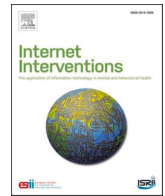


Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Internet Interventions

journal homepage: www.elsevier.com/locate/invent

Streaming mindfulness: Well-being and mindfulness among subscribers to a video streaming service

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ARTICLE INFO

Keywords:

Video streaming
Emerging technology
Well-being
Mindfulness
Exploratory study
Nonclinical

ABSTRACT

Objective: Internet and smartphone technology have advanced the dissemination of mindfulness practices and philosophy. This study explored how individuals interact with Spectiv, a subscription-based video streaming service (VSS) that advertises content for meditation, and measured levels of mindfulness and well-being. We hypothesized that users engaging with Spectiv for longer sessions and on a regular basis would report higher levels of mindfulness and well-being.

Method: A 46-question online survey was developed and distributed to all active subscribers of Spectiv (N = 119). The survey included two validated scales: (1) The Cognitive and Affective Mindfulness Scale, and (2) The Warwick-Edinburgh Mental Well-being Scale. A series of one-way ANOVAs were performed, along with a simple linear regression and descriptive statistics.

Results: Users reported relaxation as the most common activity. Levels of mindfulness and well-being were significantly higher for users whose session-duration lasted 2 hours ($p = .01$) and 3 hours ($p = .03$). Users engaging with the VSS daily had significant levels of both mindfulness ($p < .001$) and well-being ($p < .001$). There was no difference between subscription length and mindfulness and well-being. Mindfulness was found to be a significant positive predictor of well-being ($p < .0001$).

Conclusion: VSS could be valuable to facilitating mindfulness. Users engaging with a VSS for longer durations and more frequently may be more likely to experience benefits. Future research using controlled designs such as randomized control trials and feasibility studies should be conducted to determine if VSS can maintain or increase levels of mindfulness and well-being.

1. Introduction

Mindfulness is a practice to cultivate a purposeful awareness of the present moment through the careful observation of one's experiences and sensations as they emerge moment-to-moment without applying judgement (Bishop et al., 2004; Kabat-Zinn, 2003; Marlatt and Kristeller, 1999). Buddhist mindfulness-based practices (MBPs) such as meditation, yoga, and deep breathing are among the most well-known techniques used to cultivate mindfulness (Baer, 2003). Western medicine adopted these practices and used them as the foundation to develop mindfulness-based interventions (MBIs) such as mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982) and mindfulness-based

cognitive therapy (MBCT; Teasdale et al., 2000). Empirical research has shown that MBIs have improved both psychological and physiological symptoms in individuals with cancer (Carlson et al., 2003; Piet et al., 2012), chronic pain (Kabat-Zinn et al., 1986; Zgierska et al., 2016), and mental health conditions such as depression and anxiety (Barnhofer et al., 2015; Hofmann et al., 2010). Traditionally, MBIs were delivered to individuals via face-to-face communication using; however, this has changed with the emergence of new technology.

1.1. mHealth and eHealth mindfulness interventions

Mobile health (mHealth) technology such as smartphone

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applications (apps) has shown promise as an effective delivery system for MBIs and MBPs (Laurie and Blandford, 2016). Studies using popular guided meditation apps (i.e., Headspace and Calm) as an intervention have shown individuals achieved higher levels of mindfulness compared to face-to-face delivery methods (Wylde et al., 2017), experienced a reduction in stress levels and increased self-compassion (Huberty et al., 2019), and significantly reduced the onset of sleep latency in insomniacs (Low et al., 2020). Scholars have researched other internet interventions outside of apps, with web-based delivery systems (WDS) being among the more popular.

These WDS typically use education-based mindfulness modules as interventions and have shown to be effective for increasing positive mental health as well as levels of mindfulness (Cavanagh et al., 2013; Glück and Maercker, 2011; Krusche et al., 2013; Boettcher et al., 2014). Studies using clinician-guided online programs and interventions for individuals suffering from anxiety/depression have shown positive results in the reduction of anxiety, distress, and depression (Kladnitski et al., 2018, 2020). Videoconferencing and has also been used to deliver MBIs, with participants reporting improvements in areas such as anxiety, self-compassion, and depression (Krägeloh et al., 2019). While mindfulness apps and WDS are currently receiving considerable attention from researchers, one understudied delivery system is video streaming services (VSS).

