



Universiteit Utrecht

**An Investigation on the Relationship of Informal Mindfulness Exercises on
State Mindfulness and Well-being**

Master Thesis

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1. Abstract

In this study, the researcher and his colleagues both developed and executed an informal mindfulness exercise for seven days. The aim of the study was to investigate, if an informal mindfulness exercise has a positive effect on the participants' state mindfulness and well-being and if the participants were more affected when they are older. Informal mindfulness exercises are easy to implement into daily life and are cost-efficient as well. The study was internet-based with a sample of 137 participants, who were randomly allocated to the informal mindfulness condition or the control condition. Analysis of the data was conducted with a mixed ANOVA design and did not support the expectations of the researcher. The informal mindfulness exercise did not significantly increase either levels of state-mindfulness or well-being in the participants. A general significant effect over time from pre-assessment to post-assessment was found for state mindfulness ($p= 0.001$ and well-being ($p= 0.0$) in both the mindfulness condition and the control condition. In the present studies various limitations like a directive formulation of the recruitment text, attrition bias, selection bias, a rather short testing time and an unbalanced sample were found. For further investigation on the effects of state-mindfulness and well-being it is recommended to overcome these limitations.

Keywords: Informal mindfulness, state mindfulness, well-being

2. Introduction

A lot of research has been done on mindfulness in clinical psychology. Mindfulness-based interventions are becoming increasingly popular. Mindfulness has its roots in ancient eastern culture, more specific in Buddhism (Cash and Whittingham, 2010). In Buddha's Dhamma, an old teaching of the Buddhism, mindfulness is called 'appamada', which captures meanings like attentiveness and consciousness (Hanh, 2016). Mindfulness is an open, present and accepting, continuing focus of attention and awareness (Hanley, Warner, Dehili, Canto and Garland, 2015). Being aware of and attentive to inner and outer sensations and experiences helps an individual to be present in the moment and not driven by memories about the past and fantasies about the future.

Two examples for mindfulness-based interventions are mindfulness-based stress reduction (MBSR), formerly known as the stress reduction and relaxation program, a group therapy developed for people with chronic pain anxiety, depression and stress-related disorders (Lengacher et al., 2009), and mindfulness-based cognitive therapy (MBCT), which is largely build on the MBSR program. MBCT was designed to prevent relapse in patients who experienced depressive symptoms (Kaviani, Javaheri and Hatami, 2011). Altogether, these mindfulness interventions seem cost efficient strategies, as they are mostly held in group sessions and the techniques can be easily taken home by the patients for private usage (Didonna, 2009; Knight, Bean, Wilton, Lin, 2015).

Being more specific, mindfulness can be seen as a state-like quality. This state-like quality is evoked and maintained when attention is brought to inner events like thoughts or feelings and/or outer event like a specific surrounding. Thereby an open orientation towards

these events is developed. In essence mindfulness as a state is seen as a psychological process and can be developed with skill building exercises (Bergomi, Tschacher and Kupper, 2013).

The World Health Organisation (WHO) defines mental health as a state of well-being (WHO, 2004, p.12). In this state of well-being a person understands his or her own abilities, can handle difficulties in life, can work effectively and successfully, and has the capacity to provide some input to his or her community (Lamers, Westerhof, Bohlmeijer, ten Klooster and Keyes, 2011).

Mindfulness may assist well-being in a direct way. By enhancing moment-to moment experiences while not judging the content, a person is experiencing a more vivid and clear point of view. Also, being in a mindful state is associated with higher well-being (Brown and Ryan, 2007). Shapiro, Oman, Thoresen, Plante and Flinders (2008) showed in their randomized study about the cultivation of well-being, that the development of mindfulness mediates positive well-being results. Brown and Ryan (2003) conducted an experience sampling study about the relationship of state mindfulness and emotional well-being. They hypothesized, that mindfulness is a state like quality, which is variable within persons. Results indicated that state mindfulness is associated with higher levels of positive affect.

An easy way to start practising mindfulness and becoming more attentive, is the use of informal mindfulness practices. Informal mindfulness practices are not bound to specific environments and setups, but can be incorporated in our daily routines, by focusing on a current activity, which makes them easily accessible to a wide range of people. Examples for informal mindfulness exercises are mindful walking, eating, cleaning, running or bathing. Informal mindfulness measures are correlated with some aspects of higher levels of

well-being like vitality, positive affect and satisfaction with life (Hanley et al., 2015). Hanley et al. (2015) conducted a study about mindful dishwashing, where the participants executed an informal mindfulness exercise for about 6 minutes per session. They found that informal mindfulness practices can enhance positive affect and decrease negative affect. Another positive effect, an improved performance due to mindful engagement in work action, was shown by Dane and Brummel (2013). In addition, they stated that daily informal mindfulness practices could facilitate the stabilization of a transient state of mindfulness into a more stable nature.

Howells, Ivztan and Eiora-Orosa (2016) conducted a randomized, controlled and smartphone-based study using a mindfulness intervention. They investigated if the mindfulness intervention could enhance well-being in the participants. In the experimental condition the participants engaged into the smartphone application “Headspace On-The-Go” (Howells et al., (2016), p.169). This app is based on a mindfulness intervention that was evidence based and delivered a simple daily activity the participants had to do for 10 days. Next, in the control condition the participants engaged in a neutral activity for 10 days. They had to write down about their day. Results showed, that the participants significantly benefited from the mindfulness-based intervention in terms of positive affect. Hoffman et al. (2012) conducted a randomized and controlled study regarding the effectiveness of MBSR and its effects on well-being in patients with stage 0 to III breast cancer. The study revealed that the experimental group compared to the control group showed significant results after MBSR in social, emotional, physical and functional well-being, and general well-being.

