

Article

Incidental Stigmatisation?

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Characteristics of Well-Being App Descriptions and Their Effects on Public and Self-Stigmatisation of Depression

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Abstract

More and more individuals turn to apps to increase their well-being or reduce stress, with meditation apps being most popular to achieve these goals. However, considering the underlying normative imperative of idealised self-help inherent in the well-being app market, concerns have been raised that these apps and how they are promoted on the app market might contribute to the stigma of mental illness. To explore these potential detrimental effects we conducted a pre-registered experimental survey study ($N = 249$) examining whether (1) the emphasis on individual responsibility for one's well-being in the text describing the app in the app market and (2) the lack of a disclaimer that the app is not a replacement for medical treatment increase both the stigmatisation of individuals with depression and self-stigmatisation. While our findings did not support our a priori hypotheses, further exploratory analyses uncovered more complex relationships between our experimental factors, respondents' age and prior experiences with mental illness, and stigmatisation and self-stigmatisation. We, therefore, call for future empirical investigations to better assess the risk of incidental stigmatisation through how well-being apps are promoted in the app market.

Keywords

Well-being apps, mental health, stigmatisation, depression, mHealth.

Smartphone apps have become pervasive in everyday life. No matter what problem we are facing, we will find an app to help us (see, for example, the abundance of scholarly literature titled “There’s an app for that” covering the breadth of academia, e.g., BinDhim & Trevena, 2015; Buie & Blythe, 2013; Frizzo-Barker & Chow-White, 2012; Hawkins & Horst, 2020; Simmons et al., 2018). Not surprisingly, and with an abundant supply to choose from, more and more individuals turn to apps to increase their well-being or reduce stress (Radovic et al., 2016; Christmann et al., 2017).

In this context, meditation or mindfulness apps are especially popular (Perez, 2020). While practicing mindfulness and meditation can be effective strategies to increase mental and physical well-being (Plaza et al., 2013; Lykins & Baer, 2009; Howells et al., 2015), it may also harm some individuals’ mental health by raising emotions such as anxiety and guilt, for example (Clarke & Draper, 2020; Trnka, 2016; Van Dam et al., 2018). Adding the underlying normative imperative of idealised self-help inherent in the mHealth market, concerns have been raised that well-being apps might contribute to the stigma of mental illness (Byron, 2019; Fullagar et al., 2017; Lupton, 2013). This is especially concerning as people with a mental illness diagnosis, especially depression, make up a large share of meditation app users (Beard et al., 2019; Huberty et al., 2019). Moreover, prior research has identified a lack of disclaimers regarding appropriate use, limitations, and privacy for both health and well-being apps (e.g., Bowie-DaBreo et al., 2020; Larsen et al., 2019), potentially adding to the stigma of mental illness.

To explore these potential detrimental effects, we conducted a pre-registered experimental survey study examining whether (1) the emphasis on individual responsibility for one’s well-being and (2) the lack of a disclaimer that the app is not a replacement for medical treatment increase both the stigmatisation of individuals with depression and self-stigmatisation. Our study provides first exploratory experimental evidence in this area, potentially informing future regulatory efforts in the well-being app market and sparking future research.

The Search for Well-Being: Meditation Apps

Well-being is an essential part of health (WHO, 1948). Research has also established the positive effects of well-being on overall health and longevity (e.g., Diener & Chan, 2011; Ryff, 2014). Consequently, promoting well-being is regarded as a relevant means to increase and support both overall health and especially mental health (WHO, 2013). Highly accessible to users who are already using their phones to access health-related content (Link & Baumann, 2020), smartphone apps targeting well-being might make a meaningful contribution, especially in mental illness prevention (e.g., Howells et al., 2016). Studies on the content of well-being (Sukalla & Karnowski, 2019), mindfulness (Mani et al., 2015; Plaza et al., 2013), and stress management apps (Christmann et al., 2017) highlighted that most apps focus on different meditation techniques to improve well-being, mindfulness, or stress management. Moreover, meditation is also a common function or feature in the broader area of mental health apps (Parker et al., 2018).

Overall, practicing mindfulness and meditation can be effective strategies to increase mental and physical well-being, both with or without apps (Plaza et al., 2013; Lykins & Baer, 2009; Howells et al., 2016). A recent meta-analysis of randomised controlled trials confirms the efficacy of mindfulness and meditation apps to enhance well-being and mental health (Gál et

al., 2020). However, the authors also advise caution in interpreting the results carefully due to the small number of studies, potential bias, and heterogeneity.

But at the same time, there are also primarily qualitative studies reporting a negative impact on some app users with meditation eliciting emotions such as anxiety or guilt, increasing rumination, or reducing self-efficacy (Clarke & Draper, 2020; Trnka, 2016; Van Dam et al., 2018). These adverse effects seem to be more likely for individuals with mental illnesses (Kelley et al., 2017). Hence, some well-being apps could be especially detrimental to users who are already suffering from a mental illness or in a vulnerable phase of psychological distress (Torous & Roberts, 2017).

Beyond these effects on mental health, the medical or clinical health apps market has been characterised by a lack of evidence, privacy, and data security (Donker et al., 2013; Wang et al., 2018). An analysis of app store listings of publicly available apps for depression, for example, uncovered a range of ethical issues concerning validity, privacy, risks and safety, effectiveness, access to care, and responsibility (Bowie-DaBreo et al., 2020).

Framing Mental Health: Incidental Stigmatisation?

Going one step further, we want to expand the scope of discussing potential harmful side effects of users' self-responsible use of well-being apps beyond the effects of individual apps and consider the app market as a whole. Although there has not been much research on this, the ecosystem of mental well-being apps encountered in the app market likely also contributes to society's notions of health and well-being (Lucivero & Prainsack, 2015; Lupton, 2014). Just as the structure of the content we see when searching for information on the web is shaping our attitudes and beliefs (as discussed extensively in the field of communication for several decades and for example suggested by the concept of framing; Entman, 1993), we assume that the kind and structure of information we encounter when browsing the app market for a specific app will do just the same. Hence, we see the necessity to go beyond the focus on single apps and their usage practices, focusing on the phase of searching for an app and scanning app descriptions in the app market instead.

One aspect repeatedly found in these app descriptions and the discourse around mental well-being apps, in general, is their potential to empower users to take control of their own well-being (Albrecht, 2016). However, this emphasis on empowerment might come with side effects. Accordingly, the discourse of patient empowerment has not been without criticism. The idealization of taking responsibility for one's health and well-being or the "practice of individualized self-care" (Byron, 2019) is argued to neglect the social context of health (Lupton, 2014). Consequently, those people failing to self-manage their health and well-being are easily regarded as deficient (Fullagar et al., 2017). The resulting normative pressure to optimise one's own well-being has been shown to provoke guilt, anxiety, rumination, or a general negative impact on mental health (Byron, 2019; Clarke & Draper, 2020; Dejonckheere et al., 2017; Trnka, 2016). Considering this promoted norm of self-responsibility (Lupton, 2014), meditation apps are an especially crucial potential source of stigmatisation of mental illness. This is aggravated because mental health problems are an important reason for meditation app use (Cramer et al., 2016). For example, 41% of the meditation app *Calm* users reported a mental health diagnosis (Huberty et al., 2019). In another study with psychiatric patients, almost half (44%) of them had downloaded a mental health app, with mindfulness and meditation apps being most common (Beard et al., 2019).