1.2. Video streaming

Video streaming is the process of users viewing digital video content from specific web-based platforms (e.g., Netflix, YouTube, etc.) using the Internet. At this time, only one study examining VSS and mindfulness was identified in the existing literature. Buie and Blythe (2013) explored user comments and video features on YouTube meditation videos, and identified subjective experiences such as mental, emotional, physical, and spiritual. As a dearth in the literature exists on VSS and their potential to maintain or increase individual's mindfulness, an examination of VSS as a delivery format for MBIs and MBPs is warranted. This is important because VSS are extremely accessible and cost-efficient tools. Furthermore, it is crucial to understand what elements make VSS successful, as well as unsuccessful, for both researchers and users in terms of impacting mindfulness.

The purpose of this study is to explore users' interaction with Spectiv, a subscription-based VSS, and measure their levels of mindfulness and sense of well-being. Spectiv's website advertises its content can be used for meditation, relaxation, and exploration (Spectiv, n.d.). Unlike YouTube and other VSS platforms that rely on user-generated content, Spectiv employs an in-house production team that creates original, high-definition videos of landscapes from around the world (e.g., Cliffs of Moher, Yosemite National Park, etc.) and works of art (e.g., Vincent Van Gough, Rembrandt, etc.). Original content created and produced with the intention of facilitating meditation practice using a subscription-based model is novel, and it is unknown how this content is being used by subscribers, and if they are experiencing higher levels of mindfulness through engagement. The preliminary findings are intended to serve as the basis for future studies (e.g., randomized control trials, pilot studies) considering VSS as an intervention or as an addition to existing course material.

Thus, the first research question seeks to identify what content users prefer (i.e., nature, art) and what activities they prefer (i.e., relaxation, meditation) to engage in while viewing content. The second research question focuses on identifying users' session durations and frequency of use.

RQ 1. What content and activities are preferred by users?

RQ 2. What are Spectiv users' habits, including session length, weekly usage, and subscription length?

This study also posits that users engage with Spectiv content to

satisfy specific needs (i.e. increase or maintain levels of mindfulness and well-being), and these needs are satisfied through frequent engagement. Uses and gratification theory help support this assumption, as it posits that consumers are motivated to select media that will satisfy specific psychological needs (Cognitive, Affective, Personal Integrative, Social Integrative, and Escape/Tension Release), and are active (i.e., active audience) when choosing content most likely to meet one, or more of those needs (Katz et al., 1973). The theory has been used to explore the adoption of video sharing services (Cha, 2014) and streaming digital content (Kaytoue et al., 2012). Studies examining users' engagement with VSS have found positive associations with social integrative, affective, and tension release that were associated with viewer's duration of time watching the VSS (Sjöblom and Hamari, 2017). Considering duration of time as a factor that can impact levels of gratification, we hypothesize that higher levels of mindfulness and well-being will be prominent in users engaging with the Spectiv on a more frequent basis and for longer durations.

RQ 3. Does more frequent engagement with Spectiv content have an impact on users' level of mindfulness and well-being?

H1. Users who engage in sessions longer than 30 minutes will report higher levels of mindfulness, and a greater sense of well-being than those who only engage for 30 minutes.

H2. Users who engage with content daily will report higher levels of mindfulness, and a greater sense of well-being than those who engage less frequently during the week.

H3. Users who are long term subscribers of the Spectiv will report higher levels of mindfulness, and a greater sense of well-being than those who have had the service for a shorter amount of time.

The final research question seeks to understand if higher levels of mindfulness are linked to well-being, as recent research has shown that mindfulness can have a positive impact on an individual's well-being (Bajaj and Pande, 2016; Lomas et al., 2018).

RQ 4. Is mindfulness a significant predictor of well-being through VSS usage?

