they did not consider the breathing exercise as a crucial part of the intervention.

### ***Satisfaction***

For the domain satisfaction, the results reveal that especially participants that like to draw or paint in general liked the activity of colouring mandalas, describing it as fun. There was no specific question controlling for the fact that they like to draw or paint privately, but many answers to the open question about the likability of the intervention reveal this insight. This entails that the intervention is appealing to students that like to be creative in their personal life. Colouring mandalas was primarily associated with effects of relaxation and calmness. Further, the fact that the participants could decide for themselves at what day and time they want to colour the two mandalas within the week was mentioned as beneficial. This is also in line with the study by (Fong et al., 2022) which found that giving full-time working nurses the flexibility of time effort put into mindful colouring was perceived as beneficial. However, the results of the dislikes show that participants would prefer showing their finished mandalas to the researchers, which was not integrated into the intervention. But including this could be a good implementation because receiving positive feedback on accomplishments in this case on their finished mandalas has been shown to increase motivation and positive emotions (Fishbach et al., 2014; Fredrickson, 2001). Another factor that was criticized was that they would like to decide for themselves when they want to do the mandalas, which could be interpreted as receiving all mandalas at the beginning, thus having the possibility to colour less or more mandalas within one week. Overall, satisfaction of coloring mandalas was high.

### ***Future Implementation***

Most participants were not certain if they would implement colouring mandalas in their daily life. However, they reported to might implement it in the future because some experience a feeling of relaxation and calming down as well as enjoyment when taking time for themselves. In light of these findings the results by Chilton (2013), also indicate that people feel joy and satisfaction while and after colouring mandalas, as show increased well-being. A reason mentioned for not implementing the intervention in daily life was that it felt more like a chore than something enjoyable. This finding again can be related to the approach of the overjustification effect, that external motivators like the need for receiving credits make the activity itself not enjoyable because there is a lack of internal motivation (*Overjustification Effect - the Decision Lab*, n.d.).

Concludingly, the study supports the feasibility and potential utility of adapting the intervention of coloring mandalas in daily life to reduce stress and increase mindfulness. However, because the majority of the students were not sure if they want to implement coloring mandalas in their daily life in the future the aforementioned weaknesses of the feasibility of the intervention need to be taken into account.

### **Stress and Mindfulness**

The results indicate that the mean stress score before the intervention is higher than after the intervention. However, the results of the Wilcoxon's signed-rank test indicate that for the variables stress there is no effect, meaning that there is no difference between the stress scores before colouring the mandalas compared to the stress scores after colouring the mandalas. Additionally, the mindfulness scores are higher after colouring the mandalas compared to before the intervention (see Table 1). Nevertheless, the results of the Wilcoxon's signed-rank test indicate that for mindfulness there is no effect thus, there is no difference between the mindfulness scores before colouring the mandalas compared to mindfulness scores after colouring the mandalas.

These findings are not consistent with the results of the study by Apriyana et al. (2020). They found that the stress levels of first-level students are reduced by colouring mandalas. However, in this study, the results show that colouring mandalas does not reduce stress levels in university students. It has also been found that mandala colouring reduces anxiety through mindfulness (Campenni & Hartman, 2019). However, this study did not examine the direct effect between the variables stress and mindfulness. Therefore, no inferences can be made about the reducing effect mindfulness has on stress levels. This study analysed if colouring mandalas increase mindfulness. The findings show no influence of colouring mandalas on increased mindfulness.

Looking at the subjective experiences reported, most students indicate not experiencing the intervention as stressful and only half of the students report to feel more mindful after performing the breathing exercise. Further, looking at the effect the intervention has on motivation it needs to be considered to reformulate the question differently as the answers to the open question reveal different interpretations of the question. Most understood the change of motivation regarding colouring mandalas, however, one participant understood the change in motivation in general terms. Even though the question leaves too much room for interpretation, it should be taken into account to increase the motivation of the participants because half of the students did not notice an increase in motivation. This could be a reason why not many students coloured all six mandalas because they were not motivated enough. Additionally, only three students noticed a change in mood but all in a positive way. As for most students the intervention had positive perceived effects like relaxation, calming down, or enjoyment. In addition, the majority of students indicated that the breathing exercise did help them or helped them a little bit to be more mindful. This subjective experience is conforming to many findings in mindfulness research. Because mindful breathing alerts us to the present moment, with acceptance, cultivates mindfulness (Germer et al., 2005).