Mental illnesses are highly stigmatized in society resulting in discrimination and hindering treatment (Casados, 2017; Ilic et al., 2013). The idealization of self-responsibility inherent in well-being apps, particularly meditation apps, does play precisely into the public stigma of individuals with mental health disorders (Mojtabai, 2010) and especially with depression (Schomerus et al., 2009) as being too lazy or too weak. Moreover, for vulnerable individuals, the social pressure not to feel sad or anxious and to take action to feel better could increase the internalization of this stigma, i.e., lead to self-stigmatisation, and ultimately prevent users from seeking professional help (Corrigan et al., 2014). Therefore, to explore the risk of potential incidental (self-) stigmatisation of depression by meditation apps, we will first focus on the impact of an overemphasis on individual responsibility for one's mental health on stigmatisation and self-stigmatisation. We thus pose the following first hypothesis:

H1: App descriptions with an emphasis on individual responsibility for one's mental health will lead to an increase in (a) stigmatisation of individuals with depression and (b) self-stigmatisation compared to those with no emphasis.

This potential harmful influence might also result when app descriptions do not offer a medical disclaimer referring vulnerable users to professional help. A study focusing on apps for depression revealed that 80.7% of the 353 app store descriptions in that study did not include a disclaimer regarding treatment, appropriate use, or limitations (Bowie-DaBreo et al., 2020). Similar numbers have been found for mental health apps in general (Larsen et al., 2019). Compared to medical or clinical health apps, the market for well-being apps is even less regulated (Terry & Gunter, 2018). Correspondingly, Lau and colleagues (2020) found that only 21 out of 1009 publicly available wellness and stress management apps provide peer-reviewed evidence for efficacy or feasibility claims. In their conclusion, the authors call for a health warning on these apps to caution potential users against replacing medical treatment with the app (Lau et al., 2020). Given these strong recommendations to include such disclaimers to communicate the potential necessity to seek medical help clearly, our second hypothesis tests the beneficial influence of such disclaimers on stigmatisation and self-stigmatisation:

H2: App descriptions with a reference to external medical support for mental health will lead to a decrease in (a) stigmatisation of individuals with depression and (b) self-stigmatisation compared to those without such a reference.

Finally, and in line with the exploratory nature of this study being, to our knowledge, the first to investigate the influence of aspects of app descriptions on stigmatisation and self-stigmatisation experimentally, we will examine the interaction between these two factors, posing the following research question:

RQ: How do these two factors interact in their influence on (a) stigmatisation of individuals with depression and (b) self-stigmatisation?

Method

Design

We conducted a preregistered¹ online experiment with a 2 (*self-responsibility focus*: low vs. high) × 2 (*medical disclaimer*: no vs. yes) factorial between-subject design. After providing consent, participants responded to questions about their general smartphone app use before

randomly viewing one of four sets of three meditation app descriptions. Each of the four sets was manipulated according to the respective condition. Following evaluations of the app descriptions, public depression and help-seeking stigma and self-stigma were assessed. At the end of the study, participants were thoroughly debriefed and thanked.

Sample

An a priori power analysis for Analyses of Variance using the software program G*Power (Faul et al., 2009) resulted in a planned sample size of $N = 210$ to detect a medium effect size of $f = .25$ with 95% power at the standard .05 alpha error probability. To collect our data, we used SoSci Panel, a non-commercial, non-representative online respondent pool with most respondents residing in Germany, a few being from Austria or Switzerland (Leiner, 2012). Participants were required to be smartphone users and have at least one smartphone app installed. In total, 295 respondents reached the last page of the questionnaire. Of these, 46 cases were excluded because they had at least one missing value for the main dependent variables or covariates. The final sample ($N = 249$) consists of 61.8% female participants. The mean age is 44.8 years ($SD = 14.4$), with participants ranging from 19 to 75 years. Our participants are highly educated, with 67.1% having at least a university degree, while only five individuals do not have a university entrance qualification. On average, participants own a smartphone for 8.5 years ($SD = 3.6$) and 44.6% use medical, health, or fitness apps. Only 11 participants (4.4%) are using meditation apps. There were no differences between conditions for these sample characteristics (ANOVAs or χ^2 tests: all $p > .090$).

Stimulus Material

Every participant was asked to read descriptions of three different meditation apps – all manipulated according to the respective between-subject condition – ranging from 85 to 120 words that were created to mimic the types of descriptions commonly found on app stores. We used three descriptions to simulate a quick search situation, in which one potentially encounters several apps before making a choice. In addition, we aimed to create a general impression of the market. Each app description was presented on a separate page in random order. Participants could click through them at their own pace (see Appendix).

The manipulation of the emphasis on self-responsibility was realized by varying attributions of agency, i.e., who is in control of well-being. The low self-responsibility focus versions place agency on the app emphasizing the support it is providing. An example sentence is “The Meditation Heroes-App will help you to reduce stress...” The high self-responsibility versions put the user in control of their well-being, emphasizing the user’s active role. The same sentence reads, “Use the Meditation Hero-App to reduce your stress...” In addition, directive statements that have been identified in prior research within the context of health to signify self-responsibility discourse (e.g., Burles, 2018; Lawless et al., 2018) were employed in the high self-responsibility version to stress the need for individual action. An example is “Only you can overcome your fears and increase your well-being!” (see Table 1). For the second factor, a short medical disclaimer text was added at the end of the description, stating that the app does not replace therapy or medical treatment for mental illness.

Using two questions for each manipulation, we tested whether the participants perceived our manipulations as intended. The answer options (*disagree*, *agree*, *do not remember*) were recoded as 1 for *agree* and 0 for *disagree* and *do not remember*, and a sum index of both items

was computed for analyses. The items for the medical disclaimer condition were “From the descriptions of the apps, it is clear that they are not medical apps” and “The app descriptions include references to outside help for mental illness.” As expected, more participants reading the app descriptions with a medical disclaimer agreed with the statements (42% agreed with one of the two, 47.1% with both statements) concerning the non-medical status of the apps than participants (37.8% with one, 0.8% with both statements) in the conditions without a disclaimer ($\chi^2 = 99.39$, $df = 2$, $p < .001$, Cramer’s $V = .64$).