Due to little investigation of how informal mindfulness exercises influence state

mindfulness, focus will be put here also on mindfulness exercises which are being held in a formal way, like yoga and meditation. Also, instead of mindfulness as a state like quality, some focus will be put on mindfulness as a stable characteristic, which is defined as trait mindfulness (Kiken, Garland, Bluth, Palsson and Gaylord, 2015)

Khoury, Sharma, Rush and Fournier (2015) found in their meta-analysis that non-clinical participants following an MBSR treatment were more mindful in the end of the treatment, although they reviewed only studies measuring mindfulness as a stable trajectory. Khoury, Knäuper, Schlosser, Carrière and Chiesa (2016) assessed the effectiveness of traditional meditation retreats and found in their systematic review and meta-analysis that the participants could have higher levels of trait mindfulness in the follow-ups. It is important to mention that in both studies less than 50% of the studies, which were reviewed used validated mindfulness measurements. Hindman, Glass, Arnkoff, Maron (2015) conducted controlled study, in which they compared informal and formal mindfulness programs, which were designed to reduce stress and found significant increases in trait mindfulness for an informal mindfulness program called Mindful Stress Management-Informal.

Do informal mindfulness exercises enhance older people's well-being and state mindfulness? Due to little research in this area, examples are taken from a different context and do not include informal mindfulness exercises as a basis.

Weinstein, Brown and Ryan (2009) found in their multi-method examination about the relation of mindfulness to well-being and stress, that older people were higher in state mindfulness than younger people.

Mroczek and Kolarz (1998) conducted a survey with 2727 participants about the effect

of age on happiness and found that older people reported more positive affect compared to younger people after 30 days. In another study, Mroczek and Spiro (2005) tested life satisfaction, a major element of well-being, in a sample of 127 participants over a span of 22 years. They found, that life satisfaction reached its peak at the age of 65 years.

The present study has two main hypotheses with one sub hypothesis each. Both main hypotheses address what effects informal mindfulness exercises have on different variables. The first question is, can informal mindfulness exercises improve levels of state mindfulness. In addition to this, the researcher investigates, if age has a positive effect on state mindfulness. Secondly, can informal mindfulness exercises improve the level of well-being? Again, as in the first aim, the researcher will investigate, if age has a positive effect on well-being.

3. Methods

The study was conducted by three Master students of the Utrecht University. The study was built, designed and conducted by all of them together. Each student has his or her own interpretation of the data and made use of specific instruments and interventions.

3.1. Design

The experiment consisted a week-long, internet-based intervention, which means that the participants gave all information via the internet and had the possibility to email the researchers if they had questions. Altogether, there was no personal contact with the researchers. The study made use of an experimental design. More specifically it made use of a

mixed design, consisting of a between-subject design with an experimental condition and one control condition, and a within-subject design, consisting of two measurement points before and after the intervention, which will be referred to as T1 for the pre-assessment and T2 for the post-assessment throughout the paper. The experimental intervention was an informal mindfulness exercise. In the control group the participants wrote down how their day was. Another experimental condition, including a gratitude exercise was tested in the main study, but was only analysed by the other researchers and is therefore not included in this study. To construct and utilise the questionnaires for data of the participants, qualtrics software was used ("Qualtrics insight platform - so einfach machen Sie eine Umfrage | Qualtrics," 2017). The participants were blind to the fact that the study made use of two different groups and that the mindfulness state and their well-being were measured by the researcher.

3.2. Participants

The age of participants ranged from 18 to 65 years. The researchers were looking for a working population in this study. The participants were randomly assigned to the different groups, matching for the age, regarding to the two age categories between 18-41 and 42-65 years. Power analysis yielded, that 120 participants were needed in total. Power calculations were executed with GPower3.1 (Faul, Erdfelder, Lang & Buchner, 2007). Due to possible attrition, a higher number of participants was recruited.

Table 1 depicts the characteristics of all participants grouped by condition.

Table 1. *Characteristics of all participants*

Characteristics	All participants (N = 137)
Mean age in years (SD)	29.5 (10.994)
<u>n age group</u>	
18-41 years	117 (85.4%)
42-65 years	20 (14.6%)
<u>n gender</u>	
Male	45 (32.8%)
Female	92 (67.2%)

Out of all the participants, 137, with a mean age of 29.5 (10.994), completed T2 successfully in the amount of time given in order to capture the effects of the exercises. 45 participants (32.8%) were male and 92 (67.2%) were female. 117 participants (85.4%) were between 18-41 years old and 20 participants (14.6%) were between 42-65 years old. 73 participants (53.3%) were allocated to the informal mindfulness condition and 64 participants (46.7%) to the control condition.

Next, Table 2 indicates the different levels of education across the sample.

Table 2. *Highest level of education*

Level of education	Number of participants	%
High school	34	24.8
Bachelor	61	44.5
Master	29	21.2
Doctoral Degree (PhD)	5	3.6
Degree higher than high school	95	69,3
Others	8	5.8

Note: PhD = Doctor of Philosophy

34 participants (24.8%) had a high school degree, 61 participants (44.5%) had a Bachelor degree, 29 participants (21.2%) had a Master's degree, 5 participants (3.6%) a doctoral degree and 8 participants (5.8%) a degree that differed from the ones mentioned here. Taken together, 95 participants (69.3%) had a degree higher than high school.

Furthermore, people participating in this study had different cultural backgrounds. Table 3 illustrated the reported country of residence of the participants in this study.

