Draw yourself happy! Exploring the Feasibility of a Mandala Intervention Targeting Stress and Anxiety of University Students

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Abstract

Background. Research suggests that mandala interventions (digital or physical painting of a circular representation for a certain time) may be an appropriate intervention for students who are particularly suffering from stress and anxiety. There are no universally accepted factors for the implementation of a mandala intervention. Therefore, this study will investigate the feasibility and acceptability of this mandala intervention in relation to the student population.

Method. A total of 27 students, 15 in the physical group and 12 in the digital group, participated in the intervention. The intervention lasted three weeks, during which participants coloured mandalas (physical or digital) twice a week under specified conditions. Their stress and anxiety levels were measured before and after the intervention, and feasibility and acceptability were assessed by a questionnaire and open-ended questions at the end of the intervention.

Results. The data suggest that the physical mandala intervention is feasible and acceptable, and student perceived stress and anxiety decreased, which was considered beneficial. In contrast, the digital mandala intervention is not feasible and acceptable, it was found that stress decreased and anxiety increased.

Conclusion. The results of the study show that the physical intervention is feasible, acceptable and gives good evidence that it is effective, but could be partially modified to further improve adherence and effectiveness. For the digital intervention, further testing of modifications is needed to make the digital intervention feasible and acceptable and to potentially make it effectiveness.

Keywords: Mandala, Art, Intervention, Feasibility, Students, Stress, Anxiety

Contents

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The prevalence of mental health problems is steadily increasing worldwide (Beerse et al., 2019). For instance, an English study showed that the number of students dropping out of education due to mental health problems has increased by 210 % in the last four years (Sheldon et al., 2021). The most common problems, that students may suffer from include *stress*, and *anxiety* (Beerse et al., 2019). Consequently, students identified stress and anxiety as a strong influence on their poor academic behaviour (Sandmire et al., 2016). It is important to emphasise that stress and anxiety do not automatically become pathological, and many students experience these problems temporarily (Brown, 2016).

Stress. Many students feel stressed, which is shown in the Unite survey (2016) where 76% reported feeling stressed, mainly due to exams and social demands (Barbosa et al., 2013; Brown, 2016). There is no single definition of stress, one of the most common being that of Selye's: *"Stress is the response of the body to any demand"* (Fink, 2016). Thus, stress can be triggered by academic and non-academic factors (Bedewy & Gabriel, 2015).The consequences of stress are negative effects on students' daily lives (Brown, 2016). More specifically, more stressors in everyday leading to various diseases such as anxiety, depression, autoimmune diseases and increased hypertension (Beerse et al., 2019).

Anxiety. Students are more prone to anxiety than most other groups, as shown by the NUS survey, where 55% of students suffer from anxiety at times (Beerse et al., 2019; Brown, 2016). Anxiety is triggered by the aforementioned stress as well as academic pressure (Beerse et al., 2019; Brown, 2016). In addition, students also have to cope with various life tasks such as social life, work, and family (Beerse et al., 2019). What can increase students' anxiety is the fact that they have to cope with stressors without their previous support from home (Brown, 2016).

This not only puts them at more risk, but can increase the negative effects of stress and anxiety on academic performance and the likelihood of dropping out (Beerse et al.,

2019). Intensifies the problem is that many students do not seek clinical counselling services and appear to be partially unaware of their problems (Beerse et al., 2019; Brown, 2016). For example, a survey in 2012 revealed that 50% of dropouts suffer from psychological problems and still have not sought support (Beerse et al., 2019). This is unfortunate because as the World Health Organization (WHO) points out that treatment and prevention of mental health problems could be achieved at low cost. However, there are still too few effective treatment options available (WHO, n.d.)

The Benefit of Art Interventions

One type of cost-effective intervention is the so-called *art intervention.* This intervention is especially advantageous as it is a non-pharmacological alternative (Crone et al., 2012). In health research, interaction with art is divided into five categories: (1) *performing art* (such as music and theatre), (2) *visual art, design, and crafts* (such as painting, photography), (3) *literature* (such as writing or reading), (4) *culture* (such as attending exhibitions and theatres), (5) *online, digital and electronic arts* (animation and graphics) (Fancourt & Finn, 2019). Over the last two decades, art interventions have become increasingly influential. As a result, research on the impact of art interventions on human health and well-being has increased (Fancourt & Finn, 2019). Arts interventions can promote mental health, depending on the type of activity, different aspects of health can be addressed such as evoke emotions, positively influence physical activities and social interactions (Fancourt & Finn, 2019). Thus, as Sandmire et al. (2016, p.566) point out, "if young adults can develop routines such as art making to help cope with stress and anxiety, they may have better academic success as well as an improved ability to maintain both psychological and physical well-being". The WHO insists that art interventions should be used more on an individual, local and national level, as the positive effects on a person's health are well sustained. (Fancourt & Finn, 2019). This begs the question of which types of art interventions could be applicable for university students.

Mandala Art Intervention

One type of art intervention that is growing in popularity is that of mandala drawing (Campenni & Hartman, 2020). Mandalas are blank, empty shapes that are organised into a circular representation. These shapes are subsequently coloured in by an individual (Pisarik & Larson, 2011). The origin of mandala as a therapeutic technique is attributed to Carl Jung, who used it for helping individuals achieve a more congruent and true self (Pisarik & Larson, 2011). During the process of mandala painting, an individual is supposed to achieve a heightened awareness as well as a strong perception of oneself, which can lead to an increased psychological well-being (Pisarik & Larson, 2011). This can be explained by the fact that while drawing, people can concentrate and express what they were thinking at that moment, thus forgetting possible confusions and retreating into themselves (Kim et al., 2018). Indeed, through drawing, individuals can achieve a "flow state", in which time passes more quickly and one is completely devoted to the task, which above all reduces brooding and anxiety (Carswell et al., 2020).

Especially in the health sector, mandala interventions are increasingly being used and can reduce stress and anxiety (Campenni & Hartman, 2020; Kim et al., 2018; Malboeuf-Hurtubise et al., 2021). This suggests that mandala interventions may be a suitable intervention for university students. The effectiveness of mandala interventions on stress and anxiety have been shown, but there are no universally agreed upon factors for the implementation. The implementation of different mandala interventions varies in the design in terms of duration and frequency and also in regard to setting, mandala choice and colours. Due to the inconsistent implementation, there is a gap in understanding which design choices are effective in general and in terms of reducing stress and anxiety in the student population.

However, there is scientific evidence for some design choices that appear to be beneficial for stress and anxiety, for example, which will be referred to as *factors* in this research. One factor is that the mandalas should be painted in a quiet place, as this helps

participants focus on the task, and subsequently enter into a flow state while painting (Carswell et al., 2020). Another factor that has been used and sustained is that participants are instructed to express their feelings in the mandalas to reduce anxiety (Campenni & Hartman, 2020). In addition, the combination of mandala painting and nature has been shown to increase psychological well-being and reduce stress (Choi et al., 2021). The instruction that participants see mandala painting as an opportunity to improve their well-being seems to be helpful. Another factor that seems to be beneficial is when the mandala design consists of circular and geometric patterns, as this encourages mindfulness (Choi et al., 2021; Moharamkhani et al., 2023). However, it is not clear to what extent these factors are feasible and acceptable for university students, which is why it is important for research to assess these factors in terms of their feasibility and acceptability as well.

Digital Mandala Intervention

As technology is ubiquitous these days, the need for digital interventions is becoming greater. In general, a growing number of art therapists are considering digital extension, in terms of digital mandala interventions. However, few research studies investigated the effectivenes of using technology in this end, creating a need to assess the benefits of technology (Carlton, 2014; Darewych et al., 2015). Particularly for the students, a digital intervention alternative could facilitate access as the student population are "digital natives" so they are familiar with web-based interventions (Beerse et al., 2019). The digital form is easier to integrate into daily routine, as well as to apply when needed. Apart from the contemporary advantage, digital mandala art interventions are more mobile, offer more options in terms of platforms and variety, are cheaper and easier to distribute (Beerse et al., 2019; Darewych et al., 2015).

Current Study

Synthesising the findings so far, students tend to experience *stress*, and *anxiety*. However, many do not seek help for these experience or are simply not consciously aware of

them (Beerse et al., 2019; Brown, 2016). This needs to be addressed, which can be achieved through mandala interventions (physical and digital). However, before such interventions can be implemented on a large scale, it is essential to develop an effective design for them. To address this issue, this study aims to develop a feasible and acceptable mandala intervention for students, both in physical and digital form, based on a design with specific factors that were shown to increase its effectiveness. This is also illustrated in Figure 1. It is expected that the study will provide information on the feasibility and acceptability of this mandala intervention (physical and digital) and determine whether specific factors have greater feasibility and acceptability in university students. It will also show where improvements are needed to the intervention so that it can actually be used by the target group. Specifically, this means increasing the likelihood that students will use and adopt the specific intervention.

In this context, *feasibility and acceptability* are defined as: the extent to which people are able to actively use the intervention and are willing to and see purpose in continuing to use it. The aim of this study is therefore to determine the feasibility and acceptability of the following mandala intervention, which is shown in Figure 1. The mandala intervention extends over three weeks, during which the students colour mandalas twice a week, either physically or digitally, depending on the group.