### **Strength and Limitations**

The executed study has shown to have both strengths and limitations. The fact that this study is conducted online is one of its strengths since it offers benefits like flexibility (Stieger & Reips, 2010). Additionally, because the study was performed in English, participants of all nations could take part, therefore enhancing the study's cultural diversity. Further, the study gave many insights into the feasibility of the art intervention on colouring mandalas in daily life.

One limitation of the study is that the sample is too small to talk about the effects of the intervention, hence having an unstable reliability (Zamboni, 2019). Further, the majority of participants are psychology students only including two other academic programs. Additionally, the sample only comprises female students, therefore the generalizability of the study is limited (Zamboni, 2019). Another limitation is that one question in the stress questionnaire was accidentally not included in the pre-questionnaire before the intervention. This leads to falsified data regarding stress scores. Further, only a few of them performed the breathing exercise before every colour session. Therefore, it is difficult to give a reliable conclusion regarding the effect of the breathing exercise on mindfulness. In addition, participants did not start or end the intervention at the same time which could have an effect on their perceived stress levels as well as motivation and mood. Because

different or specific periods of the semester like exam seasons can be more stressful than other times of the semester (Jemmott & Magloire, 1988). Further, retrieving participants via the Sona system can have effects on the student's motivation as they might see the study as a task they need to complete to obtain the credits they need. Last, the study did not include a control condition which could have been useful to make further inferences about the effects of the art intervention to control for internal validity regarding effects (Mohr et al., 2009). To have reliable data about the effects of the intervention it is recommended to use a larger trial in future research.

### **Implications and Future Research**

For future research, it is advisable to include more students from other study programs in the sample beside the studies of psychology as well as males or other gender identifications to assure reliability. As the studies of psychology are female-dominated, the researchers could advertise their study not only through the Sona system but also through flyers in other study departments. Concerning the effects it is suggested to do a randomized controlled trial (RCT) to test the effectiveness of colouring mandalas on the variables stress and mindfulness compared to other art interventions (Mohr et al., 2009). Because the findings of the study by (Van Der Venet & Serice, 2012), support that in comparison to colouring on a plaid pattern or a blank piece of paper, colouring a mandala substantially reduces anxiety. Therefore, it would be interesting to execute an RCT to find out if colouring mandalas reduces stress significantly more than other colouring activities.

In addition, not only using the Sona system to retrieve most of the participants can also influence the experienced motivation. Because this would ensure that the students are internally motivated, rather than by external factors like receiving credits (*Overjustification Effect - the Decision Lab*, n.d.). Therefore, the students might feel more motivated to colour the mandalas, or the motivation even increases throughout the study. To give the students a feeling of satisfaction, they could be provided with a link where they can voluntarily upload their finished mandalas after every week, so the other participants and researchers can leave some feedback. To increase the motivation of participants for the breathing exercise a video can be used. Within the video, an instructor can explain the breathing exercise to the student and at the same time execute it together with the participant.

### **Conclusion**

In conclusion, the study tested the feasibility of the art intervention, colouring mandalas as well as the effectiveness of colouring mandalas on the variables stress and mindfulness. Although no objective effects on stress and mindfulness were observed students

perceived an increase in feelings of relaxation and enjoyment and did not perceive the intervention as stressful. Apart from that it can be argued that the evaluation of feasibility provided important insights into crucial elements of the intervention. Particularly strengths as well as weaknesses could be detected to take into consideration for future implementation. Overall, the intervention was perceived as feasible by the students. The number of mandalas, difficulty level of mandalas as well as time effort were perceived as suitable. An important limitation that should be considered in the future is the feasibility of the breathing exercise, the missing internal motivation of participants and the lack of possibility to share their finished mandalas with others. To assess the effectiveness of colouring mandalas compared to other art interventions on the variables stress and mindfulness, an RCT should be conducted.



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## **Appendices**

### **Appendix A**

#### **Informed consent**

The purpose of this study is to investigate the feasibility of coloring mandalas and its effects on stress, mindfulness and depression.