Table 3. *Reported country of residence of the participants in this study*

Country	Participants	%
Netherland	46	33.6
USA	31	22.6
Germany	26	19
Romania	8	5.8
England	7	5.1
Canada	5	3.6
Egypt	2	1.5
Italy, Austria, Brazil, Malaysia, Nigeria, Philippines, Scotland, Botswana, Singapore, India, Denmark, Spain	12	8.4

46 participants (33.6%) indicated the Netherlands as their country of residence, 31 participants (22.6%) the US, 26 participants (19%) Germany, 8 participants (5.8%) Romania, 7 participants England (5.1%), 5 participants (3.6%) Canada and 2 participants (1.5%) Egypt. The remaining 12 participants (8.4%) were living in Italy, Austria, Brazil, Malaysia, Nigeria, Philippines, Scotland, Botswana, Singapore, India, Denmark and Spain.

3.3. Recruitment

The participants were recruited via Facebook, Whats-app and mail. Students of Utrecht University had the chance to participate via the Research Credit Utrecht University webpage. Also, interested people could apply for the study via the online platform FindParticipants ("FindParticipants.co," 2017), where the researchers posted the study two times. For all these platforms, the same recruitment text was used. The participants were told that they participated in a study about positive interventions and its influence on wellbeing. To give an incentive, all participants had the chance to win 50€. All participants, but the UU students, also had the chance to win an iPad Air 2 with their full participation during the study. The winner was identified after the study was executed by using an online randomizer ("Random.org- List Randomizer," 2017).

3.4. Conditions

The study at hand made use of an informal mindfulness practice by implementing it into a daily routine activity of the participants during one week's time. Wolf and Serpa's (2015) general guideline for creating informal mindfulness exercises is to first become aware of present-moment experiences and was used as a first step. Next, attention that drifted away, should gently be brought back to the new present moment. The participants were instructed to brush their teeth in a mindful way for 2 minutes before going to bed in the evening. In order to do this, an audio file was recorded by the researchers and the participants were instructed to listen to it prior to the informal mindfulness exercise. The mindful teeth brushing exercise was based on an Informal Mindfulness Toolkit provided by the Positive Psychology Program ("Positive Psychology Toolkit - 121+ Exercises, Interventions And More!", 2017). Reasons

for choosing this specific practice were firstly, that informal mindfulness practices are easy to implement into daily life of the participants. Secondly, that an informal mindfulness practice provides a context free from religion, which means that a broader range of people can do the exercises without judging the content by its nature (Hanley et al., 2015). Finally, even though there is little experimental investigation about informal mindfulness exercises, they are an essential part of many mindfulness based interventions like MBSR and MBCT. In fact, MBCT is using exclusively informal mindfulness practices (Brown and Ryan, 2007).

The control group received the task to write down three neutral things that happened every day in the evening before going to sleep. The exercise was based on the 3 blessings exercise, which is writing down three positive things each evening (Seligman,2012) and was slightly changed to create a neutral experience. Again, an audio file with instructions for the exercise was recorded by the researcher.

By recording an audio file and choosing a specific time at which the informal mindfulness and control exercise should be executed, the researcher tried to standardize the exercise and try to control for confounding variables.

Table 4 shows the characteristics of all participants grouped by condition.

Table 4. *Characteristics of all participants grouped by condition*

Characteristics	Informal Mindfulness (n = 73)	Control (n = 64)
Mean age in years (SD)	29.55 (12.054)	29.45 (9.739)
<u>n Age group (%)</u>		
18-41 years	61 (83.6%)	56 (87.5%)
42-65 years	12 (16.4%)	8 (12.5%)
<u>n Gender (%)</u>		
Male	22 (30.1%)	23 (35.9%)
Female	51 (69.9%)	41 (64.1%)

The participant's mean age in the experimental group was 29.55 years (12.054) and the mean age in the control group was 29.45 (9.739). Next, 61 participants (83.6%) had younger age ranging from 18-41 years in the informal mindfulness condition and 56 participants (87.5%) in the control group had a younger age . Furthermore, in the informal mindfulness, 12 participants (16.4%) were in the older age group ranging from 42-65 and 8 participants (12.5%) from the older group were in the control condition. Next, 22 participants (30.8%) had male gender in the experimental condition and 23 participants (35.9%) had male gender in the control condition. Finally, 51 participants (69.2%) were female in the experimental condition and 41 participants (64.1%) were female in the control group.

3.5. Instruments

The Toronto Mindfulness Scale (TMS) is a scale, which assesses state mindfulness and was developed by Lau et al. (2006) and consists of 13 items. The TMS has a high internal consistency with a coefficient alpha of 0.86-0.87. The TMS shows a good fit to the data with a Tucker and Lewis reliability of 0.91 (Lau et al., 2006).

To measure well-being, the Mental Health Continuum Short Form (MHC-SF) was used in the current study. The MHC-SF is a brief questionnaire measuring emotional well-being, social well-being and psychological well-being. It contains 14 items and was derived from the long form of the Mental Health continuum (MHC-LF). Lamers et al. (2011) evaluated the psychometric properties of the MHC-SF and found that the subscales have a good total internal consistency with a coefficient alpha of 0.89 and a good convergent validity, making the instrument an accurate and reliable instrument. In this study the pooled mean value of social, emotional and psychological well-being was used to interpret the data as well-being.

3.6. Procedure and data analysis

Figure 1 illustrates the sequence of the study.