Research Questions

The resulting research questions (RQs) are:

RQ1: *To what extent is a physical three-week mandala intervention for students feasible and acceptable?*

RQ2: *To what extent is a digital three-week mandala intervention for students feasible and acceptable?*

RQ3: *To what extent do the students perceive a change in stress and anxiety in the physical as well as digital mandala intervention?*

Figure 1

Theoretical Model of the Study Design

Intervention design
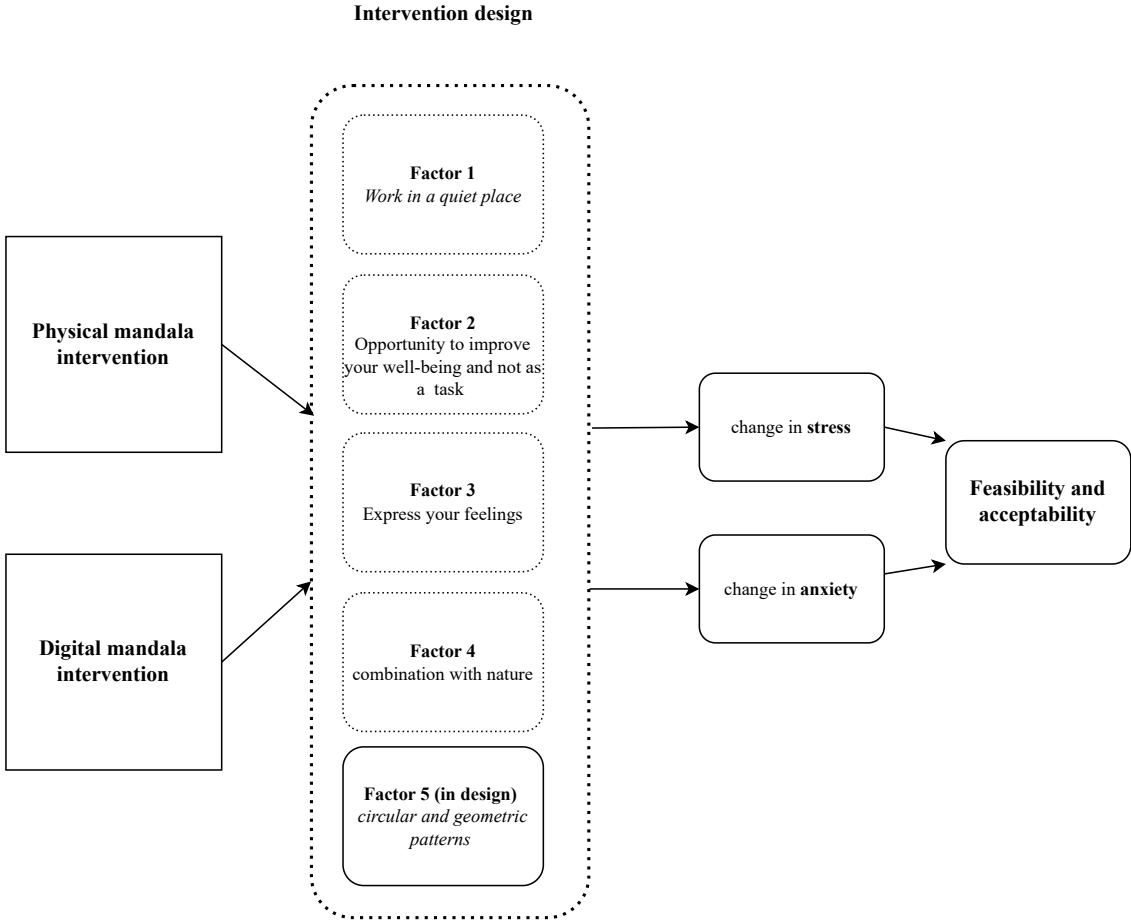
Methods

Design

This research was a feasibility study using a survey with closed as well as open questions. The extent to which the intervention is feasible and acceptable and how the variables of stress and anxiety are perceived were investigated. The participants were randomly assigned to the *physical* or the *digital* intervention group. The data collection took place between 30 March and 05 May 2023. In addition, the study was approved by the BMS Ethics Committee of the University of Twente.

Participants

Participants in this study were sampled through convenience sampling and snowball sampling. The subject portal SONA of University of Twente was also used. In order to participate in the study, participants had to be students, over 18 years of age and have a sufficient command of English. Other inclusion criteria were that participants had a printer, pens, and internet access. Before taking part in the intervention, participants gave their informed consent.

Intervention

A flow chart of the procedure of the intervention can be seen in Figure 2. The participants were randomly allocated to the *physical group* or the *digital group*. Participants were informed that this is a feasibility study in which they colour mandalas for 3 weeks. The mandalas and instructions to intervention were sent to the participants by email. It was explained that the aim was to design a mandala intervention that has the potential to improve their well-being, and to assess its feasibility and acceptability.

Physical Group. The *physical group* printed out each mandala so that it could be coloured in paper form. The pens and colours could be chosen freely by the participant.

Digital Group. The *digital group* coloured the same mandalas digitally on a website (https://colormandala.com/). The colouring worked by clicking on the field (lines, patterns etc.) of the mandalas, after the click the field is coloured. More precisely,

participants could choose whether they want to click on one, two or five fields within the design and thus coloured them in. There, the participants could freely pick the colours which are on the website.

Mandalas. The groups receive the mandalas via links in the e-mails (Appendix E). The mandalas are shown in Appendix B. By clicking on the link, the *physical group* will be directed to a PDF document where the mandala can be printed out. The *digital group*, by clicking on the link, is directed to a website where they can colour in the mandalas. It is stated that there must be three days between the mandala paintings in each week. It has been deliberately chosen that the mandalas increase in difficulty of design from the first mandala to the sixth mandala,so that the participants can familiarise themselves with colouring in the mandalas and thus try to increase adherence. For this reason, the *time* for colouring in the mandala varies per week. It was described that the participants need 15 minutes per mandala for week 1 and 20 minutes for each mandala for weeks 2 and 3. It is stated that this is only an approximation, and they are free to paint until they are satisfied. In addition, the *mandala design* for all six mandalas contains many circular and geometric patterns (Factor 5), as this favours the state of mindfulness in young adults (Choi et al., 2021; Moharamkhani et al., 2023). Mindfulness can be promoted through the patterns by reducing confusion through the process of painting them out, and furthermore, painting circles can promote relaxation (Campenni & Hartman, 2020; Kim et al., 2018).

Factors. The four factors under which the mandalas were painted and the function behind them are explained to the participants and also attached in each e-mail. *(1)Factor*: Painting mandalas in a quiet place (without music) as this helps to get into a flow state where stress and anxiety can be reduced (Carswell et al., 2020). *(2)Factor*: The intervention should be seen as a way to improve one's well-being. *(3)Factor*: When painting mandalas, try to express your feelings in them. This is because the effect of mandala painting is strongest then, especially in relation to anxiety (Campenni & Hartman, 2020). *(4)Factor*: The participant should have access to a window when painting to be able

to see nature or sit in nature when painting, as nature in connection with mandala painting can increase psychological well-being and above all reduce stress (Choi et al., 2021).

Materials

  The Perception of Academic Stress Scale (PAS). The academic stress level of the participants was measured using the Perception of Academic Stress Scale (PAS) (Appendix C1). The PAS was used because it measures the subjective perception of academic stress and is designed for students (Bedewy & Gabriel, 2015). The questionnaire consists of 18 items with a five -point Likert scale, from (1) *strongly agree* (5) *strongly disagree.* Examples of items are: *"I believe that the amount of work assignment is too much"* or *"I can make academic decisions easily".* The items can be divided into three subscales: (1) *"Academic expectations"*,(2) *"Workload and exams"*, (3) *"Students' academic self-perception".* The PAS has a fairly high reliability, with a Cronbach's alpha of $\alpha = .77$. The scale showed evidence for good content and convergent validity (Bedewy & Gabriel, 2015).

  State-Trait Anxiety Inventory (STAI-S). The participants´ anxiety level was measured with the State-Trait Anxiety Inventory (STAI-S) (Appendix C2). The questionnaire was chosen because it was commonly used in relation to the student population. The STAI-S was designed to assess the level of anxiety at the time of testing, or more specifically, the response based on the current state. The questionnaire consists of 20 items with a four- point Likert scale, from (1) *almost never* to (4) *almost always* (APA, n.d.). The STAI-S has a high reliability and validity, with a Cronbach's alpha of $\alpha = .86-.95$ (APA, n.d.).

  Feasibility and Acceptability Questionnaire for the Mandala Intervention (FAM). As there was no adequate scale available to assess the feasibility and acceptability of the current intervention, the Feasibility and Acceptability questionnaire for the Mandala intervention (FAM) was created for this intervention (Appendix C3). The questionnaires were developed based on several feasibility questionnaires, *The Usability, and Acceptability*

Questions (Mobile Health and Mobile Health Plus (Schmaderer et al., n.d.), *The feasibility and acceptability of high-intensity interval training for adults with mental illness* (Chapman et al., 2017), and *Mothers' acceptability of the online ACT Program* (Lotto et al., 2022). The FAM consists of three sections: (1) The first section concerns the acceptability of the intervention and has 11 items. The items are composed of questions, for example: "I found the mandala colouring enjoyable" or "I received enough information about the mandala colouring through the e-mails". (2) The second section focuses on the feasibility of the four factors, made up of seven items about the four factors (e.g. "I have taken all 4 factors into consideration when colouring in the mandalas"). (3) The third section of the FAM focus on the usefulness of the intervention and has six items. An example of the item is: "I believe that the Mandala Intervention would be useful for all students with stress and anxiety". The FAM questionnaire uses a five-point Likert scale, which is structured as 1 - "strongly agree" to 5 - "strongly disagree". Higher scores indicate a more positive attitude towards the mandala intervention.

Feasibility Multiple Choice Questions. After the FAM questionnaire, multiple choice questions are asked regarding the satisfaction with dose and duration of the intervention of the participants.

Open Questions About the Feasibility and Acceptability. Seven open questions (Appendix C4) were asked at the end to determine the perception of the mandala intervention. The questions asked about the advantages and disadvantages of the intervention, what helped to follow the intervention, obstacles, comments about the four factors, and suggestions for improvement.

Demographics Questions. In order to collect the demographic data of the participants, a questionnaire was created in which the participants were questioned about their gender identity, their age, and their nationality. In addition, the participants were asked about their length of study and their previous painting/colouring experience.

Procedure

  Week 1. First, the participants signed up for the intervention and afterwards received an email. The email involved the instructions for the intervention, an overview of the three weeks, explanation of the four factor and their identity code (used to match responses of the first and second survey). Additionally, the email contained the link to the Qualtrics questionnaire, which includes the PAS and the STAI-S as well as the demographics question, and links to the first and second mandala. The participants were asked to fill in the Qualtrics questionnaire first and then to colour in the mandalas.

  Week 2. In the second e-mail, the students got the same information and the links for the third and fourth mandala.

  Week 3. In the third week of the intervention, participants received two emails, on the first day and on the last day of the third week. In the first email, participants got again the similar information, as well as the fifth and sixth mandala. The second e-mail thanked the participants for taking part in the intervention and included the link to the Qualtrics questionnaire, which contains the PAS, STAI-S and FAM questionnaires.

Data Analysis

  The collected datasets were downloaded and imported from the survey platform into SPSS version 28.01. The four datasets were then merged and combined into one. Participants who did not answer items or did not complete the second Qualtrics questionnaire were excluded. In answering each of the research questions, both qualitative and quantitative measures were used in conjunction to most precisely answer them.

  Research Question 1. In a first step to answer research question 1, *To what extent is a physical three-week mandala intervention for students feasible and acceptable?*, the answers to the feasibility multiple-choice questions and the FAM questionnaire of the physical students were evaluated. In addition, the FAM open-ended questions were analysed following the article by Reese et al. (2021) and were slightly adjusted to the intervention design: Participants' responses to the seven questions were reviewed. Then the

statements that were essential in relation to the question were identified and classified into larger topics through hierarchical coding. Furthermore, the (relevant) responses were then coded according to the specific aspects of the intervention. The present analysis is organised according to the participants' responses. At the end, the important qualitative and quantitative statements were compared.

Research question 2. In order to be able to answer research question 2, *To what extent is a digital three-week mandala intervention for students feasible and acceptable?*, the same was done as for research question 1, only for the digital condition.