In the following, you are supposed to answer several questionnaires, which will take approximately 20 minutes. Afterwards, the intervention will be explained to you. Then, you will get a notification, including instructions and the mandalas for the first week. You get this notification every week on the same day.

Participation is voluntary and can be stopped at any time, without mentioning a reason. If you feel uncomfortable with answering questions, then leave the questions open. Negative consequences from withdrawing of this study or refusing to answer some questions do not exist.

The results of this data collection is only for educational purposes and to report the results of the feasibility. Personal data that can lead back to the participant will not be collected.

Data is going to be handled anonymously and stored for one year.

Minimal risks are associated with participation in this study, which may include mental distress resulting from the questionnaires or the weekly tasks. Participants suffering from symptoms of high stress and depressive symptoms might be at risk for experiencing mental burden.

The study has been reviewed and approved by the BMS Ethics Committee (Humanities & Social Sciences).

In case of any severe impact, please contact:

The researchers

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- l.warda@student.utwente.nl

The supervisor

- l.reiter@utwente.nl

The study advisors

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## Appendix B

### Notifications for participants

This appendix consists of the four notifications the participants received via email once a week for the time of around three weeks.

#### Week 1

Dear participant,  
Thank you for your participation. Part 1 is done!

Now, we can proceed with part 2. This is your notification with instructions and the first two mandalas you are supposed to color for the first week. You can find them via clicking the link below. Print them and start coloring! You can choose on your own, at which days during the week you want to take time for this task. You can paint until you are satisfied with the result, but at least you should spend **15 minutes** on it. Please make sure that you are in a **quiet environment in which you feel comfortable and do not get disturbed**.

Additionally, before you start coloring please execute the following **breathing exercise**. Sit down (anywhere that feels comfortable to you) and set a timer to **1 minute**. Now you breathe in and out. When you inhale through your nose you are going to focus on how your chest rises by placing one hand on the upper chest. When you exhale through your mouth you focus on how your chest lowers by placing your other hand just below your ribcage. Continue following this procedure for 1 minute. Please do this exercise every time before you start coloring.

You can find the mandalas by using the following link:

[https://drive.google.com/file/d/1u80YDYWKK\\_c7ZtGR2d1Z0Cf85mS8RMG0/view?usp=share\\_link](https://drive.google.com/file/d/1u80YDYWKK_c7ZtGR2d1Z0Cf85mS8RMG0/view?usp=share_link)

After the first week, you will get a second notification with the next mandalas for the second week. The same procedure will be applied in the third week.

Good luck!  
If you face any difficulties, please contact the researchers:  
l.warda@student.utwente.nl

v.michalski@student.utwente.nl

#### week 2

Dear participant,  
Thank you for your participation. The first week is over!

Now, we can proceed with week 2. This is your notification with instructions and the next two mandalas you are supposed to color for the second week. You can find them via clicking the link below. Print them and start coloring! You can choose on your own, at which days during the week you want to take time for this task. You can paint until you are satisfied with the result, but at least you should spend **15 minutes** on it. Please make sure that you are in a **quiet environment in which you feel comfortable and do not get disturbed**.

Additionally, before you start coloring please execute the following **breathing exercise**. Sit down (anywhere that feels comfortable to you) and set a timer to **1 minute**. Now you breathe in and out. When you inhale through your nose you are going to focus on how your chest rises by placing one hand on the upper chest. When you exhale through your mouth you focus on how your chest lowers



by placing your other hand just below your ribcage. Continue following this procedure for 1 minute. Please do this exercise every time before you start coloring.

You can find the mandalas by using the following link:

[https://drive.google.com/file/d/11K0MNBjwPYa-5JM6yoiWBf7ICyuWJnd/view?usp=share\\_link](https://drive.google.com/file/d/11K0MNBjwPYa-5JM6yoiWBf7ICyuWJnd/view?usp=share_link)

After the second week, you will get a third notification with the next mandalas for the third week.

Good luck!

If you face any difficulties, please contact the researchers:

[l.warda@student.utwente.nl](mailto:l.warda@student.utwente.nl)

[v.michalski@student.utwente.nl](mailto:v.michalski@student.utwente.nl)

### week 3

Dear participant,

Thank you for your participation. The second week is over!