Table 1. Manipulation of Self-Responsibility Emphasis

App	Self-Responsibility Emphasis	
	Low	High
Meditation Heroes	“The app helps you...”	“Use the app to... and increase your...”
	“The app will be a loyal companion...”	“Make the app your loyal companion...”
	“It is easy to use and will let you choose...”	“You can easily use it and choose...”
	“With this app, you can overcome...”	“Only you can overcome your fears and increase your well-being!”
	“Let well-being enter your life...”	“Bring well-being into your life.”
My Path to Meditation	“...now you would like to try?”	“...and now you want to take it into your own hands?”
	“Our app shows you step by step how to start...”	“Use our app with which you can create your meditation practice step by step...”
	“..., let you try various tools and types of meditation, so you can find out what fits best to you.”	“Try various tools and types of meditation, so you can decide what fits best to you.”
	“Finding greater well-being, health and productivity with...”	“Increase your well-being, become healthier and more productive...”
Presence in Life!	“Let the app take you...”	“Start your journey...”
	“The app will help you...”	“With the app, it is entirely in your hand to...”
	“We address topics such as...”	“You can work on topics such as.... on your own...”
	“A great tool for more presence in life.”	“A great tool for everyone who wants to be more present in their life.”

Concerning self-responsibility emphasis, the two items used to check the manipulation were “The app descriptions called on me to take action myself and take responsibility for my well-being” and “The app descriptions point out that you have it in your own hands to increase your well-being with meditation.” Unfortunately, the high self-responsibility versions were perceived as equally emphasizing individual responsibility as the low self-responsibility versions with 56.9% of the participants in the high self-responsibility condition and 55.3% in the low self-responsibility condition agreeing with both statements, and 31% and 29.5% respectively agreeing with one of the statements ($\chi^2 = 0.50$, $df = 2$, $p = .778$, Cramer’s $V = .05$). Based on the fact that (1) the manipulations are grounded in manifest changes to the app descriptions, (2) there is only negligible variance in perceived self-responsibility focus with only 34 participants not reporting any emphasis on self-responsibility in the app descriptions, and (3) on the assumption that their effects might be independent of users’ conscious perception, we will conduct and report our analyses as planned and discuss the potential implications of the manipulation check results in more detail in the discussion.

Dependent Variables

All items were measured on seven-point scales.

Public stigmatisation of depression was assessed regarding two aspects, the stigmatisation of affected individuals and the stigmatisation of the act of help-seeking. *Depression stigma* was measured with the 9-item personal stigma scale from the depression stigma-scale (Griffiths et al., 2004). An example item is “Depression is a sign of personal weakness.” Achieving good reliability (Cronbach’s $\alpha = .83$), the items were combined into a mean index ($M = 2.11$, $SD = 0.92$). The *stigma of help-seeking* was measured using the five-item stigma scale for receiving psychological help (Komiya et al., 2000). The scale achieved good reliability (Cronbach’s $\alpha = .84$), and items such as “It is advisable for a person to hide from people that he/she has seen a psychologist” were combined into a mean index ($M = 3.90$, $SD = 1.26$).

Self-stigmatisation. To assess participants’ *self-stigmatisation*, we employed the 16-item self-stigma of depression scale (Barney et al., 2010; Goepfert et al., 2019; Makowski et al., 2018). Participants were asked to imagine themselves suffering from depression and rate how they would feel, such as “I would feel ashamed” or “I would feel inadequate around other people.” A mean index was created (Cronbach’s $\alpha = .93$; $M = 3.82$, $SD = 1.26$).

Control Variables

Participants’ *prior experience* was assessed with four questions. We asked whether they have personally suffered from depression (35.3% yes), have a close family member or friend with depression (68.3% yes), and know of someone in their wider circle with depression (77.9% yes). Only 28 participants (11.2%) reported having no direct experience. An additional item asked about how relevant the issue of mental illness, in general, is in their everyday life ($M = 4.10$, $SD = 1.56$).

Randomization was successful for participants’ personal experience (χ^2 test: $p = .272$), their knowledge of someone with depression in their close (χ^2 test: $p = .544$), and wider circle (χ^2 test: $p = .082^2$). There were no differences between groups concerning mental illness relevance in everyday life (all $p > .115$).

Results

We conducted analyses of covariance (ANCOVA) with the emphasis on self-responsibility and presence of medical disclaimer as factors and gender, age, mental illness relevance, and prior experience with depression as covariates to test effects on depression stigma, public stigma of help-seeking, and self-stigmatisation. Bonferroni corrections were used for multiple comparisons. When testing assumptions of homogeneity two interactions between having someone in one's close circle with depression and the medical disclaimer factor for depression stigma and self-stigmatisation, an interaction between age and the self-responsibility emphasis factor for self-stigmatisation, as well as a three-way interaction between age and the two factors for the public stigma of help-seeking emerged. Consequently, we included these interactions in the respective analyses.

Hypotheses and Research Question

Overall, no simple main effects of or interactions between the two factors self-responsibility emphasis and presence of medical disclaimer emerged for any of the dependent variables. To illustrate, Table 2 shows the results for analyses without covariates. As none of our hypotheses was supported, the following results should be considered exploratory.

Moderating Effects of Knowing a Person with Depression in One's Close Circle

The analyses show a significant interaction effect between the medical disclaimer factor and knowing someone with depression in one's close circle for depression stigma, $F(1, 238) = 8.68$, $p = .004$, part. $\eta^2 = .035$. Adding a medical disclaimer to the app descriptions resulted in a higher depression stigma for participants who do not know anyone with depression in their close circle ($EM = 2.46$, $SE = 0.14 > EM = 2.04$, $SE = 0.15$; $F(1, 238) = 4.28$, $p = .040$, part. $\eta^2 = .018$), while it reduced depression stigma for participants who know someone ($EM = 1.87$, $SE = 0.10 < EM = 2.17$, $SE = 0.10$; $F(1, 238) = 4.76$, $p = .030$, part. $\eta^2 = .020$). While there was no difference between the two groups when they read app descriptions without a disclaimer ($F(1, 238) = 0.52$, $p = .470$, part. $\eta^2 = .002$), depression stigma was significantly higher for participants not knowing anyone in their close circle with depression compared to those who do when a disclaimer was present ($F(1, 238) = 11.28$, $p = .001$, part. $\eta^2 = .045$; see Figure 1).

Table 2. Main Effects of and Interactions Between Experimental Factors on Dependent Variables

	Depression Stigma	Self-Stigma	Public Stigma Help-seeking
Self-responsibility emphasis	$F(1, 245) = 0.80$, $p = .371$	$F(1, 245) = 0.02$, $p = .884$	$F(1, 245) = 0.41$, $p = .523$
Medical disclaimer	$F(1, 245) = 0.12$, $p = .734$	$F(1, 245) = 0.04$, $p = .835$	$F(1, 245) = 1.62$, $p = .205$
Interaction	$F(1, 245) = 0.01$, $p = .925$	$F(1, 245) = 1.13$, $p = .288$	$F(1, 245) = 0.02$, $p = .904$