2. Method

2.1. Design

This post-test, one-arm study was designed to collect preliminary data on users' experiences with Spectiv, measuring self-reported levels of mindfulness and well-being using validated scales.

2.2. Participants

At the time of the study, Spectiv had 1434 active subscribers. We used convenience sampling to recruit all active subscribers.

2.3. Procedure

After approval from the Institutional Review Board, the first author and a Spectiv representative jointly crafted an email describing the purpose of study, a link to the survey, and notification of compensation. A representative from Spectiv sent an email blast to every active subscriber, with 4 follow up emails being sent over a 4-month period. Due to the company's privacy agreement, none of the authors received any personally identifiable information about users since we were not employed by the company. Every 50th participant to complete the survey received a \$100 Amazon gift card.

2.4. Measures

A 46-item online questionnaire was designed to 1) collect

information about habits and activity preferences, and 2) measure users' levels of mindfulness and well-being. Habits and activity preferences were measured using multiple-choice questions related to engagement habits (i.e., session duration, frequency), activity preference (i.e., meditation, relaxation/distress), and content preference (i.e., original content, art gallery). In addition, users were provided with an optional text box to write and explain why they use Spectiv for a specific activity. We used two previously published scales to measure mindfulness and well-being (described below) and included questions about demographics (e.g., age, race, ethnicity, etc.).

2.4.1. Cognitive and Affective Mindfulness Scale - Revised (CAMS-R)

The 12-item scale is designed to measure mindfulness using four latent factors of mindfulness: 1) present-focus, 2) acceptance, 3) attention, and 4) awareness (Feldman et al., 2006). We adapted the questions to customize them for use of Spectiv. For example, "After using Spectiv, it's easy for me to keep track of my thoughts and feelings." CAMS-R was originally developed on a 4-point Likert scale (rarely/not at all, sometimes, often, almost always). However, we adapted the scale to a 5-point Likert by making "not at all" and "rarely" separate questions to distinguish between the two.

2.4.2. Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)

The 14-item scale is designed to measure mental well-being. It is comprised of both hedonic and eudemonic aspects of mental health (Tennant et al., 2007). Questions are subjective and designed to be answered while thinking of personal experiences occurring over the past two weeks. For this study, we adapted the questions so respondents thought of personal experiences that have occurred since they began using Spectiv. Responses were measured using a 5-point Likert scale (none of the time, rarely, some of the time, often, all of the time), and had the potential to score a minimum of 14 or a maximum of 70 after scores from each item are calculated. The greater the score, the higher level of well-being.

2.5. Data analysis

We analyzed data of participants who completed all scale-related questions for mindfulness and well-being. We used SPSS version 25 software to analyze data. We used descriptive statistics, a series of one-way ANOVAs, and simple linear regression.

3. Results

A total of 137 individuals participated in the survey, with 119 completing question sets for both the mindfulness and well-being scales (8% response rate). The first page of the survey included an informed consent stating that the survey was optional and required individuals to "agree" or "disagree." No participants clicked on the button to disagree to take the survey. However, we do not know how many people read the consent. Thus, data from these 119 responses were analyzed. A majority of participants were male (68.9%; $n = 82$), with the median age being 50 ($SD = 13.10$) (see Table 1).

3.1. What content and activities are preferred by users? (RQ 1)

The majority of users preferred original content (95%). Relaxation/distress (65.8%) was the most common activity among users (see Table 2). Users that provided free-text responses for using the content for relaxation commonly cited it produced a "calming" and "peaceful effect," which promoted relaxation.

3.2. VSS users' habits (RQ 2)

The most frequent reported duration was 1 hour (38.7%), and the most common weekly usage was 2–3× per week (31.9%). More than half

of subscribers have used the service for 1–4 months (55.5%) (see Table 3).

3.3. Mindfulness and well-being (RQ 3)

Prior to testing the hypotheses, we formed indexes for each scale using their respective questions to ensure an acceptable level of reliable was met. CAMS-R had a good internal consistency ($\alpha = 0.86$), and WEMWBS had a strong internal consistency ($\alpha = 0.93$) (see Table 4).