Research question 3. To answer research question 3, *To what extent do the students perceive a change in stress and anxiety in the physical as well as digital mandala intervention?*, the FAM questionnaires were evaluated quantitatively per group. In addition, the answers to the open question per group were evaluated following the article by, Reese et al. (2021) as described above.

Furthermore, possible differences between the pretest and posttest of the PAS (for stress) and STAI-S (for anxiety) questionnaire of both groups are examined. For this, linear models were used, treating the measurement time (levels pre & post) as predictor and the respective sum score variables as outcome. The size of the difference between pretest and posttest was analysed separately for both groups and variables. Inferential analyses were reported but not interpreted due to their limited possible implications because of the small sample size. At the end, the important qualitative and quantitative statements were compared.

Flow Chart of Procedure

Figure 2

Flowchart of the Study's Procedure
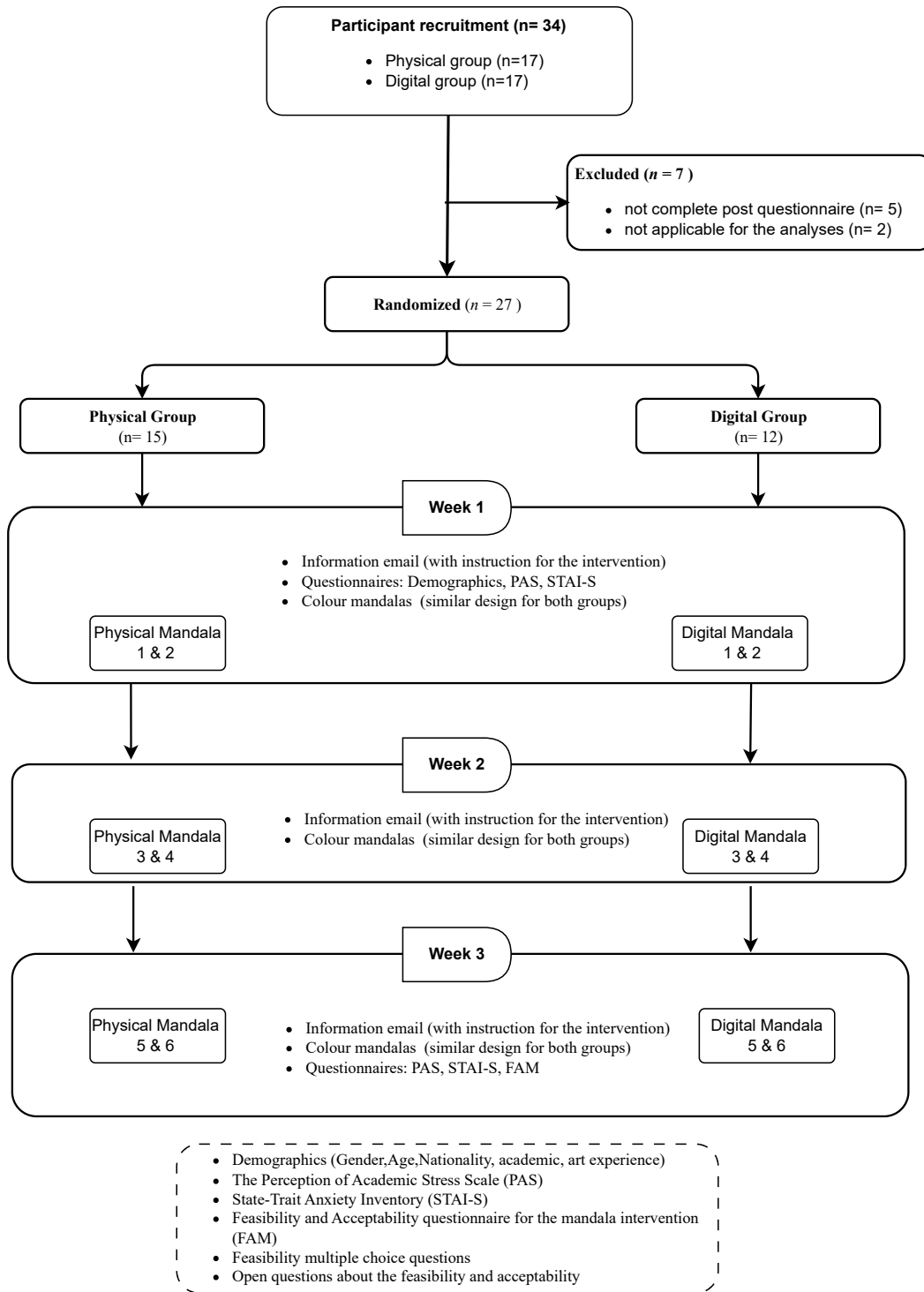
Results

Participant Flow and Descriptive Statistics

A total of 34 people participated in the study, 17 per group. Two participants in the physical group and five participants in the digital group were excluded because they had not completed the questionnaires. This resulted in a sample of 27 participants; 15 in the physical group and 12 in the digital group. Of the 27 participants, 11 (40.7%) identified as women and 16 (59.3%) identified as men. The age of the participants ranged from 18 to 26 years (SD=1.85) with an average age of 22.52 years. In terms of nationality of the participants, 24 (88.9%) are German, 2 (7.4%) Dutch and 1 (3.7%) Finnish. Furthermore, 6 (22.2%) of the respondents have been studying at the university for one year, 2 (7.4%) for two years, 6 (22.2%) for three years and 13 (48.1%) for more than three years. When asked how often they colour in their free time, 12 (44.4%) not colouring at all in the last 12 months, 7 (25.9%) colouring less than once a week, 6 (22.2%) once a week, 2 (7.4%) more than once a week.

The demographics characteristics are roughly the same for both groups. In the physical group, 9 (60.0%) identified as women and 6 (40.0%) as men, the average age was 22 years (SD = 2.384). Within the digital group, 7 (58.3%) respondents identified as women and 5 (41.7%) as men, furthermore the average age was also 22 years (SD=.89).

Feasibility and Acceptability of the Physical Mandala Intervention (RQ1)

In the following, the multiple choice questions on feasibility are presented. The participants in the physical group (N=15) painted an average of 5 mandalas (M=5.27, SD=.799), with a minimum of 4 and a maximum of 6 mandalas. Next to that, 80% found the intervention length appropriate (Appendix D1) as well as the number of mandalas suitable, with 72% (Appendix D2).

In addition, the results of the physical participants' responses to the FAM questionnaire are presented in the Table 1, which shows section 1 (acceptability) and section 2 (feasibility of the factors) of the intervention. The items illustrated that many

participants would also do this intervention outside the study. The items also showed that the intervention worked with clear instructions and that the e-mails were perceived as helpful. Furthermore, the students seemed to like the design and also the amount of circles in the design. The items also showed that many considered the four factors (which participants had to consider while colouring in the mandala) of the intervention and were also found to be helpful. Especially the factor of nature was found to be particularly helpful. Furthermore, it seemed that many students were able to get into the flow state.

Table 1

FAM: Acceptability, Feasibility of the intervention in the physical group

Item	Min	Max	Mean	SD
Section 1: Acceptability				
I found the mandala colouring enjoyable.	3	5	4.33	.617
I found the mandala colouring easy.	4	5	4.40	.507
I looked forward to the mandala sessions.	3	5	4.07	.704
I would like to continue doing this kind of mandala drawing outside the study.	2	5	3.60	.986
I would feel confident being able to do this kind of exercise when having a bad day.	2	5	3.73	.961
I found the mandala intervention easy to follow.	4	5	4.60	.507
I think the mandala intervention worked with clear instructions.	4	5	4.67	.488
I received enough information about the mandala colouring through e-mails.	4	5	4.67	.488
I liked the design of the mandalas.	1	5	4.20	1.146
I liked that there were many circles in the design.	2	5	3.87	.915
I liked that the mandala painting was physical.	3	5	4.47	.640
Section 2: Feasibility of the four factors				
I have taken all 4 factors into consideration when colouring in.	2	5	4.13	.915
The consideration of the 4 factors, when colouring in mandalas to reduce stress and anxiety, were helpful.	4	5	4.33	.488
I found the factor that I should colour the mandalas in a quiet place helpful.	2	5	4.27	.961
I was able to get into a state of flow.	2	5	4.13	.834
I found the factor to improve my well-being and not to see it as a task helpful.	3	5	4.07	.594
I considered the factor that I should remember to express my feelings while colouring helpful.	2	5	3.93	.884
I found the factor of choosing a natural place when colouring a mandala helpful.	2	5	4.33	.816

Qualitative Analyses - Physical Group

Topic 1: Printing

Seven of the 15 participants mentioned that they found it difficult to print out the mandalas. As a result, five participants described that they did not colour in all the mandalas: *"disliked having to print out the mandalas, this was a bit of a hastle for me and almost caused me to miss out drawing them in".* The participants suggest how to counteract this by printing out the mandalas. The majority of respondents perceived printing as effortful and did not like to print out.

Topic 2: Mandalas

Variety of Mandala Options. Another topic, mentioned five times by a total of 15 students, is that the participants' requested for more choice and variety in the design of the mandalas. The reasons for selecting between different mandala designs varied among the participants. As one participant described: *" [...]Providing more designs would also allow you to choose a design that speaks to you and that fits your mood".* Three other students would like to have a more varied choice because they can choose between a more difficult or easier design. A further reason is that the greater variety of mandalas provides the opportunity to colour in more mandalas, as one student described: *"During this intervention I experiences twice that I felt like I wanted to colour again but I had already completed both my mandalas for the week. [...]".* This shows that 5 out of 15 participants would have liked to have more choices in the mandalas.

Design of the Mandalas. The opinions on the design of the six mandalas varied. Two students of 15 reported that they did not like the design of the mandalas: *"[...] For a lot of them there were quite large "backgrounds' so to say".* As a consequence, not all mandalas were coloured in. On the other hand, three participants of 15 described that they found the design appealing. Especially the compilation of the design of the mandalas, was considered to be positive: *" [...] liked the design of the mandalas very much. It felt as if they were getting more complex but never frustrating"*

Topic 3: Reminders

E-mail Reminders. In general, the users agreed, ten out of 15, that the weekly email reminders were helpful in following the intervention. Further, four participants mentioned that they set specific reminders for themselves, with a time and day, so that they could better integrate the intervention into their daily lives: *"[...] So I tried to choose a time (usually quite late at night) to colour the mandalas so I would not get disrupted/distracted"*. Throughout the intervention, one participant developed a strong motivation to colour the mandalas so that the student no longer needed reminders: *"After a while my own motivation because I enjoyed it by in the beginning mainly the reminders. I ended up putting the mandala on my desk in the beginning to not forget about them"*. Some, 4 out of 15, would have liked more specific reminders and more precise information in general.