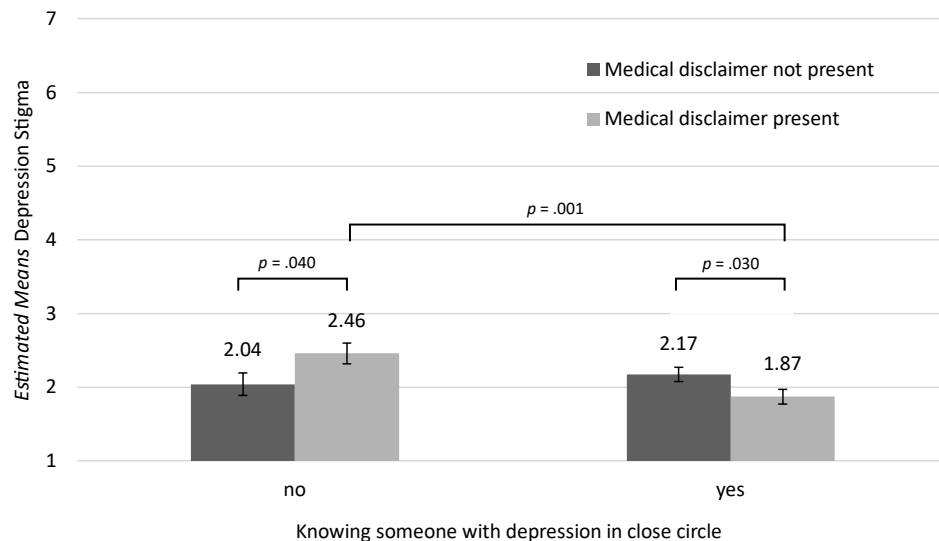


Figure 1. Interaction Effect Between the Medical Disclaimer Factor and Knowing Someone With Depression in One's Close Circle on Depression Stigma ($N = 249$)

A similar interaction between the presence of a medical disclaimer and knowing someone with depression in one's close circle emerged for self-stigmatisation, $F(1, 237) = 6.37$, $p = .012$, part. $\eta^2 = .026$. Again, adding a medical disclaimer to the app descriptions reduced self-stigmatisation for participants who know someone with depression in their close circle ($EM = 3.94$, $SE = 0.13 < EM = 3.56$, $SE = 0.14$; $F(1, 237) = 4.22$, $p = .041$, part. $\eta^2 = .018$), though it did not influence participants who do not know anyone ($F(1, 237) = 2.70$, $p = .102$, part. $\eta^2 = .011$). The level of self-stigmatisation was significantly higher for participants not knowing anyone in their close circle with depression compared to those who do when a disclaimer was present ($F(1, 237) = 5.80$, $p = .017$, part. $\eta^2 = .024$), but not when it was not present ($F(1, 237) = 1.13$, $p = .289$, part. $\eta^2 = .005$; see Figure 2).

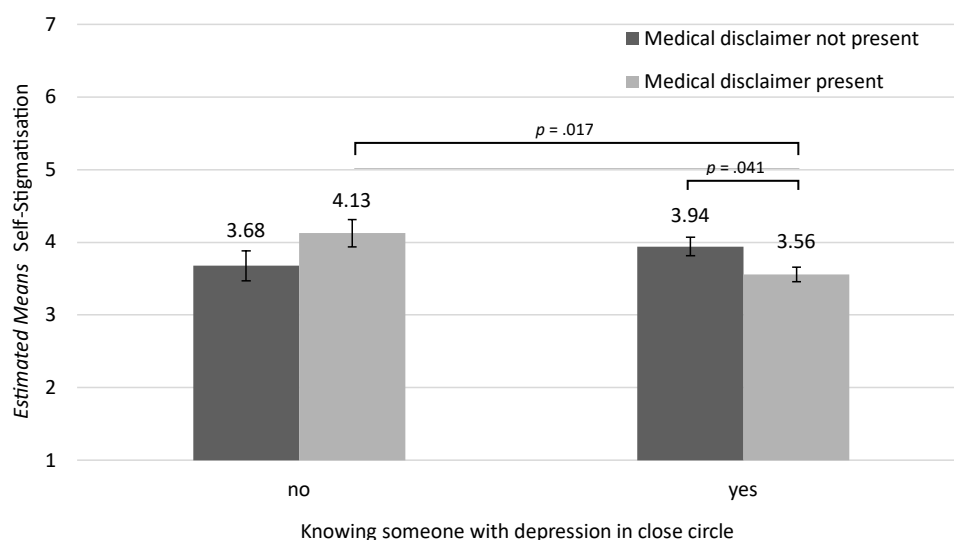


Figure 2. Interaction Effect Between the Medical Disclaimer Factor and Knowing Someone With Depression in One's Close Circle for Self-Stigmatisation ($N = 249$)

Moderating Effects of Age

To account for the continuous nature of the age variable, we used Hayes' (2013) Process Macro Model 1 with 10,000 bootstrap samples to test the moderation effect on self-stigmatisation. The analysis shows a significant interaction between the self-responsibility emphasis factor and age, $b = .03$, $SE = 0.01$, $p = .004$, $R^2 \text{ change} = .03$. Specifically (based on Johnson-Neyman significance regions), a heightened emphasis on self-responsibility in the app descriptions increases self-stigmatisation for participants older than 55.4 years (= 26.91% of the sample; see Figure 3).

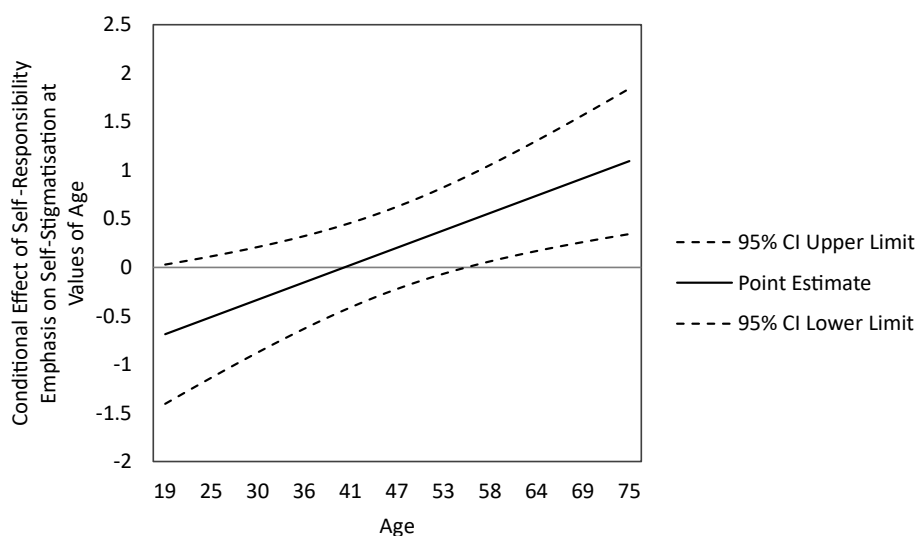


Figure 3. Johnson-Neyman Graph for the Interaction Between the Self-Responsibility Emphasis Factor and Age on Self-Stigmatisation ($N = 249$)

Note. A significant increasing positive effect of self-responsibility emphasis on self-stigmatisation can be observed for participants older than 55.4 years.