We first hypothesized that users who engaged in daily sessions longer than 30 minutes would report higher levels of mindfulness and a greater sense of well-being than those who engaged only for 30 minutes. "Longer than 30 minutes" included responses of 1 hour, 2 hours, and 3 hours.

To test the mindfulness component of the hypothesis, we conducted a one-way ANOVA. The ANOVA results were statistically significant, $F(4, 114) = 4.12, p = .004$, partial eta squared = 0.13). Post-hoc comparisons using the Sidak correction showed that three-hour sessions ($M = 3.83, SE = 0.22$) and two-hour sessions ($M = 3.77, SE = 0.18$), were both significantly associated with higher mindfulness scores than a 30-minute session ($M = 3.17, SE = 0.22; p = .03; M = 3.17, SE = 0.18; p = .01$). One-hour session and 30-minute sessions ($M = 3.41, SE = 0.15$) did not differ significantly on participant mindfulness ($p = .69$).

The well-being component of this hypothesis was also tested using a one-way ANOVA. The ANOVA showed statistical significance, $F(4, 113) = 3.10, p = .02$, partial eta squared = 0.10. However, post-hoc comparisons using the Sidak correction showed that well-being was not significantly different across daily-session durations (see Table 5).

Second, we hypothesized that users engaging with VSS content on a daily basis would report higher levels of mindfulness and well-being than those who engaged less frequently on weekly basis. "Less frequently" included responses of 4–6× per week, 2–3× per week, and once a week.

The mindfulness component of this hypothesis was tested using a one-way ANOVA. The results were statistically significant, $F(3, 114) = 5.14, p = .002$, partial eta squared = 0.12. Post-hoc comparisons using the Sidak correction revealed that daily usage ($M = 3.84, SE = 0.17$) was significantly different than using 1× per week ($M = 3.20, SE = 0.17; p = .001$), while both 4–6× per week ($M = 3.58, SE = 0.18, p = .62$) and 2–3× per week ($M = 3.44, SE = 0.16, p = .08$) were not statistically significant when compared to 1× per week.

A one-way ANOVA was used to test the well-being component of the hypothesis, which showed statistical significance, $F(3, 114) = 6.25, p = .001$, partial eta squared = 0.14. Post-hoc comparisons revealed that daily usage ($M = 55.92, SE = 2.41$) was significantly different than using 1× per week ($M = 45.53, SE = 2.41; p = .000$). By comparison, neither 4–6× per week ($M = 50.82, SE = 2.64, p = .29$) and 2–3× per week ($M = 50.58, SE = 2.32, p = .13$) were statistically significant when compared to 1× per week (see Table 6).

Our third hypothesis posited that users with subscriptions of 4–6 months or longer would report higher levels of mindfulness and well-being than those who were trial users. "Trial users" selected subscription a subscription length of 1–4 months, while "longer" included responses of 8–11 months and 1+ year. We conducted a one-way ANOVA to test the mindfulness component of the hypothesis. The ANOVA revealed there was no statistically effect of subscription length on mindfulness $F(4, 113) = 1.49, p = .21$, partial eta squared = 0.05. A one-way ANOVA was also used to test the well-being component of the hypothesis, which was also not statistically significant, $F(4, 113) = 1.95, p = .11$, partial eta squared = 0.06.

3.4. Impact of mindfulness on well-being (RQ 4)

To answer our fourth research questions, a simple linear regression was conducted in order to explore if being mindful has an impact on well-being. Results from the test revealed that mindfulness, as reported by users, was a significant positive predictor of well-being, $\beta = 0.66, t$

(117) = 9.54, $p < .001$.

4. Discussion

We collected data on users' levels of mindfulness and well-being that are subscribers of Spectiv. This is the first quantitative study to explore a subscription-based VSS model that advertises its' content can be used to facilitate a mindful practice, specifically meditation. The preliminary findings revealed that higher levels of mindfulness were significantly related to session duration and frequency, while higher levels of well-being were only significantly related to frequency. Additionally, our results revealed that there was no significant relation between subscription length and higher levels of mindfulness and well-being. Furthermore, the simple linear regression revealed that mindfulness was a significant positive predictor of well-being in users. VSS appears to be a viable option to promote mindfulness and well-being, although more in-depth research on this topic is needed to validate these findings (e.g., RCT, feasibility).