App Reminders. In addition to the point above, two students suggested using an app instead of e-mail reminders: *"Maybe instead of email reminders an app could be implemented that reminds me of painting the mandalas"*. The reason given was that the app would allow to plan exactly when to complete a mandala, and it would also be a more precise reminder in terms of day and time, as the participant's quote shows: *"Eventually an app with real reminders instead of just once per week. I would love to have them scheduled and reminded at that moment"*. This presents that the majority of respondents found reminders acceptable and therefore helpful to complete the intervention.

Topic 4: Four Factors

Music. One topic that was mentioned frequently (6 students) was the inclusion of music: *"Sometimes I would have liked to listen to relaxing music while filling them out"*. Furthermore, three noted that the combination of painting and music would not only have been more comfortable, but would also have helped them to concentrate better: *"Maybe explain why you are not allowed to listen to music. I dont really understand because i usually find listening to music helps me focus better"*. As a result, two participants described the consequences they get: *"However, I personally prefer drawing while listening*

to music otherwise it's hard for me to get in a flow". By contrast, three participants stated that they had to get used to painting without music and expressed: *"I always have music or a tv series in the background of everything I do. When colouring these mandalas, this was not allowed. In the beginning this felt a little awkward and uneasy because I am not used to this at all, but in the end it was quite nice to do just one thing without extra stimulation".* In two cases, the users preferred the fact that no music had been played, as one described: *"I like the fact that it should be quiet".*

Nature. Three individuals answered that the factor of being in or facing nature, such as painting in front of a window, was found to be more enjoyable when the participant was in nature, as the quote from this participant shows.: *"I think it works better in nature than close to a window ".*

Topic 5: Satisfaction

Easy Intervention. Overall, participants reported that they had no problems following the intervention and furthermore, six described the intervention as easy and enjoyable. One participant commented that the intervention has become a habit, which the quote illustrates: "*Sometimes it was when I forgot to draw, or when I felt stress. But setting myself a schedule allowed me to follow it. Throughout the time it also became more of a habit which made it easier for me, especially in the third week it almost felt weird to think about not drawing in mandalas next week for some reason".*

Group Intervention. Two participants reported that they found it pleasant to paint the mandalas with others at the same time: *"maybe it can be motivating to draw the mandalas with other One evening my housemates joined me that was nice"* and "*It would be nice to paint the mandalas with other people but I dont know how to implement that or how realistic it is".*

Table 2 provided an overview of the results of the qualitative and quantitative data, showing both confirmatory and contradictory results.

Table 2

Comparing qualitative and quantitative findings of the physical group in RQ 1

Qualitative topics	Quantitative findings	
	Confirmatory findings	**Conflicting findings**
Topic 1: "Printing" *is perceived as an obstacle*		Looked forward to the mandala sessions (M=4.40, SD=.507)
Topic 2: "Mandalas"		
Subtopic: "Variety of Mandala Options" *was wished for*		
Subtopic: "Design of the Mandalas"	Liked the design (M=4.20, SD=1.146) Liked the many circles in the design (M=3.87, SD=.915)	
Topic 3: "Reminders"		
Subtopic: "E-mail Reminders"	Received enough information through the e-mail reminders (M=4.67, SD=.488)	
Subtopic: "App Reminders"		
Topic 4: "Four Factors"		
Subtopic: "Music" *was wished for*		Found the factor to colour the mandalas in a quiet place helpful (M=4.27, SD=.961)
Subtopic: "Nature"	Found the factor of choosing a natural place when colouring a mandala helpful (M=4.33, SD= .816)	
Topic 5: "Satisfaction"		
Subtopic: "Easy intervention"	Found the mandala colouring easy (M=4.40, SD=.507) Found the mandala intervention easy to follow (M=4.60, SD=.507) Found the mandala colouring enjoyable (M=4.33, SD=.617) Looked forward to the mandala sessions (M=4.07; SD=.704) Liked to continue doing this kind of mandala drawing outside the study (M=3.60, SD=.986)	
Subtopic: "Group Intervention"		

Feasibility and Acceptability of the Digital Mandala Intervention (RQ2)

Below are the results of the multiple-choice feasibility questions. In the digital group, the participants (N=12) also painted an average of 5 mandalas (M=5.08, SD=1.505), however, with a minimum of 1 and a maximum of 6 mandalas. In addition, 75% found the duration of the intervention appropriate D1) and 67% found the number of mandalas appropriate (Appendix D2)

Table 3

FAM: Acceptability, Feasibility of the intervention in the digital group.

Item	Min	Max	Mean	SD
Section 1: Acceptability				
I found the mandala colouring enjoyable.	2	5	3.75	.866
I found the mandala colouring easy.	4	5	4.67	.492
I looked forward to the mandala sessions.	2	5	3.25	.965
I would like to continue doing this kind of mandala drawing outside the study.	1	5	2.42	1.379
I would feel confident being able to do this kind of exercise when having a bad day.	1	5	3.42	1.379
I found the mandala intervention easy to follow.	4	5	4.33	.492
I think the mandala intervention worked with clear instructions.	3	5	4.08	.669
I received enough information about the mandala colouring through e-mails.	3	5	4.33	.651
I liked the design of the mandalas.	2	5	3.83	1.030
I liked that there were many circles in the design.	2	5	3.92	.996
I liked that the mandala painting was digital.	1	5	2.42	1.564
Section 2: Feasibility of the four factors				
I have taken all 4 factors into consideration when colouring in the mandalas.	1	5	3.42	1.165
The consideration of the 4 factors, when colouring in mandalas to reduce stress and anxiety, were helpful.	2	4	3.25	.754
I found the factor that I should colour the mandalas in a quiet place helpful.	2	5	3.58	.900
I was able to get into a state of flow.	1	4	2.75	1.138
I found the factor to improve my well-being and not to see it as a task helpful.	2	4	3.00	.739
I considered the factor that I should remember to express my feelings while colouring helpful.	1	5	3.42	1.084
I found the factor of choosing a natural place when colouring a mandala helpful.	2	5	3.42	.900

In addition, the results of the digital groups' responses to the FAM questionnaire are shown in Table 3, which presents section 1 (acceptability) and section 2 (feasibility of factors) of the intervention. The items indicated that participants did not like that the intervention was digital and were unlikely to continue with it. However, participants found

the intervention easy and the reminders helpful. The items also indicated that the participants liked the design of the mandalas and the circles that were in them. The items also showed that the four factors were only partly used and also only partly considered helpful. The participants found the factor of the quiet environment especially helpful. In addition, only a few participants managed to get into the flow state during mandala painting.

Qualitative Analyses - Digital Group

Topic 1: The Activity Colouring

Online Colouring is not Engaging. 11 users out of 12 described that they experienced digital mandala painting as not really pleasant. The main reason is that it is less fun to paint online, as the student's quote makes clear: *"The digital coloring of the mandalas was not really engaging"*. Four participants explained in more detail that the technical implementation of online colouring was less attractive, and criticised the fact that the colouring is done by clicking: *"I did not like the clicking for colours. (for smaller pieces it was not always working: misclick protection) I did not like the cursor count also when it was helpful to be done quickly"*. Another participant concluded that: *i dont think that digitally coloring mandalas necessarily works less well than physically, but coloring by clicking the touchpad on my laptop didn't feel that engaging"*. A further reason that was mentioned three times was that the digital colouring was done too quickly so that the participants could not get into the flow state: *"didn't like that it was digital (This takes the flow and one mandala is done too fast and I didn't want to draw the same mandala again"*. One participant described a solution for this: *"doing it with a tablet and a digital pen would for example still be very much engaging"*. Except for one participant, all other digital group users affirmed that online painting is not engaging. The main reason people do not find online colouring appealing is that colouring is done by clicking.

Interest in Physical Colouring. Five participants, out of 15, concluded that they would have preferred physical painting: *"I liked the idea, but I would have preferred to*

colour them in physically and not digitally". In addition, there was mentioned an increased interest in physical painting and that the participants could imagine using the intervention physically in the future, as shown for example by the participant's quote: *"I developed an interest for colouring and even bought myself a mandala book".*

Colour selection. The choice of colours was an issue that was raised four times,out of 12, in the open questions: *"Maybe offering the option to pick more specific colours from a colour table".* The limited choice of colours had the effect of making it less possible to express one's feelings, according to one student: *"colouring according to your feelings: online is hard because the pre-chosen colours and customise colours are quite time-consuming".* Interestingly, two participants preferred exactly that, so that they did not have to worry about the colours and use the ones that were available:*"I liked that you did not have to worry too much about choosing the "wrong" colours".*

Topic 2: Reminders

The e-mail reminders were considered helpful, *"Reminders in my calendar helped me to stick to it".* However, four of the users indicated that they would have preferred to have specific reminders for the exact day rather than just one reminder per week: *"Getting a reminder for that specific day, not a reminder for the whole week".* The majority of participants agreed that reminders are helpful and wished more specific information, which was also the case in the physical group.

Topic 3: Four Factors

Difficulties to include the four factors. With regard to the four factors, it can be noted that four students, out of 12, wrote down that they found it difficult to take them into account. As a result, some individuals did not consider any factors during the intervention,*"I did however completely miss the '4 instructions mentioned', I do not recall them at all".*

Nature. Of the four factors, the nature factor was discussed in more detail. The difficulty of including nature in the digital mandala was pointed out: *"Not choosing*

something natural. you needed internet or you stayed home anyway". Another student added that this one considered that the difficulty of integration is due to the season: *"I think in the summer it will be easier to go into nature for drawing"*. The results of the qualitative evaluation show that participants had problems taking the four factors into account in the intervention, especially the factor of nature is partly a problem due to the digital aspect.

The results of the qualitative and quantitative data in terms of confirmatory as well as contradictory findings are summarised in the Table 4.

Table 4

Comparing qualitative and quantitative findings of the digital group in RQ2

Qualitative topics	Quantitative findings	
	Confirmatory findings	Conflicting findings
Topic 1: "The Activity Colouring"		
is perceived as an obstacle		
Subtopic: "Online Colouring is not Engaging"	Liked that the mandala painting was digital (M=2.42, SD=1.564)	Found the mandala colouring enjoyable (M=3.75, SD=.866)
	Like to continue doing this kind of mandala drawing outside the study (M=2.42, SD= 1.379)	
Subtopic: "Interest in Physical Colouring"		
Subtopic: "Colour selection"		
wished for more		
Topic 2: "Reminders"	Received enough information about the mandala colouring through the e-mails (M=4.33, SD=.651)	
Topic 3: "Four Factors"		
Subtopic: "Difficulties to include the four factors"		Have taken all factors into consideration when colouring in the mandalas (M=3.42, SD=1.156)
Subtopic: "Nature"	Found the factor of choosing a natural place when colouring a mandala helpful (M=3.42, SD=.900)	

Effect on Stress and Anxieties (Research Question 3)

Perceived Impact in the Physical Group

Table 5 displays the section 3 (usefulness of the intervention) of the intervention in the physical group. According to the items, respondents felt less stressed and less anxious after participating in the mandala intervention. The items indicated that the participants described the intervention as useful for other students and stated that the intervention was easy to learn. Another item indicated that the intervention is easy to integrate into everyday life.