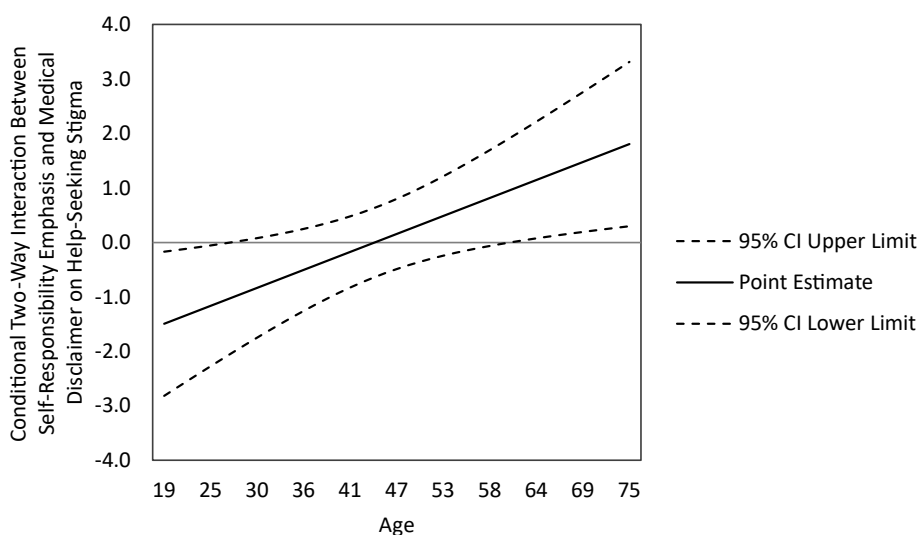


Figure 4. Johnson-Neyman Graph for the Three-Way Interaction Between the Experimental Factors and Age on Psychological Help-Seeking Stigma ($N = 249$)

Note. Significant increasing positive and negative interactions between the experimental factors on help-seeking stigma can be observed for participants older than 60.7 and younger than 27.1 years, respectively.

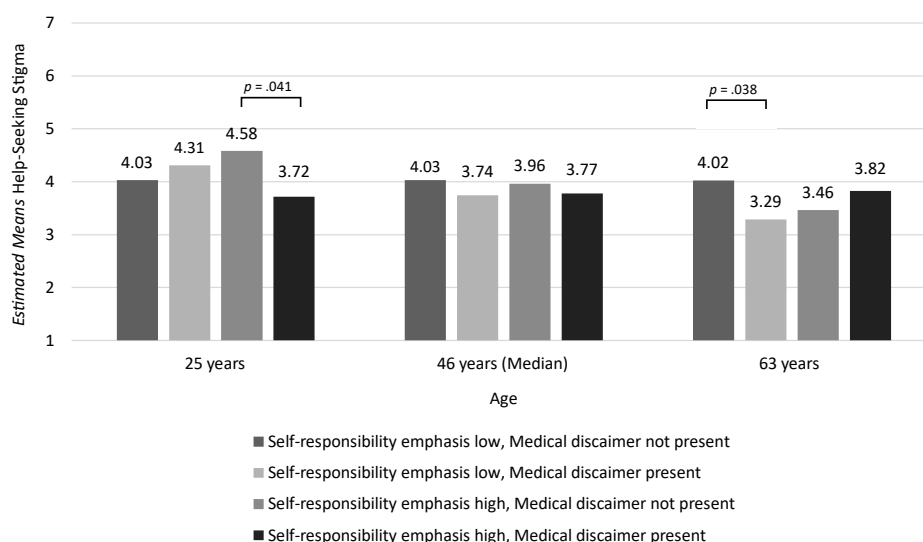


Figure 5. Illustration of the Three-Way Interaction Between the Experimental Factors and Age for the Public Stigma of Help-Seeking ($N = 249$).

Note. To illustrate the three-way interaction, help-seeking stigma means for the four experimental groups are shown at the median age and ages within the Johnson-Neyman significance regions.

For the analysis of the public stigma of help-seeking, age again violated the homogeneity of regression assumption. Using Model 3 of the Process Macro a significant three-way interaction between the experimental factors and age emerged, $b = 0.06$, $SE = 0.02$, $p = .011$, R^2 change = .03 (see Figure 4).

The presence of a medical disclaimer reduces the help-seeking stigma for older people, i.e., 60.7 years according to the Johnson-Neyman significance regions, but only in the low self-responsibility emphasis conditions. Conversely, only in the high self-responsibility emphasis conditions does the medical disclaimer reduce the help-seeking stigma for participants younger than 27 years (see Figure 5). This corresponds to 14.86 and 12.05% of our sample.

Discussion

In light of the potential stigmatizing effects of meditation apps, we conducted a first preregistered experimental study exploring whether two characteristics of app descriptions, the overemphasis of self-responsibility for one's mental health and the lack of a medical disclaimer, increase stigmatisation of individuals with depression and self-stigmatisation. The findings did not support our a priori hypotheses. However, very interesting results unveiling more complex relationships than anticipated emerged in the exploratory analyses. The effects of both factors are dependent on participants' age or direct experience with depression.

While the presence of a medical disclaimer in line with hypothesis 2 reduced depression stigma and self-stigmatisation for individuals having close family members or friends with depression, it unexpectedly increased the depression stigma of participants without persons with depression in their close circle. This counterintuitive finding might be explained by a priming effect (Price & Tewksbury, 1997), i.e., the activation of the concept of depression and related stigmatizing beliefs through the disclaimer might lead to heightened levels of stigmatisation. Albeit in a different context, research on media disclaimers for seemingly ideal yet unrealistic body depictions has similarly found counterproductive effects of disclaimers

(McComb & Mills, 2020). This extremely worrying finding needs additional investigation into the effects of disclaimers on stigmatisation against the backdrop of potential chronic effects of knowledge activation (Higgins, 1996). Considering the call for further regulation of the app market, potentially including such disclaimers (Lau et al., 2020), we need to be sure first that such disclaimers are not more harmful than helpful. At the same time, the positive effects for participants with direct experience – especially concerning self-stigmatisation – highlight the beneficial potential of medical disclaimers for concerned or affected individuals. To them, the presence of a disclaimer might signify a certain normalization of mental illness as a medical issue within society. Here, especially qualitative studies exploring the subjective perceptions of such disclaimers are needed to identify their meanings. Overall, the results illustrate that the addition of medical disclaimers has to be considered beyond its mere legal implications.

Besides participants' direct experience, their age has emerged as a moderator of the experimental factors' influence on self-stigmatisation and help-seeking stigma. In line with hypothesis 1, we find that a heightened emphasis on self-responsibility for one's well-being increases self-stigmatisation, but only for older participants above 55 years. Somewhat consistent, the three-way interaction between age and both factors shows that the presence of a medical disclaimer reduced the stigma of psychological help-seeking for older people above 60 years when the app description had a low emphasis on self-responsibility. In contrast, the presence of a medical disclaimer reduced the help-seeking stigma for younger people below 27 years only when the app description had a high emphasis on self-responsibility. Taken together, the effects of both factors, i.e., medical disclaimers and emphasized self-responsibility, are much more complex than anticipated. We can see a tendency for older respondents that effects occur as hypothesized. Younger participants, in contrast, show quite different patterns. This young cohort that has grown up in a highly individualized environment – in the sense of a heightened autonomy of the individual being of high societal value – is not negatively influenced by a heightened emphasis on self-responsibility. Beyond such a sociological explanation, this paradoxical finding might also hint at an optimistic bias (Klein & Helweg-Larsen, 2002; Weinstein, 1989) and a corresponding feeling of invulnerability being more prevalent among younger people. Further investigations are needed, especially considering that subjective perceptions of an emphasis on self-responsibility in the descriptions did not vary among experimental groups.