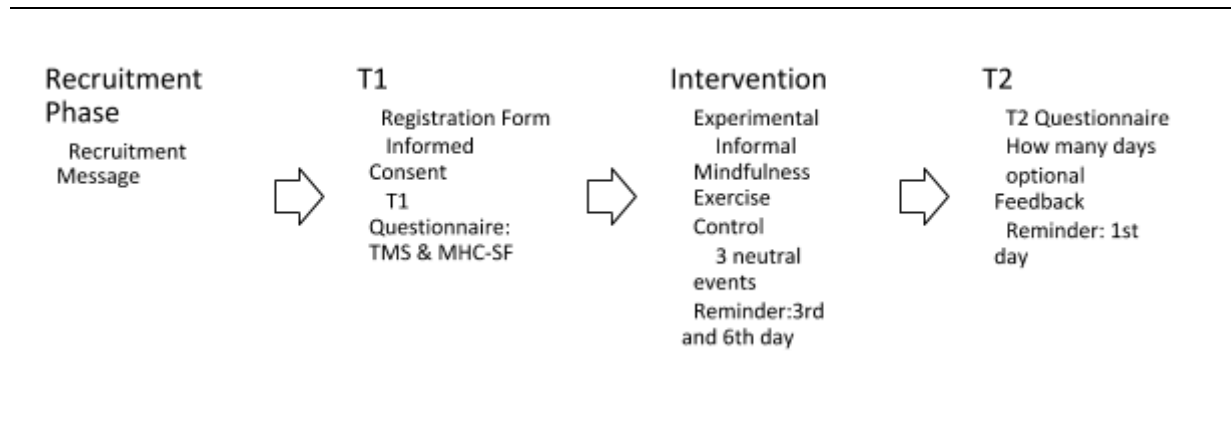


Figure 1 Sequence of the study

After being recruited, the participants were sent an invitation for the T1 consisted of two measurement instruments, TMS and the MHC-SF. Next, the participants filled in an informed consent and a registration form in T1. After completing T1 successfully, the participants were randomly allocated to the experimental or the control group matched with regard to age and gender and they received an email with their respective group and the instructions for the next seven days, including the audio file either for the experimental or the control group. A reminder for doing the exercises was sent to the participants on the third and sixth day of the experiment.

Later, on the eighth day the participants received an invitation for T2. T2 consisted of TMS and MHC-SF. Participants received a reminder to fill in T2 on the ninth day. Data from T1 and T2 was only used, when the participants filled in T2 three days after the first invitation, to ensure that the intervention effects do not vanish with time.

The data from the participants was analysed with SPSS (Version 24, IBM Corp.). A

mixed ANOVA design was used to interpret the differences between the control and the experimental group and the differences within each group with respect to the two different measurement points T1 and T2. The primary measure outcomes were changes in state mindfulness and the changes in well-being in the course of one week of experiment. Further, age was used as a covariant, to see what differences were across for younger participants between 18-41 years and older participants between 42-65 years for the two primary measure outcomes.

4. Results

The present study was an investigation on the effects of an informal mindfulness exercise on well-being and state mindfulness. The researcher had two main hypotheses. The first hypothesis was, that an informal mindfulness exercise has a positive effect on the level of well-being of the participants compared to the control condition. The second hypothesis was, that an informal mindfulness exercise has a positive effect on state mindfulness compared to the control condition. Age was controlled separately for both hypotheses, with the expectation, that people in the older age group show higher levels of state mindfulness or well-being after the intervention.

Figure 2 shows attrition of the participants in the course of the study.

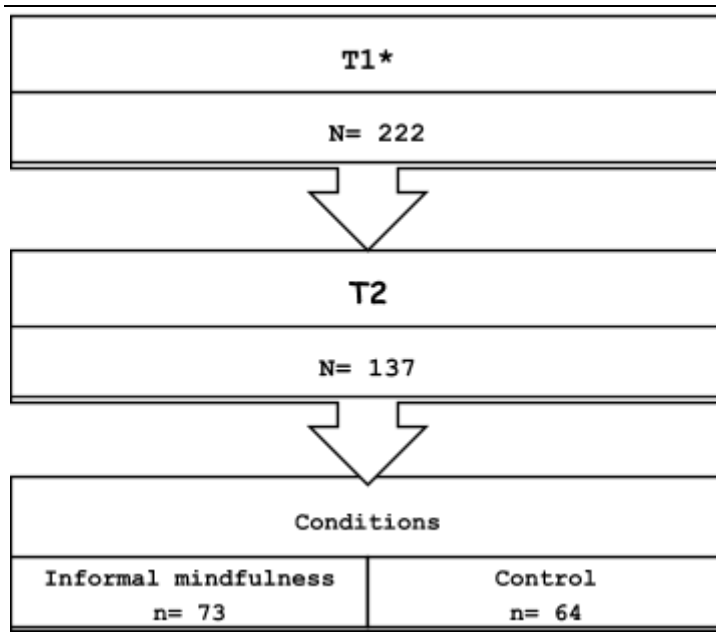


Figure 2 Attrition of participants in the course of the study

222 participants completed T1* successfully. T1* defines all participants who filled in T1, even though they did not finish the study and completed T2. After the intervention, 137 participants completed T2, with 73 participants in the informal mindfulness condition and 64 participants in the control condition.

Table 5 illustrates the changes of data caused by attrition of the participants.