4.1. Session duration

Participants enrolled in face-to-face MBSR programs with session durations of 2 hours or more have reported physical and psychological health improvements (Gross et al., 2004; Grossman et al., 2007; Kabat-Zinn et al., 1992). Studies using technology have also employed sessions longer than an hour. Krägeloh et al. (2019) videoconferencing program that delivered MBIs used sessions lasting between 90 and 110 minutes, and participants showed significant improvement in levels of mindfulness, as well as psychological health. While the current study did not measure specific health conditions, it found that higher levels of mindfulness were significant in users engaging with Spectiv content for session durations longer than 1 hour (i.e., 2 hours and 3 hours). This suggests that users engaging with digital content for longer session durations could produce similar benefits as those conducted face-to-face. However, the limited number of users in this study that reported using Spectiv to meditate ($n = 15$), which is a vital component of MBIs and MBPs, should be acknowledged. This could indicate an unknown mediator facilitated the benefits of mindfulness for the users that reported using Spectiv for other activities (i.e., relaxation/destress, yoga, and productivity and focus).

When examining the findings related to session duration, it is important to note research has shown that shorter sessions can also heighten levels of mindfulness, in addition to improving health (Carmony and Baer, 2009). For example, recent research on mobile-based mindfulness apps (e.g., Headspace, Calm, etc.) has shown improvement in users' well-being, levels of mindfulness, and reduced stress, with sessions lasting between 5 and 30 minutes (Bostock et al., 2019; Flett et al., 2019; Huberty et al., 2019). This suggests that it is possible for Spectiv users that engage for shorter durations to experience heightened levels of mindfulness. Additionally, when considering the benefits cited from previous research related to session duration and health improvements (both face-to-face and technology), it is important to note that these studies examined programs that lasted weeks and included structured material (e.g., classes, lesson plans, activities, etc.), while Spectiv offers no structured material. Therefore, comparing session durations from existing research and the findings from this study should be done carefully. Lastly, it is puzzling that there was no significance in users' levels of well-being that engaged with the VSS for the same session durations (i.e., 2 hours and 3 hours), especially when the regression found mindfulness to be a significant positive predictor of well-being.

4.2. Session frequency

Studies have shown participants that keep a regular mindful practice can maintain and strengthen the benefits associated with mindfulness (Carmony and Baer, 2008; Weber et al., 2017). This study showed that

users engaging with Spectiv daily had significant levels of mindfulness and well-being than those who did not. These findings further support the idea that a regular interaction with a mindfulness tool can enhance benefits. These findings also bolster mindfulness research focusing on user engagement with emerging technologies, as they can serve as preliminary evidence that usage frequency can impact health benefits.

4.3. Reasons for engaging with VSS

Examining users' comments about why they engaged with VSS content showed that a majority do so to find relaxation, or to destress, and reported feeling a sense of "calm" or "peace" when watching content. These findings suggest that users are seeking content that can satisfy a specific need, specifically escape/tension release. Buie and Blythe's (2013) findings on YouTube meditation video comments revealed that viewers also experienced feelings of relaxation and calm. While using VSS as an intervention or facilitator for MBPs is a novel concept, our findings suggest there is a trend in users/viewers experiencing relaxation when engaging with digital video content advertised to facilitate meditation. Furthermore, this suggests that users/viewers are engaging with this type of content to satisfy a specific psychological need, as is proposed in the uses and gratification theory (Katz et al., 1973).

5. Conclusion

Through examining this subscription-based VSS, we found that its' content could be used as a tool to facilitate and encourage MBPs. Our results suggest that the amount of time an individual interact with the content most likely has an impact on the perceived benefits experienced. Individuals seeking escape/tension release using digital video content curated for MBPs could benefit from this VSS. Although we surveyed current subscribers, our findings reveal practices that may be relevant to users on other VSS platforms as mindfulness content continues to expand.