This brings us to the discussion of the limitations of our study. This first experimental study on this topic is based on a single experimental stimulus, i.e., an app search episode with three app descriptions, assessing short-term effects. Hence, we caution against overinterpreting our findings. At the same time, the existence of differences, even based on this single exposure, strongly hints at the need for further empirical investigations into these questions.

The fact that our manifest changes to the app descriptions concerning the emphasis on self-responsibility were not recognized by participants yet did have an impact on stigmatisation similarly calls for more scholarly attention. We aimed to create different levels of self-responsibility focus by manifest changes to the language of the descriptions while keeping content and functionalities the same. These changes might not have been strong enough to be noticed by participants, although, curiously, they did have effects on dependent variables. The fact that just advertising an app for meditation and well-being already stresses the need for individuals' actions might have been the overriding force influencing participants' perceptions. From a methodological perspective, formulating the manipulation check items as a categorical choice between *yes* and *no* (or *do not remember*) might not have captured the relative

differences in self-responsibility focus. This might explain the high percentage of agreement with a focus on self-responsibility being present. However, future studies should try to create a successful manipulation of participants' perceptions of self-responsibility focus to test the corresponding effects. One possible way might be to focus on the low self-responsibility focus versions and reduce these descriptions to a list of their functionalities. If, in fact, apps themselves are inherently entwined with a high emphasis on self-responsibility, it might be necessary to use a control group without exposure to app descriptions, for example. In light of the significant effects of the manipulation on dependent variables, another limitation of our study becomes apparent. We did not measure any psychological mechanisms potentially explaining the effects. It is plausible that variations in self-responsibility focus in the descriptions do not have to be recognized by participants to exert their influence on perceived self-responsibility, a perceived self-responsibility norm, or feelings of inadequacy, which in turn affect the dependent variables. Therefore, it is critical for future studies to include relevant explanatory constructs.

In addition, assuming a medium-size effect might have been overly optimistic. However, we chose a higher power than the conventional 80% to allow for some flexibility in detecting unexpected relationships with covariates. At the same time, sensitivity analysis for our final sample ($N = 249$) allows the detection of an effect size of .18, which corresponds to the median effect size in communication research (Rains et al., 2018), thus giving us certain confidence in our results. Nevertheless, they need to be replicated in future studies, potentially planning sample sizes based on smaller effect sizes.

Finally, this study is based on a highly educated sample with high degrees of direct experience with mental health issues. Therefore, future studies should aim for more diverse samples to further investigate these relationships.

Despite these limitations, our study highlights the necessity to further examine potential harmful effects of well-being app descriptions in the app market. It is evident that there is a risk of incidental stigmatisation through how well-being apps are promoted in the app market. This risk needs further empirical investigation to ultimately inform adequate regulatory measures to mitigate negative effects.

Notes

1. Please see https://osf.io/p5agj/?view_only=f7df9866f1d64506b6203099affa2dbf.
2. We acknowledge that this p value does not allow for a confident judgment on the similarity between groups. At the same time, all the listed control variables were included in the following analyses as covariates to control for their potential effects.

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Conflict of Interest

The authors do not declare any conflict of interest.

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Appendix

Overview of the stimulus material

Each app was presented on a separate page in random order within each condition. Participants clicked through the app descriptions at their own pace.

Original Presentation (German)

Condition	App Descriptions		
	<i>Meditation Heroes</i>	<i>My Path to Meditation</i>	<i>Presence in Life!</i>
low self-responsibility emphasis, without medical disclaimer	 <p>Meditationshelden</p> <p>Die <i>Meditationshelden</i>-App hilft dir, Stress zu reduzieren, deine Ziele zu erreichen, deine Ängste zu überwinden und erhöht dein Wohlbefinden. Die <i>Meditationshelden</i>-App wird dir ein treuer Begleiter sein, egal ob du schon seit Jahren meditierst oder erst jetzt damit beginnen möchtest. Sie ist einfach zu bedienen und lässt dich zwischen geführten und nicht-geführten Meditationen wählen. Die nicht-geführten stillen Meditationen werden in einem zeitlichen Intervall von 3, 5, 15 oder 30 Minuten durch den Klang einer Klangschale eingeteilt.</p> <p>Mit dieser App Ängste überwinden und das Wohlbefinden erhöhen! Lade die <i>Meditationshelden</i>-App jetzt und lasse Wohlbefinden in dein Leben.</p> <p>Installieren</p>	 <p>Mein Weg zur Meditation</p> <p>Sie haben gehört, dass Meditation Gesundheit und Wohlbefinden steigern kann, und nun wollen Sie es versuchen? Aber Sie sind sich nicht sicher, wie Sie anfangen sollen? Wie beruhigt man seinen Geist? Unsere App zeigt Ihnen Schritt für Schritt, wie Sie mit Ihrer Meditationspraxis beginnen können, um produktiver zu werden. Um herauszufinden, welche Art der Meditation für Sie am besten funktioniert, lassen wir Sie verschiedene Werkzeuge und Arten der Meditation ausprobieren, so dass Sie herausfinden können, was am besten zu Ihnen passt.</p> <p>Mit <i>Mein Weg zur Meditation</i> zu mehr Wohlbefinden, Gesundheit und Produktivität finden.</p> <p>Installieren</p>	 <p>Präsenz im Leben!</p> <p>Lassen Sie sich von der <i>Präsenz im Leben!</i>-App auf eine Reise zu einem gelasseneren und gesünderen Geisteszustand mitnehmen. Egal, ob Sie gerade erst anfangen oder bereits Erfahrung mit Meditation haben - die <i>Präsenz im Leben!</i>-App wird Ihnen helfen, präsenter in Ihrem täglichen Leben zu werden.</p> <p><i>Präsenz im Leben!</i> bietet Ihnen unbegrenzten Zugang zu über 200 geführten Meditationen. Wir behandeln Themen wie Stressabbau, Fokus, Schlaf, Emotionen, Achtsamkeit bei der Arbeit und in Beziehungen mit unseren regelmäßig aktualisierten Inhalten.</p> <p>Ein großartiges Werkzeug für mehr Präsenz im Leben.</p> <p>Installieren</p>
	 <p>Meditationshelden</p> <p>Nutze die <i>Meditationshelden</i>-App, um Stress zu reduzieren, deine Ziele zu erreichen, deine Ängste zu überwinden und dein Wohlbefinden zu erhöhen. Mache die <i>Meditationshelden</i>-App zu deinem treuen Begleiter, egal ob du schon seit Jahren meditierst oder erst jetzt damit beginnen möchtest. Du kannst sie einfach bedienen und zwischen geführten und nicht-geführten Meditationen wählen. Die nicht-geführten stillen Meditationen werden in einem zeitlichen Intervall von 3, 5, 15 oder 30 Minuten durch den Klang einer Klangschale eingeteilt.</p> <p>Nur Du kannst deine Ängste überwinden und Dein Wohlbefinden erhöhen! Lade die <i>Meditationshelden</i>-App jetzt und bringe Wohlbefinden in dein Leben.</p> <p>Installieren</p>	 <p>Mein Weg zur Meditation</p> <p>Sie haben gehört, dass Meditation Gesundheit und Wohlbefinden steigern kann, und nun wollen Sie es selbst in die Hand nehmen? Aber Sie sind sich nicht sicher, wie Sie anfangen sollen? Wie beruhigt man seinen Geist? Nutzen Sie unsere App, mit welcher Sie Schritt für Schritt Ihre Meditationspraxis aufbauen können, um produktiver zu werden. Um herauszufinden, welche Art der Meditation für Sie am besten funktioniert, probieren Sie verschiedene Werkzeuge und Arten der Meditation aus, so dass Sie entscheiden können, was am besten zu Ihnen passt.</p> <p>Steigern Sie jetzt ihr Wohlbefinden, werden Sie gesünder und produktiver durch <i>Mein Weg zur Meditation!</i></p> <p>Installieren</p>	 <p>Präsenz im Leben!</p> <p>Beginnen Sie Ihre Reise zu einem gelasseneren und gesünderen Geisteszustand mit der <i>Präsenz im Leben!</i>-App. Egal, ob Sie gerade erst anfangen oder bereits Erfahrung mit Meditation haben - mit der <i>Präsenz im Leben!</i>-App haben Sie es selbst in der Hand, präsenter in Ihrem täglichen Leben zu werden.</p> <p><i>Präsenz im Leben!</i> bietet Ihnen unbegrenzten Zugang zu über 200 geführten Meditationen. Sie können Themen wie Stressabbau, Fokus, Schlaf, Emotionen, Achtsamkeit bei der Arbeit und in Beziehungen mit unseren regelmäßig aktualisierten Inhalten eigenständig bearbeiten.</p> <p>Ein großartiges Werkzeug für alle, die in ihrem Leben präsenter werden wollen.</p> <p>Installieren</p>