Table 5

FAM: Usefulness of the intervention in the physical group

Item	Min	Max	Mean	SD
Section 3: Usefulness of the intervention				
The mandala painting has improved my wellbeing.	2	4	3.73	.594
I have the feeling that I am less stressed through the mandala intervention.	2	5	3.73	.799
I feel that I am less anxious because of the mandala intervention.	2	4	3.53	.640
I believe that the mandala intervention would be useful for all students with stress and anxiety.	3	5	3.93	.704
I think that most students would learn to use this mandala intervention very quickly.	4	5	4.40	.507
I could easily integrate the intervention into my daily life.	3	5	3.93	.594

Topic 6: Stress

In response to the question about the benefits of the intervention, 10 out of 15 students described feeling calmer and less stressed with different statements.Partly, respondents explained their reasons for feeling calmer and less stressed, such as that they have entered a flow state, for example, as shown by the participant's statement: *"I felt more relaxed I could enter a sort of flow state that actually transferred over to tasks I did afterwards, I felt like I was more in the moment. [...] Some nice childhood memories came up which was unexpected but felt really pleasant and raised my mood almost every time"*. Another cause was that the students were distracted from their thoughts, as for example, one of them outline: *"I felt calm and happy during the sessions. I liked going outside to do*

it or sitting next to the window. It felt relaxing. All in all I feel less stressed and they provided a nice way to distract me from negative thoughts". Another reason given by the students was: *"I could take my mind off of things while drawing".*

Perceived Impact of the Digital Group

The following Table 6 reports on section 3 (usefulness of the intervention) within the digital group. The items indicated that the participants perceive only a very slight reduction in stress and anxiety as a result of the intervention. Only a few students describe the digital interview as useful for other students. In contrast, the items demonstrated that the interview is easy to learn and to integrate into everyday life.

Table 6

FAM: Usefulness of the intervention in the digital group

Item	Min	Max	Mean	SD
Section 3: Usefulness of the intervention				
The mandala painting has improved my wellbeing.	1	4	2.75	1.055
I have the feeling that I am less stressed through the mandala intervention.	1	4	2.33	.888
I feel that I am less anxious because of the mandala intervention.	1	4	2.42	.996
I believe that the mandala intervention would be useful for all students with stress and anxiety.	2	4	3.17	.835
I think that most students would learn to use this mandala intervention very quickly.	3	5	4.25	.754
I could easily integrate the intervention into my daily life.	2	5	3.92	.900

Topic 4: Stress and Creativity

In response to the open question about how participants benefited from the intervention, stress was mentioned as a common topic by seven of the 12 students. For illustration purposes, participants identified the following: *"It reminded me that mandalas help to relax and I should do it more often".* Two responded that there were even able to enter the flow state, as illustrated by the explanation of one participant: *"[...] I did manage to get into a state of flow for a moment while drawing the mandelas".* Next to stress, four users described that they benefit from the expression of creativity. As one mentioned: *"Incorporating creative breaks into my everyday life will be something I will try to keep*

doing". More precisely, two explained that they were able to express their feelings through the colours: *"I liked the thought to express my feelings in the colors"*.

**Results of the Pre and Post Measurement by Stress**

Linear models were performed to see whether the qualitative implications described are also reflected in the quantitative data. While inferential statistics are reported, these are not interpreted since the small sample size did not allow drawing implications from them. In the box plot in Figure 3, the results of the Perception of Academic Stress Scale (PAS) are presented for the physical and digital group.

Physical group. To investigate the change in perceived stress within the physical group, a linear model was used, treating measurement (levels pre & post) as predictor and the sum score of the PAS as outcome. Within this sample, the pre sum score (M=55.47, SD=8.50) of stress decreased in comparison to the post score (M=51.93; SD=7.14). The relationship was found to be not significant with (B = -3.53, $t(11)$=-1.23, 95% CI [-9.4, 2.34], p=.228).

Digital group. To investigate the change in perceived stress within the digital group, a linear model was used, again treating measurement (levels pre & post) as predictor and the sum score of the PAS. Within this sample, the pre sum score (M=57.92, SD=7) of stress decreased in comparison to the post score (M=51.25; SD=5.34). The relationship was found to be significant with (B=-6.67, $t(11)$=-2.62, 95% CI [-11.94, -1.39], p=<.05). In summary, stress was reduced in both groups, it was reduced slightly more in the digital group, but these were also more heavily stressed from the start (Physical group: M=(M=55.47, SD=8.50) and digital group: (M=57.92, SD=7)).

Results of the Pre- and Post-Measurement by Anxiety

The same statistical analysis as for stress was carried out for anxiety. A box plot in Figure 4 illustrates the results of the State-Trait Anxiety Inventory (STAI-S) are reported for the physical and digital group.

Figure 3

Boxplot of Stress scores
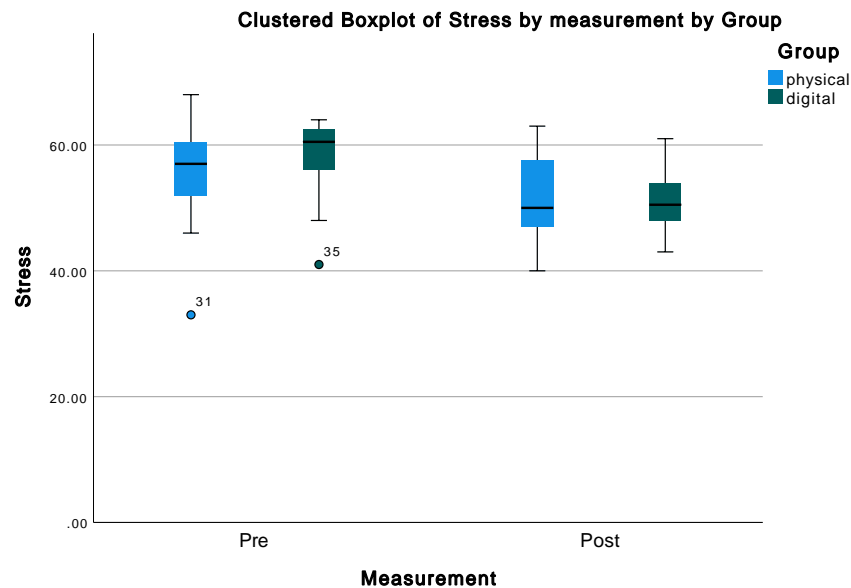
Physical group. To investigate the change in perceived anxiety within the physical group, a linear model was used, treating measurement (levels pre & post) as predictor and the sum score of the STAI-S as outcome. Within this sample, The sum anxiety pre-score (M=43.13, SD=8.78) decreased in comparison to the post score (M=42.60, SD=6.57). The relationship was found to be not significant with (B=-.53, t(14)=-.19, 95% CI [-6.33, 5.27], p=.852).

Digital group. To investigate the change in perceived anxiety within the digital group, a linear model was utilised, treating measurement (levels pre & post) as predictor and the sum score of the STAI-S as outcome. Within this group, the sum anxiety pre-score (M=45.33, SD=6.44) increased in comparison to the post score (M=45.5000, SD=6.26). The relationship was found to be not significant with (B=.17, t(14)=.06, 95% CI [-5.21, 5.55], p=.949). In summary, anxiety has decreased in the physical group and increased in the digital group.

Figure 4

Boxplot of Anxiety scores

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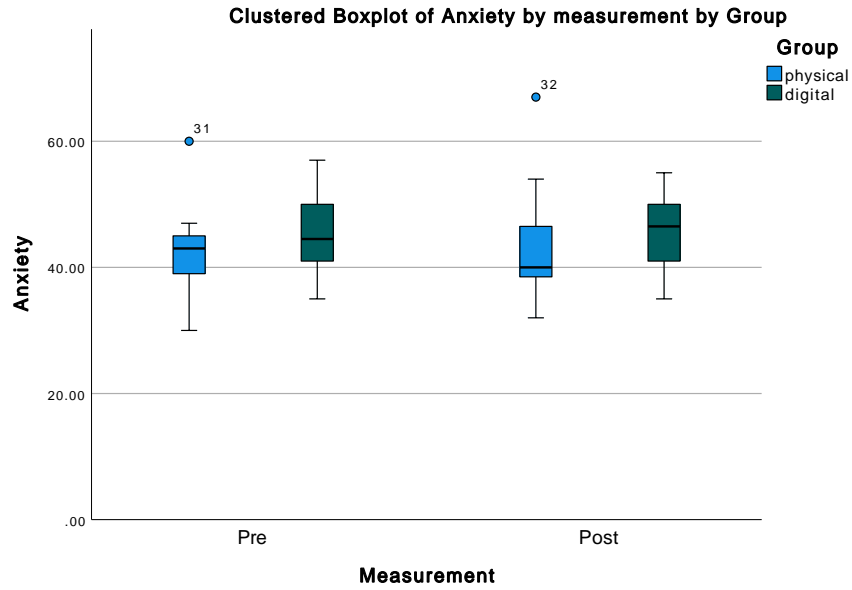
In order to have a better understanding of the overlap between the qualitative and quantitative findings, both data have been listed in terms of confirmatory and contradictory results (Table 7 for physical and Table 8 for digital) The results of the scales are to some extent consistent with the aforementioned perceived findings of the respondents on stress and anxiety.

Table 7

Comparing qualitative and quantitative findings of the physical group in RQ 3

Qualitative topics	Quantitative findings	
	Confirmatory findings	**Conflicting findings**
Topic 6: "Stress" *perceived a reduction*	FAM: Mandala painting has improved my wellbeing (M=3.73, SD=.594) Have the feeling that I am less stressed through the mandala intervention (M=3.73, SD=.799) Mandala intervention would be useful for all students with stress and anxiety (M=3.93, SD=.704) PAS: Pre measurement (M=55.47, SD= 8.50) Post measurement (M= 51.93, SD= 7.14)	

Table 8

Comparing qualitative and quantitative findings of the digital group in RQ 3

Qualitative topics	Quantitative findings	
	Confirmatory findings	**Conflicting findings**
Topic 4: "Stress and creativity" *perceived a reduction in stress*	FAM: Mandala intervention would be useful for all students with stress and anxiety (M=3.17, SD=.835) PAS: Pre measurement (M=57.92, SD=7) Post measurement (M=51.25, SD=5.34)	FAM: Have the feeling that I am less stressed through the mandala intervention (M=2.33, SD=.888)

Discussion

The aim of the study was to determine the feasibility and acceptability of a three-week mandala intervention (physical and digital) targeting stress and anxiety in university students. While the physical mandala colouring was deemed to be feasible and acceptable among university students, the digital intervention was perceived as not feasible and acceptable enough.