Our findings suggest this model of VSS shows promise as an effective tool for facilitating MBPs engagement that could increase levels of mindfulness and well-being. Researchers interested in testing emerging technologies to help maintain or increase mindfulness in controlled designs such as RCTs or feasibility studies should consider subscription-based content VSS because it is both cost-effective (\$2.99/month; Spectiv, n.d.) and easily accessible. Furthermore, this type of service might be especially useful for populations that are unable travel or go outside, such as long-term hospital patients and individuals that are limited by their abilities.

5.1. Limitations and future research

This study is valuable to advancing research focused on the intersection of mindfulness and emerging technologies, but its limitations should also be noted. First, the study was not setup using a traditional pre-post test design. The absence of a pre-test survey to gather users' baseline levels of mindfulness and well-being could have skewed the data because some users might have possessed higher levels before using the service. Second, the low response rate should also be highlighted as a notable limitation. While the purpose of this study was to gather preliminary data, the low number of participants does not allow these results to be generalizable. Additionally, the sample lacked diversity, as most users reported male as their gender. Third, Spectiv does not have any guided prompts for meditation like apps and WDS modules and is also advertised for a broad range of uses including decoration and entertainment. The broad range of uses makes it difficult to identify users that subscribe specifically to facilitate MBPs.

Future research should be conducted on VSS that advertise content intended to facilitate MBPs. Studies using a pre-post test design could better determine the feasibility of VSS as an intervention that helps

maintain or increase individuals' levels of mindfulness and well-being. RCTs could be used to test the effects of VSS on individuals with specific health issues (i.e., physical, psychological) and generate empirical evidence of the effectiveness of this technology as an intervention. Furthermore, studies should be conducted on other VSS platforms, both free and subscription-based models, to identify similarities and differences. Ultimately, increased research on VSS can expand the scope of technologies that enable individuals access to mindfulness and its health-benefits.

Funding

Funding for the project was provided by Spectiv Incorporated.

Informed consent for human participants

All participants were provided with an IRB approved informed consent statement prior to voluntarily completing the survey.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

The lead author received payment as a consultant. A contract was signed between the two parties (lead author and Spectiv), stating explicitly that the "Principal Investigator shall have sole control over the manner in which the Research Project is conducted," to ensure data integrity was maintained and not manipulated. The lead author completed the Conflict of Interest form required by the university's Institutional Review Board. The review determined there was no conflict of interest, but that transparency of the payment between parties was necessary to disclose to participants. This disclosure was provided in the informed consent.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.invent.2021.100419>.