Now, we can proceed with week 3 (the last week of coloring). This is your notification with instructions and the next two mandalas you are supposed to color for this week. You can find them via clicking the link below. Print them and start coloring! You can choose on your own, at which days during the week you want to take time for this task. You can paint until you are satisfied with the result, but at least you should spend **15 minutes** on it. Please make sure that you are in a **quiet environment in which you feel comfortable and do not get disturbed**.

Additionally, before you start coloring please execute the following **breathing exercise**. Sit down (anywhere that feels comfortable to you) and set a timer to **1 minute**. Now you breathe in and out. When you inhale through your nose you are going to focus on how your chest rises by placing one hand on the upper chest. When you exhale through your mouth you focus on how your chest lowers by placing your other hand just below your ribcage. Continue following this procedure for 1 minute. Please do this exercise every time before you start coloring.

You can find the mandalas by using the following link:

[https://drive.google.com/file/d/1OdaH\\_wh6RkPJj34g-o784e3HAXC1taGx/view?usp=share\\_link](https://drive.google.com/file/d/1OdaH_wh6RkPJj34g-o784e3HAXC1taGx/view?usp=share_link)

After the third week, you will have to fill out questionnaires again for the last time!

Good luck!

If you face any difficulties, please contact the researchers:

[l.warda@student.utwente.nl](mailto:l.warda@student.utwente.nl)

[v.michalski@student.utwente.nl](mailto:v.michalski@student.utwente.nl)

### After week 3

Dear participant,

Thank you for your participation. The third week is over!

Now, we can proceed with the last part of the study which is the second questionnaire. Please fill out the following questionnaire.

You can find the questionnaire by using the following link:

[https://utwentebs.eu.qualtrics.com/jfe/form/SV\\_bEGQ5obd0MQNJum](https://utwentebs.eu.qualtrics.com/jfe/form/SV_bEGQ5obd0MQNJum)

Thank you in advance!  
If you face any difficulties, please contact the researchers:

[l.warda@student.utwente.nl](mailto:l.warda@student.utwente.nl)

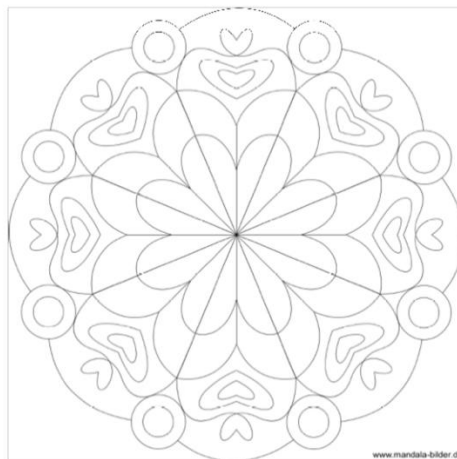
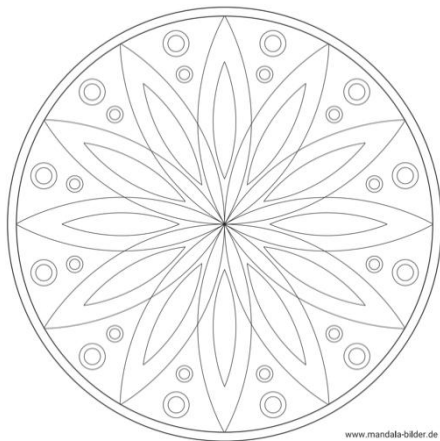
[v.michalski@student.utwente.nl](mailto:v.michalski@student.utwente.nl)