Feasibility and Acceptability of the Physical Mandala Intervention

The feasibility and acceptability of the physical mandala intervention was confirmed in the quantitative and qualitative part of the evaluation of the intervention. The high adherence (on average 5 out of 6 mandalas completed) as well as the satisfaction with the duration of the intervention and the number of mandalas per week were positive results. Overall, the implementation of the intervention was described as simple and easy to integrate. This feasibility and acceptance could be mainly due to the fact that the colouring took place physically, which can be confirmed in the science, as the interaction through colouring can evoke satisfaction in people (Vandoren et al., 2008).A possible explanation for this is the finding of Pisarik and Larson (2011), which confirms that a state of well-being can be induced after colouring.

An additional positive aspect of the intervention that stood out was that the respondents were satisfied with the reminders and found them supportive in the process of the intervention. In some cases, participants would have liked more specific instructions and information, e.g. on which specific day they should colour in the mandalas. Studies on behaviour change confirm that more reminders can help reinforce a person's behaviour, so more reminders could be used to modify the intervention in the future (Liddelow et al., 2023). In addition, some wished for the intervention to be supported by an app, this would also be beneficial for providing reminders as mobile apps are increasingly being used in the health sector (Lau et al., 2020). In addition, the participants suggested that the intervention could be extended as a group intervention, which can be considered as a

possible option as the literature so far supports the idea that group interventions are effective (Jafar et al., 2016). However, there is no study on group interventions for mandala colouring yet, so this should be tested in the future before this will be implemented.

Printing was perceived as the main obstacle to colour the mandalas. This is underlined by a study of Hinckley (1985), which states, the greater the workload for the participants, the less likely it is that everyone will participate full time. One possible solution to this problem is to provide participants with printed mandala sheets to reduce the workload. This should be adapted for future interventions. Another aspect that was perceived as an obstacle was the choice within the mandalas. This is confirmed by research postulating that participants are supposed to express their feelings with the mandalas, and if they do not like the design, it might be difficult to draw the way one feels at that moment (Campenni & Hartman, 2020). The aspect of choosing more mandalas should be tested and implemented if necessary.

With regard to the four factors (which the participants should take into account during the intervention), the participants seemed to be mostly satisfied and included them, the most likely explanation would be that these were perceived as effective. However, the factor of a quiet environment was partly perceived as an obstacle in the qualitative part, interestingly, only among participants in this group. Previous research has confirmed that listening to music can have a calming effect on the individual, leading to attention being focused on something pleasant, and can also contribute to entering a flow state (Bradt et al., 2013; Warr et al., 2018). For this reason, future interventions should investigate the aspect of music during colouring. Another factor that was discussed in more detail by the participants was that they perceived the nature factor as helpful, but emphasised that they could use it even better if they were fully in nature. This also in line with Choi et al. (2021), which found that colouring mandalas in nature positively influences well-being. This suggests that the factor could be better utilised if the participants were instructed to paint the mandalas entirely in nature. However, this needs to be further tested in relation

to the sample of students before it is implemented.

Feasibility and Acceptability of the Digital Mandala Intervention

The feasibility and acceptability of the digital mandala intervention was not confirmed in the quantitative and qualitative part of the evaluation of the intervention. Although the adherence was high (on average 5 out of 6 mandalas) and the satisfaction with the duration and number of mandalas was observed. It should be noted that almost none of the participants from the digital group would continue to use the intervention. However, participants indicated that they were interested in using the intervention physically. Within the digital intervention, the main obstacle was the activity of digital colouring, which is done by clicking on the boxes and was not perceived as satisfactory by the participants. This is underlined by the study of Vandoren et al. (2008), where participants were comfortable with digital colouring when it was made more realistic (e.g. an interactive colouring surface so that brush strokes could be followed in detail) in an attempt to develop digital colouring as a natural interaction. In future, the digital mandala intervention could be made more physical, for example by having participants paint with a pen on a tablet rather than clicking on it. This could also be effective, as previous research has shown that the activity of physical colouring can lead to increased awareness and self-awareness, which can increase an individual's physical well-being (Pisarik & Larson, 2011). Another aspect that was considered an obstacle was the choice of colours, which was surprising as the respondents could choose between 30 colours and the custom function allowed them to mix colours. Perhaps this is due to the fact that the participants were not yet familiar enough with the website. If some were not comfortable with the website and thus did not have the right colours available, this might have influenced the feasibility and acceptability of the intervention. For the future, one can consider whether a website should be used at all, and if it is used, how it can be made user-friendly, taking into account that digital colouring is becoming more physical.

One positive aspect that stood out was that the participants found the reminder

emails helpful, like the physical group. Another commonality was that the digital group also wanted more specific reminders and information, which should be taken into account when modifying the intervention. With regard to the four factors, the participants did not seem to be satisfied and considered them less, also in comparison to the physical group. The nature factor was seen as an obstacle, as one needs internet access to paint completely in nature, which is more difficult due to the digital components and the laptop. In addition, as in the physical group, the aspect was expressed that the nature factor can be used more effectively when drawing completely in nature. For a modification of the intervention, the nature factor should be checked and adjusted, for example offering an offline version of the intervention.

The Change Students Perceive in Stress and Anxiety

Physical Group

The reduction of stress (-3.53) and anxiety (-.53) after participating in the physical mandala intervention was confirmed in the quantitative and qualitative part of the evaluation of the intervention. In particular, participants reported in the open questions that they felt less stressed and even calmer as a result of the intervention. This can be explained by the fact that while colouring the mandala, students focused on colouring and less on their thoughts. This is consistent with previous research showing that the process of colouring mandalas generally leads to better well-being and less stress (Kim et al., 2018; Malboeuf-Hurtubise et al., 2021). Another important aspect is that participants were able to partially enter a flow state; previous research confirms that this can reduce stress and anxiety (Carswell et al., 2020). The reduction in anxiety was only confirmed quantitatively, but not actively described in the open questions. A possible explanation for this may lie in the findings of Beerse et al. (2019) who report that students are often not aware of their problems, which would explain why they had not actively described it. Nevertheless, this shows a positive change after the intervention, and future research could investigate how students become aware of their anxiety and adapt the intervention accordingly.

Digital Group

The decrease in stress after the digital mandala intervention was confirmed in the quantitative (-6.67)and qualitative part of the evaluation of the intervention. In contrast, a quantitative increase in anxiety was found. Specifically, some students reported feeling more relaxed and less stressed overall as a result of colouring. A few were even able to enter a flow state. The decrease in stress was unexpected because the intervention was not feasible and acceptable, which raises the question of why the intervention was partially effective if it was not feasible and acceptable to the students.Possible explanations need to be explored, as there is currently little research on digital mandala interventions. One possibility is that the effectiveness was caused by an unknown factor that functions even without feasibility/acceptability. With regard to the increase in anxiety, possible explanations need to be explored. One possible explanation could be that anxiety increased because the feasibility of the digital colouring exercise did not work. However, this assumption needs to be tested in the future. In future studies, a control group could be included to examine the effectiveness more closely.

Strength, Limitations, and Future Research

Sample Limitation. The first limitation of the study was the relatively small sample size of 27 participants, and next to that the majority of the participants were of German nationality. Nevertheless, as the focus of this study was on the design of the intervention, the small sample size represents actually a strength, as it made it possible to more precisely consider the feedback of each individual respondent.

The Self Created FAM Questionnaire. Another arguable limitation lies in the FAM questionnaire, as it was self-designed and therefore could not be used for comparison between interventions. However, no other measures were available that were appropriate for the current art intervention. Furthermore, the FAM did provide detailed information on the aspects of acceptability, feasibility of the four factors and the usefulness of the intervention. Future research could make use of this questionnaire and assess its reliability and validity

for measuring feasibility and acceptability in art interventions. Alongside this, one should also consider the three sections of the FAM individually to evaluate whether any section is particularly appropriate for the feasibility and acceptability of mandala interventions.

The Four Factors. While the four factors are based on scientific evidence, the combination of them is new and the questionnaire should be validated more for a better application in future mandala interventions. In the process that, the four factors are used in other mandala interventions and tested for their effectiveness.

Recommendations for Future Mandala Interventions. Based on this feasibility study's findings, future research may investigate how to further improve mandala interventions for students. Most importantly, as the physical intervention was found to be feasible and acceptable for students, this is the most promising medium for future interventions. Further, the design choices of a three-week duration with two mandalas consisting of circular and geometric patterns per week was effective and is consequently recommended. Motivating students to express their emotions while colouring in, and regarding the intervention as an opportunity, rather than a task, should also be considered for effective future interventions. Colouring in the mandala next to a window with a few on nature, as well as quiet places, cannot currently be confirmed to be effective and may thus better be replaced with potential alternative factors in future research. Colouring completely in nature, listening to music, using more specific reminders, pre-printed mandalas, and offering a wider range of mandala choices have been found to constitute promising alternatives. The next studies can be guided by these aspects, and the physical mandala intervention could be tested for effectiveness with this design in the future.

The digital mandala intervention was not found to be feasible and acceptable. To re-investigate how digital interventions can be made effective, some suggestions for their design can be made. For one, making the digital colouring more physical, for example by offering a physical pen to paint with, and exploring alternatives to the website used in this research appear to be promising improvements. The reminders were found useful, but

should be adapted with more specific reminders. As it may have been more difficult to engage with the utilised design factors, such as colouring in nature, in the digital version, it may also be necessary to investigate entirely different factors. The next studies can be guided by these aspects, and further feasibility studies should be conducted before the effectiveness of the digital mandala intervention can be assessed.

Conclusion

The aim of the study was to investigate the feasibility and acceptability of this mandala intervention, physical and digital, on the population of university students. As the population can suffer from the problems of stress and anxiety, it was to be seen whether these problems would decrease through participation in the intervention and with the help of the factors (Sandmire et al., 2016).

It can be concluded that the physical intervention was deemed to be feasible and acceptable by the university students. In addition, the students reported a decrease in stress and anxiety after participating in the intervention. However, this intervention could still be modified (e.g. printed mandalas, more specific reminders) in order to increase the students' adherence and to optimise the wellbeing outcomes. With the digital intervention, it was determined that it was not considered feasible and acceptable by the students. Nevertheless, the stress reported by the students decreased somewhat, and the anxiety increased, which might have to do with feasibility but needs to be checked in the future. The main obstacle was that the digital colouring was done by clicking. Further tests are needed to establish whether a digital intervention can be made feasible and acceptable, and to improve its effectiveness. The data from this study can contribute to the research of a mandala intervention, and further studies could make the mandala intervention an effective intervention for students suffering from stress and anxiety.