Table 5. *Changes of data caused by attrition of the participants*

Characteristics	T1* (N=222)	T1 (N=137)
Mean age in years (SD)	31.04 (11.986)	25.5 (10.994)
<u>% Age Group (n)</u>		
Younger: 18-41 years	79.3 (176)	85.4 (117)
Older: 42-65 years	29.7 (46)	14.6 (20)
<u>% Gender (n)</u>		
Male	27.5 (61)	32.8 (45)
Female	72.5 (161)	67.2 (92)
Mean TMS (SD)	23.56 (9.654)	24.65 (9.074)
Mean MHC-SF (SD)	42.54 (13.544)	43.19 (13.323)
Attrition Rate (From T1* to T1)	-	38.3%

Note. TMS = Toronto Mindfulness Scale; MHC-SF = Mental Health Continuum Short Form

Participants' attrition affected mean age from 31.04 years (11.986) in T1* to 25.5 years (10.994) in T1. Next, participants' younger age group percentage rose from 79.3% (176) in T1* to 85.4% (117) in T1 and participants' older age group percentage changed from 29.7% (46) in T1* to 14.6% (20) in T1. Furthermore, the percentage of male participants went up from 27.5 (61) in T1* to 32.8 (45) in T1 and the percentage of female participants diminished from 72.5 (161) in T1* to 67.2 (92) in T1. Additionally, the mean score of TMS slightly changed from 23.56 (9.654) in T1* to 24.65 (9.074) in T1. Moreover, the mean score of MHC-SF changed from 42.54 (13.544) in T1* to 43.19 (13.323) in T2. Finally, the attrition

rate had a value of 38.3% from T1* to T1.

4.1 First Hypothesis: Informal Mindfulness Exercises have a Positive Effect on Levels of State Mindfulness

State mindfulness, the dependent variable, was quantitative. The mindfulness and control group were independent from each other. The participants were randomly assigned to a condition and did the exercise of their own group exclusively, without knowing that there even is another group doing other exercises.

Table 6 shows the measurements of normality and reliability for TMS.

Table 6. *Measurements of normality and reliability of TMS*

<u>TMS</u>	T1	T2	TMS
Shapiro Wilk	p= 0.421*	p= 0.658*	-
Cronbach's alpha	-	-	a= 0.889

Note. TMS= Toronto Mindfulness Scale, *p<0.05

The assumption of normality for TMS has been fulfilled in T1 (p= 0.421) and in T2 (p= 0.658). The measurement of Cronbach's alpha indicated that TMS is a reliable measurement instrument (a= 0.889).

Table 7 shows the descriptives of TMS..

Table 7. *Descriptives of TMS*

TMS	T1		T2	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Informal Mindfulness	24.92	8.457	27.77	9.537
Control	24.34	9.789	26.75	10.217
Total	24.63	9.123	27.26	9.877

Note. TMS= Toronto Mindfulness Scale

The researcher analysed the data of the measurement of TMS from both the experimental group and the control group at both measurement points to obtain his results for the first hypothesis. Participants in the informal mindfulness condition had a TMS mean value of 24.92 (8.457) at T1 and a TMS mean value of 27.77 (9.537) at T2. Furthermore, participants in the control condition had a TMS mean value of 24.34 (9.789) at T1 and a TMS mean value of 26.75 (10.217) at T2. Finally, the participants had a MHC-SF total mean value of 24.63 (9.123) at T1 and a MHC-SF total mean value of 27.26 (9.877) at T2.

Table 8 illustrates the results of mixed ANOVA of TMS.

Table 8. *Mixed ANOVA results of TMS*

	F (1, 135)	p	η^2
Time	11.948	0.001*	0.081
Group	0.307	0.58*	0.002
Group * time	0.085	0.771*	0.001

Note. TMS= Toronto Mindfulness Scale; $p < 0.05$

There was a significant main effect for time within the groups from T1 to T2 TMS, $F(1, 135) = 11.948, p = 0.001, \eta^2 = 0.081$. Additionally, there was a non-significant main effect between the informal mindfulness group and the control group, $F(1, 135) < 1, p = 0.58, \eta^2 = 0.002$. Finally, no interaction was found between state mindfulness over time and the informal mindfulness condition and the control condition, $F(1, 135) < 0.01, p = 0.771, \eta^2 = 0.001$.

Figure 3 shows the main effect of TMS over time.

AN INVESTIGATION ON THE RELATIONSHIP OF INFORMAL MINDFULNESS EXERCISES ON STATE MINDFULNESS AND WELL-BEING

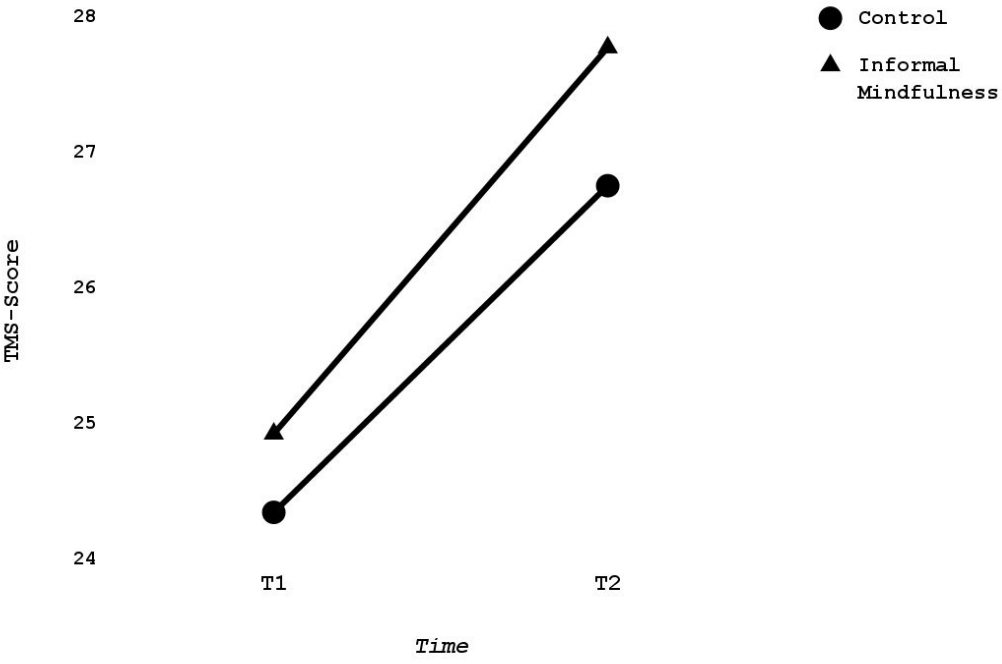


Figure 3 Main effect from the measurement of TMS over time

Table 9 shows the mixed ANOVA results for TMS after controlling for age.