## Appendix C

### Mandala templates

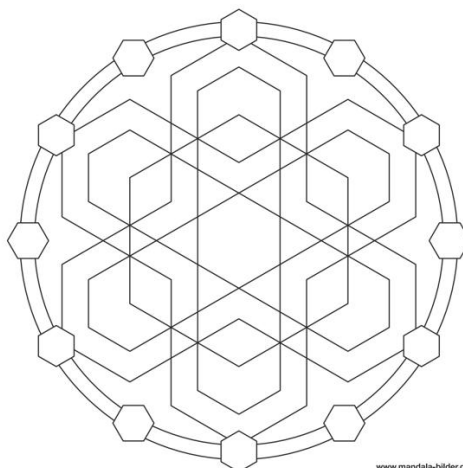
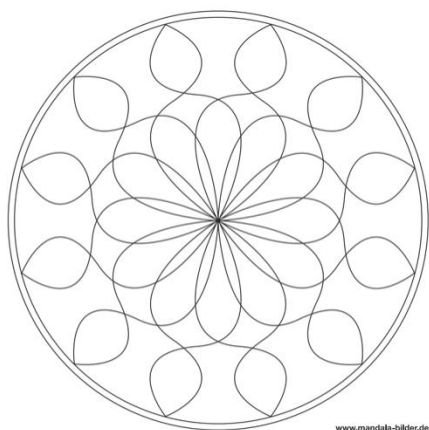
#### Week 1

[https://drive.google.com/file/d/1u80YDYWKK\\_c7ZtGR2d1Z0Cf85mS8RMG0/view?usp=share\\_link](https://drive.google.com/file/d/1u80YDYWKK_c7ZtGR2d1Z0Cf85mS8RMG0/view?usp=share_link)



#### Week 2

[https://drive.google.com/file/d/11K0MNBjwPYa-5JM6yojWBf7lCyuWJnd/view?usp=share\\_link](https://drive.google.com/file/d/11K0MNBjwPYa-5JM6yojWBf7lCyuWJnd/view?usp=share_link)



**Week 3**

[https://drive.google.com/file/d/1OdaH\\_wh6RkPJ34g-o784e3HAXC1taGx/view?usp=share\\_link](https://drive.google.com/file/d/1OdaH_wh6RkPJ34g-o784e3HAXC1taGx/view?usp=share_link)



## Appendix D

### Categorization of answers and coding

#### Code groups

- **Ease of usage**
  - Music 1
  - Fun 3
  - No problems 7
  - Relaxation 2
  - Quietness 2
  - Time Planning 3
  - Free Time 2
  - Technical issues 1
  - Stress on top 2
- **Effects (mood/motivation)**
  - Relaxation 5
  - No change 9
  - Excitement 2
  - Satisfaction 1
  - Happiness 1
  - Outcome 1
  - Self-care 1
  - Mindfulness 1
  -
- **Future implementation**
  - Yes: mental health 1
  - Yes: Fun 2
  - Yes: Relaxation 3
  - Yes: passion 1
  - Yes: focus 2
  - Yes: satisfaction 1
  - No: not fun 1
  - No: other activities 1
- **Satisfaction**
  - Free time task 1
  - Colours/creativity 3
  - Relaxation 5
  - Fun 2
  - Focus 2
  - Time consuming 1
- No satisfaction
  - Design 4
  - Stress on top 2
  - technical issues 1
- **Helpfulness of mindfulness task**
  - Yes 5

- No 3
- Little bit 2
- Yes(calming down) 1

Did you perceive the intervention as stressful? **Stress**

1	no
2	Sometimes
3	No
4	No
5	sometimes
6	Sometimes
7	sometimes
8	no
9	No
10	No

Q20. If you were instructed to perform the breathing exercise did it help you to be more mindful **Helpfulness of mindfulness task**

1	It definitely calmed me down and helped my to concentrate on the next step of coloring the mandala	Calming down
2	Not really	
3	yes	
4	yes	
5	Yes	
6	Yes	
7	No	
8	Yes, very shortly	
9	A little bit	

Did you notice an increase in motivation throughout the study as a consequence of coloring the mandalas regularly? **Effect motivation**

1	Probably yes
2	Definetly not
3	Probably not
4	Might or might not
5	Probably yes
6	Definetly not
7	Probably not
8	Probably yes
9	Probably not
10	Probably yes

In which way did you notice a change in your motivation throughout the study? **Effect motivation**