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Appendix A

Ethical Approval

UNIVERSITY OF TWENTE.
FACULTY BMS

230360 REQUEST FOR ETHICAL REVIEW

Request nr: 230360
Researcher: Schaffer, I.
Supervisor: Reiter, L.C.
Reviewer: Klooster, P.M. ten
Status: Approved by commission
Version: 2

1. START

A. TITLE AND CONTEXT OF THE RESEARCH PROJECT

1. What is the title of the research project? (max. 100 characters)

Draw yourself happy! - Exploring the feasibility of an arts intervention targeting well-being.

2. In which context will you conduct this research?

Bachelor's Thesis

3. Date of the application

21-03-2023

5. Is this research project closely connected to a research project previously assessed by the BMS Ethics Committee?

No/Unknown

B. CONTACT INFORMATION

6. Contact information for the lead researcher

6a. Initials:
I.
6b. Surname:
Schaffer
6c. Education/Department (if applicable):
B-PSY
6d. Staff or Student number:
2310325
6e. Email address:
i.schaffer@student.utwente.nl
6f. Telephone number (during the research project):

2023-03-23 18:31:49 1/6

+4917647096078

6g. If additional researchers (students and/or staff) will be involved in carrying out this research, please name them:

Heidi Toivonen

6h. Have you completed a PhD degree?
No

7. Contact information for the BMS Supervisor

7a. Initials:
L.C.
7b. Surname:
Reiter
7c. Department:
BMS-PGT
7d. Email address:
l.c.reiter@utwente.nl
7e. Telephone number (during the research project):
+31534893328

8. Is one of the ethics committee reviewers involved in your research? Note: not everyone is a reviewer.
No

C. RESEARCH PROJECT DESCRIPTION

9a. Please provide a brief description (150 words max.) of the background and aim(s) of your research project in non-expert language.

The aim of this study is to design a mandala intervention based on scientifical well sustained factors and to test its feasibility and acceptability with regard to the variables of stress and anxiety and the population of students. The effectiveness of a mandala intervention has been shown, but there are no universally agreed upon criteria for the implementation. This is a problem as the intervention cannot be implemented widely. Therefore, a feasibility study is conducted in which the participants take part in a mandala intervention that is applied physically and digitally. The results will be used to assess the extent to which the adapted mandala intervention is perceived as user-friendly and to what extent the problems (stress and anxiety) are improved.

9b. Approximate starting date/end date of data collection:

Starting date: 2023-03-26
End date: 2023-05-05

9c. If applicable: indicate which external organization(s) has/have commissioned and/or provided funding for your research.

2023-03-23 18:31:49 2/6

Commissioning organization(s):
Not applicable
Funding organization(s):
Not applicable

2. TYPE OF STUDY

Please select the type of study you plan to conduct:

I will be collecting new data from individuals acting as respondents, interviewees, participants or informants.

4. RESEARCH INVOLVING THE COLLECTION OF NEW DATA

A. RESEARCH POPULATION

20. Please provide a brief description of the intended research population(s):

The intended research population are students, individuals who are enrolled at a university or a comparable institution, which are above the age of 18.

21. How many individuals will be involved in your research?

For the intervention, I am aiming for a total of 30 participants. More precisely, 10 participants for the physical mandala group and 10 participants for the digital mandala group. To compensate for missing or erroneous data, I am aiming for about 30 participants.

22. Which characteristics must participants/sources possess in order to be included in your research?

Participants need to be students and 18 or older and should have sufficient knowledge of English to understand the instructions of the intervention and to fill in the questions. In addition, participants in the physical group will need a printer to print the mandalas and pens to colour them. Both groups (physical and digital) require internet access. It is important that the participants have not taken part in another mandala intervention that is also found on SONA. Each participant is only allowed to participate in one mandala intervention.

23. Does this research specifically target minors (<16 years), people with cognitive impairments, people under institutional care (e.g. hospitals, nursing homes, prisons), specific ethnic groups, people in another country or any other special group that may be more vulnerable than the general population?
No

24. Are you planning to recruit participants for your research through the BMS test subject pool, SONA
Yes

B. METHODS OF DATA COLLECTION

25. What is the best description of your research?
• Experimental/intervention research

26. Please prove a brief yet sufficiently detailed overview of activities, as you would in the Procedure

2023-03-23 18:31:49 3/6

section of your thesis or paper. Among other things, please provide information about the information given to your research population, the manipulations (if applicable), the measures you use (at construct level), etc. in a way that is understandable for a relative lay person.

After registering for the study, participants are divided into a physical or digital group. The participants are then asked to fill out questionnaires to demographics and on stress and anxiety. Subsequently, over a period of three weeks, the participants receive six mandalas, or more precisely two mandalas per week, which they are asked to print out and colour in physically (physical group) or digitally on their laptop (digital group). Before colouring the mandalas, participants are given instructions based on scientifically supported factors that have been shown to be beneficial for the mandala intervention. The first instruction is to ask the participants to express their feelings in the mandalas. The second instruction is to ask the students to colour the mandalas in connection with nature by asking them to sit near a window. Another factor is that the design of the mandalas is circular. In addition, the design of the mandalas is the same for both the digital and the physical group and the severity of the designs is increased per session. The physical group prints them out and colours the mandalas with pens of their choice from home. The digital group receives a link so that they can colour the digital mandalas and use the colours available there. The participants are reminded by email when to colour the mandalas and fill in the questionnaires. At the end of the 3 weeks, the participants fill out the questionnaires on stress and anxiety again. Besides, they fill in a feasibility and acceptance questionnaire with open-ended questions where they can describe their facilitators and barriers to participation and give tips for adaptation. They also have the opportunity to provide general comments.

How much time will each participant spend (mention the number of sessions/meetings in which they will participate and the time per session/meeting)?

Mandala painting: 6 sessions of 15 minutes. In session 1 and 6 there are questions to be filled in so that it is in total 35/45 minutes. Session 1: 35 minutes Session 2: 15 minutes Session 3: 15 minutes Session 4: 15 minutes Session 5: 15 minutes Session 6: 45 minutes

C: BURDEN AND RISKS OF PARTICIPATION

27. Please provide a brief description of these burdens and/or risks and how you plan to minimize them

There are no risks associated with this study. Participants might find it uncomfortable to color mandalas for several weeks.

28. Can the participants benefit from the research and/or their participation in any way?
Yes
Please Explain:

2023-03-23 18:31:49 4/6

The participant can benefit to learn a new treatment method which is self-applicable and easy to integrate into everyday life. Furthermore, they can reflect their anxieties and may become less stressed. In addition, participants can get SONA points with their participation.

29. Will the study expose the researcher to any risks (e.g. when collecting data in potentially dangerous environments or through dangerous activities, when dealing with sensitive or distressing topics, or when working in a setting that may pose 'lone worker' risks)?
No

D. INFORMED CONSENT

30. Will you inform potential research participants (and/or their legal representative(s), in case of non-competent participants) about the aims, activities, burdens and risks of the research before they decide whether to take part in the research?
Yes

Briefly clarify how:

The participants receive the information consent via Qualtrics, in which they are informed about everything, and it is in accordance with the content of the BMS ethical committee.

32. How will you obtain the voluntary, informed consent of the research participants (or their legal representatives in case of non-competent participants)?
Active online consent

33. Will you clearly inform research participants that they can withdraw from the research at any time without explanation/justification?
Yes

34. Are the research participants somehow dependent on or in a subordinate position to the researcher(s) (e.g. students or relatives)?
No

35. Will participants receive any rewards, incentives or payments for participating in the research?
• For student participants: Human research participant credits (if you use the SONA test subject pool)

36. In the interest of transparency, it is a good practice to inform participants about what will happen after their participation is completed. How will you inform participants about what will happen after participation is concluded?
• Participants will receive the researcher's contact details, so that they can contact the researcher if they have questions/would like to know more.

E. CONFIDENTIALITY AND ANONYMITY

37. Does the data collected contain personal identifiable information that can be traced back to specific individuals/organizations?
No

2023-03-23 18:31:49 5/6

39. Will you make use of audio or video recording?
No

5. DATA MANAGEMENT

• I have read the UT Data policy.
• I am aware of my responsibilities for the proper handling of data, regarding working with personal data, storage of data, sharing and presentation/publication of data.

6. OTHER POTENTIAL ETHICAL ISSUES/CONFLICTS OF INTEREST

40. Do you anticipate any other ethical issues/conflicts of interest in your research project that have not been previously noted in this application? Please state any issues and explain how you propose to deal with them. Additionally, if known indicate the purpose your results have (i.e. the results are used for e.g. policy, management, strategic or societal purposes).
No.

7. ATTACHMENTS

Inform consent- Draw yourself happy! - Exploring the feasibility of an arts inte

8. COMMENTS
-

9. CONCLUSION

Status: Approved by commission

The BMS ethical committee / Domain Humanities & Social Sciences has assessed the ethical aspects of your research project. On the basis of the information you provided, the committee does not have any ethical concerns regarding this research project. It is your responsibility to ensure that the research is carried out in line with the information provided in the application you submitted for ethical review. If you make changes to the proposal that affect the approach to research on humans, you must resubmit the changed project or grant agreement to the ethical committee with these changes highlighted.

Moreover, novel ethical issues may emerge while carrying out your research. It is important that you re-consider and discuss the ethical aspects and implications of your research regularly, and that you proceed as a responsible scientist.

Finally, your research is subject to regulations such as the EU General Data Protection Regulation (GDPR), the Code of Conduct for the use of personal data in Scientific Research by VSNU (the Association of Universities in the Netherlands), further codes of conduct that are applicable in your field, and the obligation to report a security incident (data breach or otherwise) at the UT.

2023-03-23 18:31:49 6/6

Attachment: Inform consent- Draw yourself happy! - Exploring the feasibility of an arts inte

Informed consent

You are welcome to this study on mandala interventions: „Draw yourself happy! - Exploring the feasibility of an arts intervention targeting well-being". The study is conducted by Isabelle Schaffer and Supervisor Luisa Reiter from the Faculty of Behavioural, Management and Social Sciences at the University of Twente. The aim of this study is to design a mandala intervention (physical and digital) based on scientifically supported factors and to test its feasibility and acceptability regarding the variables stress and anxiety as well as the population of students.

It is important that you only participate in one study on mandala interventions.

Procedure

After registering the study, you will be assigned to a physical or digital group. Participation takes place at home and extends over 3 weeks with a total of 6 sessions, more precisely 2 sessions per week. For each session you will be asked to colour one mandala and depending on the group you will either print it out and colour in it physically or colour it in online. If you want to participate, you should have a printer (to print 6 mandalas) and pencils. You will receive a timetable and reminders by email so that you know exactly which day to colour in the mandala. The first session lasts 35 minutes and you have to fill in several demographic, stress and anxiety questionnaires and colour in a mandala. In the second, third, fourth and fifth sessions you will be given a mandala to colour in, and each session will last 15 minutes. In the sixth session you will again fill in questionnaires on stress and anxiety as well as questions on feasibility and acceptance, which will take 45 minutes. Please read all the questions carefully.