Condition	Meditation Heroes	App Descriptions My Path to Meditation	Presence in Life!
low self-responsibility emphasis, with medical disclaimer	 <p>Meditationshelden</p> <p>Die <i>Meditationshelden</i>-App hilft dir, Stress zu reduzieren, deine Ziele zu erreichen, deine Ängste zu überwinden und erhöht dein Wohlbefinden. Die <i>Meditationshelden</i>-App wird dir ein treuer Begleiter sein, egal ob du schon seit Jahren meditierst oder erst jetzt damit beginnen möchtest. Sie ist einfach zu bedienen und lässt dich zwischen geführten und nicht-geführten Meditationen wählen. Die nicht-geführten stillen Meditationen werden in einem zeitlichen Intervall von 3, 5, 15 oder 30 Minuten durch den Klang einer Klangschale eingeteilt.</p> <p>Mit dieser App Ängste überwinden und das Wohlbefinden erhöhen! Lade die <i>Meditationshelden</i>-App jetzt und lasse Wohlbefinden in dein Leben.</p> <p>Das Hören und Anwenden der Meditationsprogramme ersetzt keine Therapie oder medizinische Behandlung psychischer Erkrankungen.</p> <p>Installieren</p>	 <p>Mein Weg zur Meditation</p> <p>Sie haben gehört, dass Meditation Gesundheit und Wohlbefinden steigern kann, und nun wollen Sie es versuchen? Aber Sie sind sich nicht sicher, wie Sie anfangen sollen? Wie beruhigt man seinen Geist? Unsere App zeigt Ihnen Schritt für Schritt, wie Sie mit Ihrer Meditationspraxis beginnen können, um produktiver zu werden. Um herauszufinden, welche Art der Meditation für Sie am besten funktioniert, lassen wir Sie verschiedene Werkzeuge und Arten der Meditation ausprobieren, so dass Sie herausfinden können, was am besten zu Ihnen passt.</p> <p>Mit <i>Mein Weg zur Meditation</i> jetzt zu mehr Wohlbefinden, Gesundheit und Produktivität finden!</p> <p>Diese App ersetzt keine medizinische oder therapeutische Behandlung. Leiden Sie an einer psychischen Erkrankung, dann suchen Sie sich bitte professionelle Hilfe!</p> <p>Installieren</p>	 <p>Präsenz im Leben!</p> <p>Lassen Sie sich von der <i>Präsenz im Leben!</i>-App auf eine Reise zu einem gelasseneren und gesünderen Geisteszustand mitnehmen. Egal, ob Sie gerade erst anfangen oder bereits Erfahrung mit Meditation haben - die <i>Präsenz im Leben!</i>-App wird Ihnen helfen, präsenter in Ihrem täglichen Leben zu werden.</p> <p><i>Präsenz im Leben!</i> bietet Ihnen unbegrenzten Zugang zu über 200 geführten Meditationen. Wir behandeln Themen wie Stressabbau, Fokus, Schlaf, Emotionen, Achtsamkeit bei der Arbeit und in Beziehungen mit unseren regelmäßig aktualisierten Inhalten.</p> <p>Ein großartiges Werkzeug für mehr Präsenz im Leben.</p> <p>Diese App ist kein Medizinprodukt. Sollten Sie an einer psychischen Erkrankung leiden, wenden Sie sich dafür bitte unbedingt an eine/n Arzt/Ärztin oder eine/n Psychotherapeut/in.</p> <p>Installieren</p>
high self-responsibility emphasis, with medical disclaimer	 <p>Meditationshelden</p> <p>Nutze die <i>Meditationshelden</i>-App, um Stress zu reduzieren, deine Ziele zu erreichen, deine Ängste zu überwinden und dein Wohlbefinden zu erhöhen. Mache die <i>Meditationshelden</i>-App zu deinem treuen Begleiter, egal ob du schon seit Jahren meditierst oder erst jetzt damit beginnen möchtest. Du kannst sie einfach bedienen und zwischen geführten und nicht-geführten Meditationen wählen. Die nicht-geführten stillen Meditationen werden in einem zeitlichen Intervall von 3, 5, 15 oder 30 Minuten durch den Klang einer Klangschale eingeteilt.</p> <p>Nur Du kannst deine Ängste überwinden und Dein Wohlbefinden erhöhen! Lade die <i>Meditationshelden</i>-App jetzt und bringe Wohlbefinden in dein Leben.</p> <p>Das Hören und Anwenden der Meditationsprogramme ersetzt keine Therapie oder medizinische Behandlung psychischer Erkrankungen.</p> <p>Installieren</p>	 <p>Mein Weg zur Meditation</p> <p>Sie haben gehört, dass Meditation Gesundheit und Wohlbefinden steigern kann, und nun wollen Sie es selbst in die Hand nehmen? Aber Sie sind sich nicht sicher, wie Sie anfangen sollen? Wie beruhigt man seinen Geist? Nutzen Sie unsere App, mit welcher Sie Schritt für Schritt Ihre Meditationspraxis aufbauen können, um produktiver zu werden. Um herauszufinden, welche Art der Meditation für Sie am besten funktioniert, probieren Sie verschiedene Werkzeuge und Arten der Meditation aus, so dass Sie entscheiden können, was am besten zu Ihnen passt.</p> <p>Steigern Sie jetzt Ihr Wohlbefinden, werden Sie gesünder und produktiver durch <i>Mein Weg zur Meditation</i>!</p> <p>Diese App ersetzt keine medizinische oder therapeutische Behandlung. Leiden Sie an einer psychischen Erkrankung, dann suchen Sie sich bitte professionelle Hilfe!</p> <p>Installieren</p>	 <p>Präsenz im Leben!</p> <p>Beginnen Sie Ihre Reise zu einem gelasseneren und gesünderen Geisteszustand mit der <i>Präsenz im Leben!</i>-App. Egal, ob Sie gerade erst anfangen oder bereits Erfahrung mit Meditation haben - mit der <i>Präsenz im Leben!</i>-App haben Sie es selbst in der Hand, präsenter in Ihrem täglichen Leben zu werden.</p> <p><i>Präsenz im Leben!</i> bietet Ihnen unbegrenzten Zugang zu über 200 geführten Meditationen. Sie können Themen wie Stressabbau, Fokus, Schlaf, Emotionen, Achtsamkeit bei der Arbeit und in Beziehungen mit unseren regelmäßig aktualisierten Inhalten selbst bearbeiten.</p> <p>Ein großartiges Werkzeug für alle, die in ihrem Leben präsenter werden wollen.</p> <p>Diese App ist kein Medizinprodukt. Sollten Sie an einer psychischen Erkrankung leiden, wenden Sie sich dafür bitte unbedingt an eine/n Arzt/Ärztin oder eine/n Psychotherapeut/in.</p> <p>Installieren</p>