1	I often looked forward to having time for myself in a quiet and safe space to calm down after the first week	Relaxation
2	I looked forward to coloring the mandalas	Excitement
3	I did not	No change
4	I didn't	No change
5	The results motivated me. I had time all by myself and at the end there was a little outcome as well. I always created something Individual.	outcome
6	/	No change
7	/	No change
8	/	No change
9	I am usually pretty motivated, so nk change	No change
10	When I started I was not really motivated and it was difficult for me to start with the mandalas. But over time I was looking forward to draw the mandalas.	Excitement

Did you notice an increase in mood throughout the study as a consequence of coloring the mandalas regularly? **Effect mood**

1	Might or might not
2	Probably not
3	Probabaly not
4	Might or might not
5	Probably yes
6	Probably yes
7	Probably not
8	Might or might not
9	Probably yes
10	Might or might not

In which way did you notice a change in your mood throughout the study? **Effect mood**

1	I felt a caring feeling for myself as I did something for calming my mind every week	Self care
2	It didn't change much	No change
3	I did not	No change
4	After colouring mandalas, I was more calm and present in the here and now for a while	Relaxation mindfulness
5	I enjoyed colouring the mandalas. For me it felt relaxing.	Relaxation
6	I felt a bit more light-hearted	Relaxation
7	I didn't	No change
8	Looking at the finished piece gave me a burst of satisfaction but only shortly	Satisfaction
9	I enjoyed it, so I became a little hapier	Happiness
10	Right after the drawing I felt a bit more relaxed	Relaxation

Did you experience any obstacles when coloring the mandalas and why? **Ease of usage**

1	One time my printer was empty so I had to buy color patrons first so I had to postpone it to another day	Technical issues
2	I sometimes forgot to colour the second mandala because I got distracted by things happening around me.	Stress on top
3	No, I did not.	No problems
4	I experienced no obstacles	No problems
5	No.	No problems
6	No	No problems
7	No	No problems
8	Daily stressors	Stress on top
9	No	No problems
10	No	No problems

What helped you in order to do the mandalas? **Ease of usage**

1	a quiet place, being alone, and listing to music	Quietness
2	I tried to get both of them done right after each other so that I wouldn't be as distracted.	Time Planning
3	Having free time	Free Time
4	It helped me to calm my mind down	Relaxation
5	Enough freetime, so I could really focus on colouring the mandalas.	Free Time
6	It was fun	Fun
7	a quite environment	Quietness
8	Planning beforehand to do one	Time planning
9	Taking my time, not just the minimum amount.	Time Planning
10	To know that it will be relaxing and fun.	Relaxation Fun

Did you like receiving the mandalas via e-mail? **Ease of usage**

1	yes
2	yes
3	yes
4	yes
5	yes
6	yes
7	yes
8	yes
9	yes
10	yes

Do you have any additional notes about the intervention? **Ease of usage**

1	/	
2	no	
3	no	



4	no	
5	/	
6	/	
7	/	
8	No	
9	No	
10	It was a really nice and fun intervention. I really enjoyed it.	Fun

How many of the 6 mandalas did you actually do? **Time effort**

1	3
2	5
3	6
4	2
5	4
6	4
7	3
8	4
9	6
10	5

How did you experience the number of mandalas per week? **Time effort**

1	appropriate
2	Too little
3	Appropriate
4	appropriate
5	Too many
6	appropriate
7	Too many
8	appropriate
9	appropriate
10	Appropriate

What is an appropriate time dose to engage in mandala painting? **Time effort**

1	2-3 times a week
2	2-3 times a week
3	2-3 times a week
4	Once a week
5	Once a week
6	Once a week
7	Once a week
8	Once a week
9	2-3 times a week
10	2-3 times a week

If you were asked to perform a breathing exercise in the instructions, how often did you perform the breathing exercise actually? **Time effort**

1	3
2	3
3	1
4	2
5	4
6	4
7	5
8	4
9	6
10	5

Please indicate what you liked about the intervention **Satisfaction**

1	that we could decide by ourselves when we want to paint the mandalas and that it was something creative that could be easily applied in my day	Time planning
2	I liked the coloring since I have in general always like coloring drawings	Colours/creativity
3	I generally like painting and drawing so this was fun for me.	Colours/creativity and fun
4	I liked that it was a creative intervention as opposed to many interventions I've worked with until now.	Creativity
5	It reminded me to really take some time just for myself, where I had the chance to calm down.	Relaxation
6	It was a creative and fun intervention. I enjoyed coloring the mandalas but did not give myself enough time for it.	Colours/creativity, fun
7	Focusing on just doing this one thing and not checking the mobile	Focus
8	It's a nice and pleasant activity, helped me to take time for myself	Taking time
9	I liked the calming effect of the mandala, also that I could just focus on that for a moment	Focus relaxation
10	That you could do something you normally do not do because of limited time or because you spend your free time otherwise. But it was fun to draw the mandalas because it was calming during the stressful daily life.	Fun, Relaxation