Potential Risks and Discomforts

There are no physical, legal, or economic risks in participating in this study. Furthermore, the study has been reviewed and subsequently approved by the BMS Ethics Committee of the University of Twente. If you have any questions or problems regarding the ethics of the study, you can contact the following email address ethicscommittee-bms@utwente.nl , Secretariat of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences of the University of Twente.

Potential Benefits

Participants can get SONA points with their participation.

Confidentiality

No identifiable information from participants will be included in the research project. Their privacy will be protected to the extent permitted by law and data will be handled responsibly, and only the research team will have access to participants' responses.

Right to Withdraw and Questions

Participation in the study is based on the participant's own decision and is voluntary. In addition, you can withdraw from the study at any time; the participant will neither be disadvantaged nor lose any

benefits as a result. The data you provide before you withdraw will be processed. If you have any questions or problems regarding the study, please contact us.

Contact Information

Student: Isabelle Schaffer (i.schaffer@student.utwente.nl)

Supervisor: Luisa Reiter (l.c.reiter@utwente.nl)

Appendix B

Mandalas

Appendix C

Measures

Table C1

The Academic Stress Scale (PAS)

Academic Stress Items	Response options				
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Q1. Competition with my peers for grades is quite intense.	○	○	○	○	○
Q2. My teachers are critical of my academic performance.	○	○	○	○	○
Q3. Teachers have unrealistic expectations of me.	○	○	○	○	○
Q4. The unrealistic expectations of my parents stresses me out.	○	○	○	○	○
Q5. The time allocated to classes and academic work is enough.	○	○	○	○	○
Q6. The size of the curriculum (workload) is excessive.	○	○	○	○	○
Q7. I believe that the amount of work assignment is too much.	○	○	○	○	○
Q8. Am unable to catch up if getting behind my work.	○	○	○	○	○
Q9. I have enough time to relax after work.	○	○	○	○	○
Q10. The examination questions are usually difficult.	○	○	○	○	○
Q11. Examination time is short to complete the answers.	○	○	○	○	○
Q12. Examination times are very stressful to me.	○	○	○	○	○
Q13. Am confident that I will be a successful student.	○	○	○	○	○
Q14. Am confident that I will be successful in my future career.	○	○	○	○	○
Q15. I can make academic decisions easily.	○	○	○	○	○
Q16. I fear failing courses this year.	○	○	○	○	○
Q17. I think that my worry about examinations is weakness of character.	○	○	○	○	○
Q18. Even if I pass my exams, am worried about getting a job.	○	○	○	○	○

Table C2

The State-Trait Anxiety Inventory (STAI-S)

	Response options			
State-Trait Anxiety Items	Almost Never	Sometimes	Often	Almost Always
Q1. I feel pleasant.	○	○	○	○
Q2. I feel nervous and restless.	○	○	○	○
Q3. I feel satisfied with myself.	○	○	○	○
Q4. I wish I could be as happy as others seem to be.	○	○	○	○
Q5. I feel like a failure.	○	○	○	○
Q6. I feel rested.	○	○	○	○
Q7. I am "calm,cool, and collected".	○	○	○	○
Q8. I feel that difficulties are piling up so that I cannot overcome them.	○	○	○	○
Q9. I worry too much over something that really doesn't matter.	○	○	○	○
Q10. I am happy.	○	○	○	○
Q11. I have disturbing thoughts.	○	○	○	○
Q12. I lack self-confidence.	○	○	○	○
Q13. I feel secure.	○	○	○	○
Q14. I make decisions easily.	○	○	○	○
Q15. I feel inadequate.	○	○	○	○
Q16. I am content.	○	○	○	○
Q17. Some unimportant thoughts run through my mind and bothers me.	○	○	○	○
Q18. I take disappointments so keenly that I can't put them out of my mind.	○	○	○	○
Q19. I am a steady person.	○	○	○	○
Q20. I get in a state of tension or turmoil as I think over my recent concerns and interests.	○	○	○	○

Table C3

FAM: Acceptability, Feasibility of the Intervention in the Physical/Digital Group

FAM Items	Strongly Agree	Agree	Neither Agree nor Disagree	Strongly Disagree
Section 1: Acceptability				
I found the mandala colouring enjoyable.	○	○	○	○
I found the mandala colouring easy.	○	○	○	○
I looked forward to the mandala sessions.	○	○	○	○
I would like to continue doing this kind of mandala drawing outside the study.	○	○	○	○
I would feel confident being able to do this kind of exercise when having a bad day.	○	○	○	○
I found the mandala intervention easy to follow.	○	○	○	.○
I think the mandala intervention worked with clear instructions.	○	○	○	○
I received enough information about the mandala colouring through e-mails.	○	○	○	○
I liked the design of the mandalas.	○	○	○	○
I liked that there were many circles in the design.	○	○	○	○
I liked that the mandala painting was physical/digital.	○	○	○	○
Section 2: Feasibility of the four factors				
I have taken all 4 factors into consideration when colouring in.	○	○	○	○
The consideration of the 4 facts, when colouring in mandalas to reduce stress and anxiety.	○	○	○	○
I found the factor that I should colour the mandalas in a quiet place helpful.	○	○	○	○
I was able to get into a state of flow.	○	○	○	○
I found the factor to improve my well-being and not to see it as a task helpful.	○	○	○	○
I considered the factor that I should remember to express my feelings while colouring helpful.	○	○	○	○
I found the factor of choosing a natural place when colouring a mandala helpful.	○	○	○	○
Section 3: Usefulness of the intervention				
The mandala painting has improved my wellbeing.	○	○	○	○
I have the feeling that I am less stressed through the mandala intervention.	○	○	○	○
I feel that I am less anxious because of the mandala intervention.	○	○	○	○
I believe that the Mandala Intervention would be useful for all students with stress and anxiety.	○	○	○	○
I think that most students would learn to use this mandala intervention very quickly.	○	○	○	○
I could easily integrate the intervention into my daily life.	○	○	○	○

Table C4

Open Questions About the Feasibility and Acceptability

Open Questions About the Feasibility and Acceptability

Q1. What did you like and dislike about the intervention?

Q2. Do you have any suggestions on how to improve the intervention in the future (tips for adaptation)?

Q3. What benefits did you get from participating in this mandala intervention?

Q4. What things helped you to follow the intervention?

Q5. Do you have any comments/improvement suggestions for the 4 factors?

Q6. Was it difficult to follow the intervention?

Q7. Do you have any additional remarks for the intervention?

Appendix D

Tables

Table D1

Satisfaction with the Duration of the Intervention

	Overall (n=27)		Physical (n=15)		Digital (n=12)	
Response Option	Frequency	Percent	Frequency	Percent	Frequency	Percent
Appropriate.	21	77.8	12	80.0	9	75.0
Would have preferred a shorter duration.	3	11.1	2	13.3	1	8.3
Would have preferred a longer duration.	3	11.1	1	6.7	2	16.7

Table D2

Satisfaction with the Number of Mandalas per Week

	Overall (n=27)		Physical (n=15)		Digital (n=12)	
Response Option	Frequency	Percent	Frequency	Percent	Frequency	Percent
Appropriate.	19	70.4	11	73.3	8	66.7
Would have preferred more mandalas.	6	22.2	2	13.3	4	33.3
Would have preferred less mandalas.	2	7.4	2	13.3	0	0

Appendix E

E-mail example

Dear Participant,

Thank you for showing interest and participating in my study: „Draw yourself happy! - Exploring the feasibility of an arts intervention targeting well-being"

Before starting with the survey, I would like you to enter your anonymous Identity Code: XXX This will be used to match your responses of the first and second survey (Use this number for the two surveys in week 1 and week 3)

To start off, I would like to explain your next required steps. First, please fill in the questionnaires, which you can find by clicking on the Qualtrics link below, and thus participate in the study.

o This is the Qualtrics link:

Please note that you first have to fill in the survey before you colour in the mandalas.

Below you will find two links that represent the mandalas for this week and are labelled Mandala (1) and Mandala (2). Please print out the mandalas. Please make sure that you colour the two mandalas within the next 7 days, which takes about 15 minutes.

o This is the link for Mandala 1: https://colormandala.com/api/design/view/t/pdf/d/b1b24269afa0889688fb712702edc5c5

o This is the link for Mandala 2: https://colormandala.com/api/design/view/t/pdf/d/68fc3f3a35bbf99cfcb7e0cfa06b5b87

You are free to choose when you colour in the mandalas during these 7 days,

but there need to be 3 days between mandala (1), and mandala (2). Please colour the mandalas until they are finished. The times given are only approximate guidelines for how long each mandala will take.

While working on the mandalas, please keep the following in mind:

This intervention is intended to help you and your personal well-being! Being a student can feel very stressful at times, and the challenges you may face as a consequence may even seem overwhelming. Mandalas can help you feel less stressed and also less anxious. So, above all, this study is designed to help you personally in managing said stress and/or anxiety.

To achieve this, please consider the following factors:

o Please work on the mandalas in a quiet place (do not listen to music) and do nothing else. This will help you to concentrate only on colouring and encourage getting into a "flow" state, which will reduce your stress and anxiety.

o Try to see it as an opportunity to improve your well-being and not as a task. We often like to jump at tasks to cross them off our list, but I would like to invite you to do colour the mandalas for your own sake.

o You can choose the colours yourself. When you colour the mandala, please remember to try to express your feelings. More specifically, try to colour in how you feel at that moment, because that is when the effect of colouring in the mandala is strongest, especially in relation to your fears.

o When colouring in a mandala, find a place close to nature by sitting in front of a window with a view of greenery or colouring in with a view of an indoor plant. This is because nature in connection with mandala painting can increase mental well-being and above all reduce stress.

It can be helpful to flag this email or somehow mark it in your inbox so you can easily find it within the next days.

Study overview: If you are a student of the University of Twente, please note that you have to participate in both surveys (in week 1 and week 3) to get the SONA points.

Week 1 In the first email you receive a survey and two mandalas to color in within 7 days. Please complete the survey first and then color in the mandalas. A minimum of 15 minutes is provided for coloring in the mandalas, but you are free to color until you are satisfied.

Week 2 In your second email, you receive the two mandalas for the next seven days. Here you can plan at least up to 20 minutes per mandala, but you are free to colour until you are completely satisfied.

Week 3 In the third week you will receive your last two e-mails. In the first e-mail you will be sent the two mandalas for the next seven days, here you can plan up to at least 20 minutes per mandala. You are free to paint longer.

Afterwards, you will receive a second e-mail in which you have to fill in questionnaires. Your participation is complete after you fill out the last questionnaire.

If you have any questions, please do not hesitate to contact the researcher. Isabelle Schaffer: i.schaffer@student.utwente.nl