Translated Stimuli Texts

Condition	App Descriptions		
	<i>Meditation Heroes</i>	<i>My Path to Meditation</i>	<i>Presence in Life!</i>
low self-responsibility emphasis, without medical disclaimer	<p>Meditation Heroes</p> <p>The <i>Meditation Heroes</i> app helps you reduce stress, achieve your goals, overcome your fears, and increase your well-being. The <i>Meditation Heroes</i> app will be a loyal companion, whether you've been meditating for years, or are just getting started. It is easy to use and will let you choose between guided and non-guided meditations. The non-guided silent meditations are divided into time intervals of 3, 5, 15 or 30 minutes by the sound of a singing bowl.</p> <p>With this app you can overcome fears and increase well-being with this app. Download the <i>Meditation Heroes</i> app now and let well-being enter your life.</p>	<p>My Path to Meditation</p> <p>You've heard that meditation can increase health and well-being, and now you would like to try? But you are not sure how to start? How do you calm your mind? Our app shows you step by step how to start with your meditation practice to become more productive. To find out what type of meditation works best for you, we'll let you try various tools and types of meditation so you can find out what fits best to you.</p> <p>Finding greater well-being, health and productivity with <i>My Path to Meditation</i>.</p>	<p>Presence in Life!</p> <p>Let the <i>Presence in Life!</i> app take you on a journey to a more serene and healthier state of mind. Whether you're just starting out or already have experience with meditation, the <i>Presence in Life!</i> app will help you become more present in your daily life.</p> <p><i>Presence in Life!</i> gives you unlimited access to over 200 guided meditations. We address topics such as stress reduction, focus, sleep, emotions, mindfulness at work and in relationships with our regularly updated content.</p> <p>A great tool for more presence in life.</p>
	<p>Meditation Heroes</p> <p>Use the <i>Meditation Heroes</i> app to reduce stress, achieve your goals, overcome your fears, and increase your well-being. Make the <i>Meditation Heroes</i> app your loyal companion, whether you've been meditating for years or are just getting started. You can easily use it and choose between guided and non-guided meditations. The non-guided silent meditations are divided into time intervals of 3, 5, 15 or 30 minutes by the sound of a singing bowl.</p> <p>Only you can overcome your fears and increase your well-being! Download the <i>Meditation Heroes</i> app now and bring well-being into your life.</p>	<p>My Path to Meditation</p> <p>You've heard that meditation can increase health and well-being, and now you want to take it into your own hands? But you are not sure how to start? How do you calm your mind? Use our app, with which you can create your meditation practice step by step to become more productive. To find out what type of meditation works best for you, try various tools and types of meditation so you can decide what fits best to you.</p> <p>Increase your well-being, become healthier and more productive through <i>My Way to Meditation</i> now!</p>	<p>Presence in Life!</p> <p>Start your journey to a more serene and healthier state of mind with the <i>Presence in Life!</i> app. Whether you're just starting out or already have experience with meditation, with the <i>Presence in Life!</i> app it is entirely in your hand to become more present in your daily life.</p> <p><i>Presence in Life!</i> gives you unlimited access to over 200 guided meditations. You can work on topics like stress reduction, focus, sleep, emotions, mindfulness at work and in relationships on your own with our regularly updated content.</p> <p>A great tool for anyone who wants to be more present in their life.</p>

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low self-responsibility emphasis, with medical disclaimer	<p>Meditation Heroes</p> <p>The <i>Meditation Heroes</i> app helps you reduce stress, achieve your goals, overcome your fears, and increase your well-being. The <i>Meditation Heroes</i> app will be a loyal companion, whether you've been meditating for years, or are just getting started. It is easy to use and will let you choose between guided and non-guided meditations. The non-guided silent meditations are divided into time intervals of 3, 5, 15 or 30 minutes by the sound of a singing bowl.</p> <p>With this app you can overcome fears and increase well-being with this app. Download the <i>Meditation Heroes</i> app now and let well-being enter your life.</p> <p>Listening to and using the meditation programs does not replace therapy or medical treatment for mental illness.</p>	<p>My Path to Meditation</p> <p>You've heard that meditation can increase health and well-being, and now you would like to try? But you are not sure how to start? How do you calm your mind? Our app shows you step by step how to start with your meditation practice to become more productive. To find out what type of meditation works best for you, we'll let you try various tools and types of meditation so you can find out what fits best to you.</p> <p>Finding greater well-being, health and productivity with <i>My Path to Meditation</i>.</p> <p>This app is not a substitute for medical or therapeutic treatment. If you have a mental illness, please seek professional help!</p>	<p>Presence in Life!</p> <p>Let the <i>Presence in Life!</i> app take you on a journey to a more serene and healthier state of mind. Whether you're just starting out or already have experience with meditation, the <i>Presence in Life!</i> app will help you become more present in your daily life.</p> <p><i>Presence in Life!</i> gives you unlimited access to over 200 guided meditations. We address topics such as stress reduction, focus, sleep, emotions, mindfulness at work and in relationships with our regularly updated content.</p> <p>A great tool for more presence in life.</p> <p>This app is not a medical application. If you have a mental illness, please consult a doctor or psychotherapist.</p>
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