Table 9. *Mixed ANOVA results for TMS after controlling for age*

	F (1, 134)	p	η^2
Time	0.162	0.688*	0.001
Age group	0.003	0.96*	0
Group	0.304	0.582*	0.002
Time* age	0.731	0.394*	0.005
Time* group	0.083	0.774*	0.001

Note. TMS= Toronto Mindfulness Scale; * $p < 0.05$.

After controlling for age, there was no significant main effect on time from T1 to T2, $F(1, 134) < 1$, $p = 0.688$, $\eta^2 = 0.001$, there was no significant main effect between younger and older participants, $F(1, 134) < 1$, $p = 0.96$, $\eta^2 = 0$, and there was no significant main effect between the conditions of the study, $F(1, 134) < 1$, $p = 0.582$, $\eta^2 = 0.002$. There was no statistically significant interaction between state mindfulness over time and the old and young participants, $F(1, 134) < 1$, $p = 0.394$, $\eta^2 = 0.005$, and no significant interaction between state mindfulness over time and the conditions, $F(1, 134) < 1$, $p = 0.774$, $\eta^2 = 0.001$.

**4.2 Second Hypothesis: Informal Mindfulness Exercises have a Positive Effect on
Well-being**

Table 10 illustrates the measurements of normality and reliability of MHC-SF.

Table 10. *Measurement of normality and reliability of MHC-SF*

<u>MHC-SF</u>	T1	T2	MHC-SF
Shapiro Wilk	p= 0.006*	p= 0.005*	-
Cronbachs alpha	-	-	0.9

Note. MHC-SF= Mental Health Continuum Short Form; *p<0.05.

The assumption of normality was violated at T1 (p= 0.006) and at T2 (p= 0.005). Due to a large sample comprising 137 participants, normality can be assumed on a population level. The MHC-SF was a reliable measure (a=0.9).

Table 11 shows the descriptives of MHC-SF for both measurement points, T1 and T2 and both conditions, the informal mindfulness group and the control group.

Table 11. *Descriptives of MHC-SF*

MHC-SF	T1		T2	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
Informal Mindfulness	42.44	12.866	44.73	13.267
Control	44.05	13.878	47.53	13.855
Total	43.19	13.323	46.06	13.568

Note. MHC-SF = Mental Health Continuum Short Form.

The researcher analysed the data of MHC-SF from both the experimental group and the control group at both measurement points to obtain his results for the second hypothesis. Participants in the informal mindfulness condition had a MHC-SF mean value of 42.44 (12.866) at T1 and a MHC-SF mean value of 44.73 (13.267) at T2. Furthermore, participants in the control condition had a MHC-SF mean value of 44.05 (13.878) at T1 and a MHC-SF mean value of 47.53 (13.855) at T2. Finally, both conditions had a MHC-SF total mean value of 43.19 (13.323) at T1 and a MHC-SF total mean value of 46.06 (13.568) at T2.

Table 12 showed the results of mixed ANOVA for MHC-SF.

Table 12. *Mixed ANOVA results for MHC-SF*

	F (1, 135)	p	p ²
Time	17.267	0*	0.113
Group	1.011	0.317*	0.007
Group * time	0.742	0.39*	0.005

Note. MHC-SF = Mental Health Continuum Short Form; *p<0.05.

Analysis revealed, that there was a significant main effect for time within the groups from T1 to T2, $F(1, 135) = 17.267$, $p = 0$, $\eta^2 = 0.113$. However, the main effect between the informal mindfulness group and the control group was not significant, $F(1, 135) = 1.011$, $p = 0.317$, $\eta^2 = 0.007$. There was no significant interaction found for well-being over time for the informal mindfulness condition and the control condition, $F(1, 135) < 1$, $p = 0.39$, $\eta^2 = 0.005$.

Figure 4 shows the main effect for time for MHC-SF.

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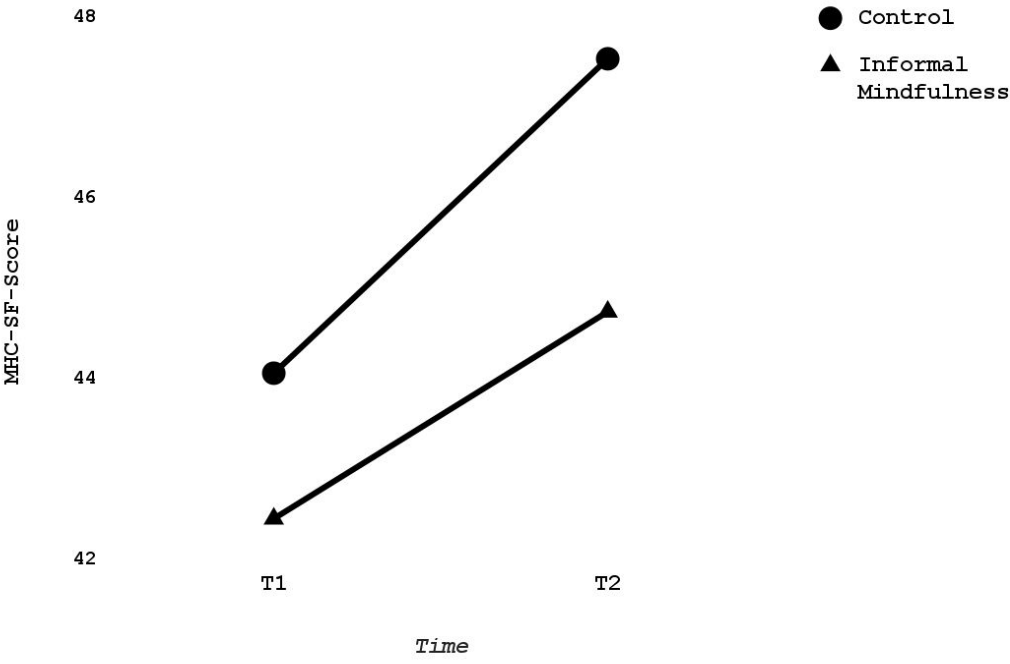


Figure 4 Main effect for time for MHC-SF

Table 13 illustrated the results of mixed ANOVA for MHC-SF after controlling for age.