Please indicate what you did not like about the intervention **Satisfaction**

1	maybe not being able to show my finished mandalas.	Design
2	The breathing before hand.	Design
3	It was too many mandalas	Design

4	I disliked that you were not able to decide for yourself when you would start on the new mandala	Design
5	Nothing.	No problems
6	The amount of mandalas stressed me a little bit	Time consuming
7	/	No problems
8	Sometimes it's hard to take time for it when times are extremely stressful	Time consuming
9	/	No problems
10	/	No problems

Have you been satisfied with the process (patterns, colors, fulfilment) of coloring your mandalas? **Satisfaction**

1	yes
2	yes
3	yes
4	Sometimes
5	yes
6	Yes
7	Sometimes
8	yes
9	yes
10	Sometimes

Why would you or would you not implement coloring mandalas in your daily life in the future? **Future implementation**

1	Because it is a relaxing feeling for me and it made me feel better about caring for my mental health.	Yes: mental health
2	I don't think I would be able to stick to a regular schedule for coloring mandalas, but I do like coloring them so I think I will color mandalas whenever I have time and feel like doing it	Yes: fun
3	It felt like a chore- maybe because it is a study	No: not fun
4	because it helps to calm me down when I experience stress or anxiety	Yes: Relaxation
5	It really reminds me of a little passion, I normally do not take time for.	Yes: Passion
6	I know it helps me to calm down but allowing myself to take time for it is challenging for me when I have other seemingly important things to do	No: other activities
7	Nice way to focus and concentrate	Yes: focus
8	It was fun, it's a good me-time activity, it's satisfying	Yes: fun satisfaction
9	I liked the effect it had on me, was very calming	Yes: Relaxation
10	I would do it because it helps me to calm down and concentrate on something else.	Yes: relaxation focus

Do you want to implement coloring mandalas in your daily life in the future? **Future implementation**

1	Maybe
2	Yes
3	Maybe
4	Maybe
5	Maybe
6	Maybe
7	No
8	Maybe
9	yes
10	Maybe

## Appendix E

### PSS and FFMQ

#### Perceived Stress Scale

A more precise measure of personal stress can be determined by using a variety of instruments that have been designed to help measure individual stress levels. The first of these is called the **Perceived Stress Scale**.

The Perceived Stress Scale (PSS) is a classic stress assessment instrument. The tool, while originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. The questions in this scale ask about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

**For each question choose from the following alternatives:**

**0 - never   1 - almost never   2 - sometimes   3 - fairly often   4 - very often**

- \_\_\_\_\_ 1. In the last month, how often have you been upset because of something that happened unexpectedly?
- \_\_\_\_\_ 2. In the last month, how often have you felt that you were unable to control the important things in your life?
- \_\_\_\_\_ 3. In the last month, how often have you felt nervous and stressed?
- \_\_\_\_\_ 4. In the last month, how often have you felt confident about your ability to handle your personal problems?
- \_\_\_\_\_ 5. In the last month, how often have you felt that things were going your way?
- \_\_\_\_\_ 6. In the last month, how often have you found that you could not cope with all the things that you had to do?
- \_\_\_\_\_ 7. In the last month, how often have you been able to control irritations in your life?
- \_\_\_\_\_ 8. In the last month, how often have you felt that you were on top of things?
- \_\_\_\_\_ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?
- \_\_\_\_\_ 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

#### Figuring Your PSS Score

You can determine your PSS score by following these directions:

- First, reverse your scores for questions 4, 5, 7, and 8. On these 4 questions, change the scores like this:  
0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.
- Now add up your scores for each item to get a total. **My total score is \_\_\_\_\_.**
- Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.
  - ▶ Scores ranging from 0-13 would be considered low stress.
  - ▶ Scores ranging from 14-26 would be considered moderate stress.
  - ▶ Scores ranging from 27-40 would be considered high perceived stress.