Table 13. *Mixed ANOVA results for MHC-SF after controlling for age*

	F (1, 134)	p	η^2
time	1.435	0.233*	0.011
Age group	0.27	0.604*	0.002
Group	1.001	0.309*	0.007
Time* age	0.069	0.793*	0.001
Time* group	0.739	0.392*	0.005

Note. MHC-SF= Mindfulness Health Continuum Scale; * $p < 0.05$.

Table 14 shows, there was no significant main effect for well-being in time from T1 (43.246, 1.145) to T2 (46.132, 1.161), $F(1, 134) = 1.435$, $p = 0.233$, $\eta^2 = 0.011$, there was a non-significant main effect for age between young and old participant's $F(1, 134) < 1$, $p = 0.604$, $\eta^2 = 0.002$, and a non-significant main effect between the tested conditions, $F(1, 134) = 1.001$, $p = 0.309$, $\eta^2 = 0.007$. Interaction over time between well-being and age was non-significant, $F(1, 134) < 1$, $p = 0.793$, $\eta^2 = 0.001$, and interaction over time between well-being and the tested groups was non-significant, $F(1, 134) < 1$, $p = 0.392$, $\eta^2 = 0.005$.

5. Discussion

The aim of this controlled and randomized internet-based study was to investigate whether an informal mindfulness exercise, that was executed for seven days excluding the time for filling in the questionnaires, has a positive effect on both state mindfulness and well-being. Further the researcher controlled in both hypotheses for age and expected that the older age group, ranging from 42-65, showed higher levels of state mindfulness and well-being after the intervention.

It was expected that the participants in the informal mindfulness group would have higher levels of state mindfulness after one week, in comparison to the control group. In general, all participants seemed to be significantly ($p= 0.001$) more mindful after exercising for one week. Nevertheless, the researcher did not find a significant difference in regard to the experimental condition and the control condition ($p= 0.58$) or any interaction effect ($p= 0.771$). Therefore, the higher levels of state mindfulness might not been caused by the informal mindfulness intervention, but could have been caused by a general effect not accounted for in the hypotheses. Hindman et al. (2015) also used an informal mindfulness program and found significant increases in trait mindfulness. The results stand in conflict with the present study. This can have more than one explanation. We need to take into account that 82.4% of Hindman et al.'s (2015) sample had meditation experience and 53.6% had yoga experience, whereas in the present study the researcher did not collect data about the level of mindfulness experience. In the present study, state mindfulness was used as measurement, which is a more fluent measure of mindfulness and not as stable as trait mindfulness. Additionally, Hindman et al.'s (2015) study lasted for a longer period of time, it lasted for

more than five weeks. In this time the participants could have been building up a mindfulness-related trait like mindfulness skills, as Dane and Brummel (2013) hypothesized. In contrast, the participants in the present study had a much shorter period of time to do the informal mindfulness exercise. Furthermore, participants in the control condition also had higher levels of state mindfulness after the intervention. It could be, that the exercise in the control condition also encouraged people to be more mindful. Seear and Vella-Brodrick (2013) conducted a randomized and controlled study, in which they tested if positive interventions, like the three blessings, could enhance well-being in participants. They found that people's level of mindfulness increased during the treatment, As our control condition is derived from the three blessings exercise, it could be that the exercise had a similar effect on the participants in the present study.

Further, it was expected that participants in the older age group from 41-65 show higher levels of state mindfulness in the informal mindfulness exercise compared to the control group after the intervention. The researcher found no significant results at all. An assumption is, that state mindfulness is a skill both young and old people are able to build and does therefore not necessarily come with age. The results of the current study stand in contrary to Weinstein et al.'s (2009) multi-method examination about the relation of mindfulness to well-being and stress, in which they found, that older people were higher in state mindfulness than younger people. It is important to say, that the sample in the study of Weinstein et al. (2009) ranged from 18 to 40 years and did not cover the additional range of age we analysed. In addition, the sample of the present study was unbalanced, with 85.4% of the participants being in the younger age group, ranging from 18-41. This could have an affect

the results and therefore they need to be interpreted with caution.

The second hypothesis was, that participants in the informal mindfulness group have higher levels of well-being after the intervention, compared to the control group. The researcher found, that both groups had significantly higher levels of well-being from measurement point T1 to T2 ($p= 0.0$), which was not solely caused by the informal mindfulness condition, but rather by a general effect. Howell et al. (2016) found significant results in enhancing well-being with their mindfulness app. One possible explanation is that Howell et al.'s (2016) study was conducted with the evidence-based app, called "Headspace On-The-Go" (Howell et al.'s, (2016), p.169). Although the instructions in the control condition were similar in both this and Howell et al.'s (2016) study, the informal mindfulness exercise in the study at hand was designed by the researcher and his colleagues themselves. Therefore, no previous evidence was collected for the recorded audio file the researchers used for his study. Another possible explanation is, that Howell et al. (2016) used a formal mindfulness exercise instead of informal mindfulness exercise. These are not comparable to the informal mindfulness exercise in the present study. Furthermore, no significant differences between the experimental group and the control group ($p=0.0317$) or any interaction effect (0.39) was found.

Finally, it was expected that participants in the older age group show higher levels of well-being after one week, compared to the control group. Unfortunately, no significant results were found here. This null finding could be due to the fact, that the study was rather short than long in time. Mroczek and Kolarz (1998) used a 30-days long self-reported questionnaire to assess well-being in young and old people, in which they found their positive

results regarding higher levels of well-being in an older age. The present study tested if an informal mindfulness exercise is more effective in older people, while Mroczek and Spiro (2005) tested life satisfaction in general over a lifespan of 22 years. Again, the time span measured was way shorter in this study, without regard to the type of mindfulness exercise used. As the combination of variables used in this study is completely new there is little to no possibility to compare the results with other studies.

Last but not least, study had several limitations, which could have influenced the outcomes in different ways. Firstly, the recruitment text may have biased the control group, which may have resulted in higher well-being results of the participants in T2. The recruitment text stated, that the researchers currently conduct research on the influence of positive activities on well-being. By asking the participants about participating in a study about positive activities, the neutral activity from the control group may possibly have gotten a positive connotation. Seligman, Steen, Park and Peterson (2005) showed in their internet-based study about the empirical evaluation of positive psychology interventions, that their participants were happier after six months of doing the three blessings exercise, on which our neutral activity is based on. The fact that our neutral exercise is based on the three blessings exercise and our recruitment text has a positive connotation, could be an explanation why the control group in the present study also showed a positive trend in terms of well-being. Secondly, the study was designed and conducted as an internet-based study. The researcher had almost no personal contact with the participants, beside via mail, and could not control how often the participants did the exercises or whether the participants understood the exercises well. In contrast, Hanley et al. (2015) conducted a study, in which the participants

did an informal mindfulness exercise in form of washing dishes. These dishes were all prepared in the same manner for all the participants. Here, the researchers were able to control procedure and the correct sequence of the study. Thirdly, 85 participants who did not finish the study might have brought some attrition bias, which possibly affects the internal validity of the study.

The 83 participants, who did not finish the study completely, make for an attrition rate of 38.3%. Marcellus (2004) stated, that attrition bias is a concern if the rate exceeds 20%. The present study clearly exceeded this value. Furthermore, the participants were randomized and matched with regard to their age group and gender. Attrition affected the matched allocation. At the beginning of the study 27.6% of the participants belonged to the older group. After finishing the study only 14% of the participants were still in the older group, showing a strong attrition in this group of participants. The mean age of the participants was 5.56 years lower at the end of the study than it was before attrition. These facts makes it hard to compare the age groups with each other and draw valid conclusions.

Also, mean values for state mindfulness and well-being were higher after attrition, compared to the first measurement point, when no attrition took place. One possible explanation is, that people with higher levels of state mindfulness and well-being stayed in the study because they were more interested in the content. Fourthly, a part of the selected participants could have introduced a selection bias into the study. Here, three kind of groups were identified by the researcher. The first group were participants, who were students at University Utrecht. Since the researcher is a student of the same university, he asked fellow students to participate in the study. Further, bachelor psychology students of the University

Utrecht received credit points for their participation, which are necessary to absolve their bachelor degree and also had the chance to win 50 euro. The psychology student sample does not represent a well-balanced population, but rather comprises of mostly young people with academic knowledge about psychology. The second group were friends and family the researcher recruited via mail, Whats-app and Facebook. This sample may have brought in a bias in trying to participate in the study especially well, because they have a personal connection to the researcher. The third group were participants, who were recruited via the platform FindParticipants (FindParticipants.com. (2017)). The people visiting the webpage possibly did not represent the general population in terms of them being overly motivated to participate in scientific studies and possibly have a higher level of education. In fact, 69.3% of the participants in the sample of the present study had a degree higher than high school. The selection bias could also explain the higher levels in state mindfulness even in the control condition, by the fact that participants are already interested in mindfulness and that participants try to give their best.

Beside these limitations, the study also had strengths that need to be pointed out. First, the informal mindfulness exercise and the neutral exercise were cleverly standardized: they were both recorded as an audio file and they were both set to be executed before the participants went to bed. Even though the exact bed times might differ, most of the people should have listened to it around a similar time span before going to bed. Even though the researcher did not control the study in a fixed setting, he was able to control for time a little with the recorded audio instructions. Second, the informal mindfulness exercise was presented without a religious context. If it had been put in a religious context, it could have led to some

doubts and prejudice about mindfulness and its application and could have given the people a more negative perspective on it. Third, by recording the instructions as an audio file, the voice in the audio file may have given the participants the feeling that the researcher is present. Finally, the informal mindfulness intervention is cost efficient and can be easily implemented into daily life, without the need of being trained by a professional before applying it.

Overall, the idea of using an informal mindfulness exercise to measure state mindfulness and well-being over two measurement points was new. Some of the studies, that were used to give the single hypotheses of the study hold, were presented in a totally different context than the present study and were therefore not comparable to it. Further investigation is needed with a similar construct the researcher built and should account for the limitations in order to improve the study design.

6. Conclusion

The researcher evaluated the effects of an informal mindfulness exercise on state mindfulness and well-being. The study was randomized and controlled. Results showed a positive and significant trend from the first measurement point to the second measurement point for both state mindfulness and well-being. The results did not satisfy the hypotheses that the researcher set. Further research should include refinement the measurement instruments, which were designed by the researcher and his colleagues, executing the study in a more controlled setting like a laboratory and the execution of the study for a longer period of time.

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