The Perceived Stress Scale is interesting and important because your perception of what is happening in your life is most important. Consider the idea that two individuals could have the exact same events and experiences in their lives for the past month. Depending on their perception, total score could put one of those individuals in the low stress category and the total score could put the second person in the high stress category.

*Disclaimer: The scores on the following self-assessment do not reflect any particular diagnosis or course of treatment. They are meant as a tool to help assess your level of stress. If you have any further concerns about your current well being, you may contact EAP and talk confidentially to one of our specialists.*



## Five Facet Mindfulness Questionnaire (FFMQ)



### Five Facet Mindfulness Questionnaire (FFMQ)

Please rate each of the following statements with the number that best describes <i>your own opinion</i> of what is <i>generally true</i> for you.		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 1	When I'm walking, I deliberately notice the sensations of my body moving. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 2	I'm good at finding words to describe my feelings. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 3	I criticize myself for having irrational or inappropriate emotions. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 4	I perceive my feelings and emotions without having to react to them. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 5	When I do things, my mind wanders off and I'm easily distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 6	When I take a shower or bath, I stay alert to the sensations of water on my body. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 7	I can easily put my beliefs, opinions, and expectations into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 8	I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 9	I watch my feelings without getting lost in them. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 10	I tell myself I shouldn't be feeling the way I'm feeling. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 11	I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 12	It's hard for me to find the words to describe what I'm thinking. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 13	I am easily distracted. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 14	I believe some of my thoughts are abnormal or bad and I shouldn't think that way. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 15	I pay attention to sensations, such as the wind in my hair or sun on my face. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 16	I have trouble thinking of the right words to express how I feel about things. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 17	I make judgments about whether my thoughts are good or bad. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 18	I find it difficult to stay focused on what's happening in the present. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 19	When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 20	I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 21	In difficult situations, I can pause without immediately reacting. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 22	When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words. (D-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 23	It seems I am "running on automatic" without much awareness of what I'm doing. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 24	When I have distressing thoughts or images, I feel calm soon after. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 25	I tell myself that I shouldn't be thinking the way I'm thinking. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 26	I notice the smells and aromas of things. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 27	Even when I'm feeling terribly upset, I can find a way to put it into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 28	I rush through activities without being really attentive to them. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 29	When I have distressing thoughts or images, I am able just to notice them without reacting. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 30	I think some of my emotions are bad or inappropriate and I shouldn't feel them. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 31	I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 32	My natural tendency is to put my experiences into words. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 33	When I have distressing thoughts or images, I just notice them and let them go. (NR)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 34	I do jobs or tasks automatically without being aware of what I'm doing. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 35	When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 36	I pay attention to how my emotions affect my thoughts and behavior. (OBS)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5



		Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
FFQM 37	I can usually describe how I feel at the moment in considerable detail. (D)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
FFQM 38	I find myself doing things without paying attention. (AA-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
FFQM 39	I disapprove of myself when I have irrational ideas. (NJ-R)	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

**Scoring:**

(Note: R = reverse-scored item)

Subscale Directions	Your Score TOTAL	Your score item Avg.
<b>Observing:</b> Sum items 1 + 6 + 11 + 15 + 20 + 26 + 31 + 36		
<b>Describing:</b> Sum items 2 + 7 + 12R + 16R + 22R + 27 + 32 + 37.		
<b>Acting with Awareness:</b> Sum items 5R + 8R + 13R + 18R + 23R + 28R + 34R + 38R.		
<b>Nonjudging</b> of inner experience: Sum items 3R + 10R + 14R + 17R + 25R + 30R + 35R + 39R.		
<b>Nonreactivity</b> to inner experience: Sum items 4 + 9 + 19 + 21 + 24 + 29 + 33.		
<b>TOTAL FFMQ (add subscale scores)</b>		

**NOTE:** Some researchers divide the total in each category by the number of items in that category to get an average category score. The Total FFMQ can be divided by 39 to get an average item score.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45.