References

- Baer, R.A., 2003. Mindfulness training as a clinical intervention: a conceptual and empirical review. *Clin. Psychol. Sci. Pract.* 10 (2), 125–143. <https://doi.org/10.1093/clipsy.bpg015>.
- Bajaj, B., Pande, N., 2016. Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personal. Individ. Differ.* 93, 63–67. <https://doi.org/10.1016/j.paid.2015.09.005>.
- Barnhofer, T., Crane, C., Brennan, K., Duggan, D.S., Crane, R.S., Eames, C., Radford, S., Silverton, S., Fennell, M.J.V., Williams, J.M.G., 2015. Mindfulness-based cognitive therapy (MBCT) reduces the association between depressive symptoms and suicidal cognitions in patients with a history of suicidal depression. *J. Consult. Clin. Psychol.* 83 (6), 1013–1020. <https://doi.org/10.1037/ccp0000027>.
- Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D., Carmody, J., Segal, Z.V., Abbey, S., Speca, M., Velting, D., Devins, G., 2004. Mindfulness: a proposed operational definition. *Clin. Psychol. Sci. Pract.* 11 (3), 230–241. <https://doi.org/10.1093/clipsy.bph077>.
- Boettcher, J., Åström, V., Pålsson, D., Schenström, O., Andersson, G., Carlbring, P., 2014. Internet-based mindfulness treatment for anxiety disorders: a randomized controlled trial. *Behav. Ther.* 45 (2), 241–253. <https://doi.org/10.1016/j.beth.2013.11.003>.
- Bostock, S., Crosswell, A.D., Prather, A.A., Steptoe, A., 2019. Mindfulness on-the-go: effects of a mindfulness meditation app on work stress and well-being. *J. Occup. Health Psychol.* 24 (1), 127–138. <https://doi.org/10.1037/ocp0000118>.
- Buie, E., Blythe, M., 2013. Meditations on YouTube. In: Proceedings of the 6th International Conference on Designing Pleasurable Products and Interfaces, pp. 41–50. <https://doi.org/10.1145/2513506.2513511>.
- Carlson, L.E., Speca, M., Patel, K.D., Goodey, E., 2003. Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress, and immune parameters in breast and prostate cancer outpatients. *Psychosom. Med.* 65 (4), 571. <https://doi.org/10.1097/01.PSY.0000074003.35911.41>.
- Carmody, J., Baer, R.A., 2008. Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *J. Behav. Med.* 31 (1), 23–33. <https://doi.org/10.1007/s10865-007-9130-7>.
- Carmody, J., Baer, R.A., 2009. How long does a mindfulness-based stress reduction program need to be? A review of class contact hours and effect sizes for psychological distress. *J. Clin. Psychol.* 65 (6), 627–638. <https://doi.org/10.1002/jclp.20555>.
- Cavanagh, K., Strauss, C., Cicconi, F., Griffiths, N., Wyper, A., Jones, F., 2013. A randomised controlled trial of a brief online mindfulness-based intervention. *Behav. Res. Ther.* 51 (9), 573–578. <https://doi.org/10.1016/j.brat.2013.06.003>.
- Cha, J., 2014. Usage of video sharing websites: drivers and barriers. *Telematics Inform.* 31 (1), 16–26. <https://doi.org/10.1016/j.tele.2012.01.003>.
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., Laurenceau, J.-P., 2006. Mindfulness and emotion regulation: the development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *J. Psychopathol. Behav. Assess.* 29 (3), 177. <https://doi.org/10.1007/s10862-006-9035-8>.
- Flett, J.A.M., Hayne, H., Riordan, B.C., Thompson, L.M., Conner, T.S., 2019. Mobile mindfulness meditation: a randomised controlled trial of the effect of two popular apps on mental health. *Mindfulness* 10 (5), 863–876. <https://doi.org/10.1007/s12671-018-1050-9>.
- Glück, T.M., Maercker, A., 2011. A randomized controlled pilot study of a brief web-based mindfulness training. *BMC Psychiatry* 11 (1), 175. <https://doi.org/10.1186/1471-244X-11-175>.
- Gross, C.R., Kreitzer, M.J., Russas, V., Treesak, C., Frazier, P.A., Hertz, M.I., 2004. Mindfulness meditation to reduce symptoms after organ transplant: a pilot study. *Altern. Ther. Health Med.* 10 (3), 58–66.
- Grossman, P., Tiefenthaler-Gilmer, U., Raysz, A., Kesper, U., 2007. Mindfulness training as an intervention for fibromyalgia: evidence of postintervention and 3-year follow-up benefits in well-being. *Psychosom.* 76 (4), 226–233. <https://doi.org/10.1159/000101501>.
- Hofmann, S.G., Sawyer, A.T., Witt, A.A., Oh, D., 2010. The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. *J. Consult. Clin. Psychol.* 78 (2), 169–183. <https://doi.org/10.1037/a0018555>.
- Huberty, J., Green, J., Glissmann, C., Larkey, L., Puzia, M., Lee, C., 2019. Efficacy of the mindfulness meditation mobile app "calm" to reduce stress among college students: randomized controlled trial. *JMIR Mhealth Uhealth* 7 (6). <https://doi.org/10.2196/14273>.
- Kabat-Zinn, J., 1982. An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *Gen. Hosp. Psychiatry* 4 (1), 33–47. [https://doi.org/10.1016/0163-8343\(82\)90026-3](https://doi.org/10.1016/0163-8343(82)90026-3).
- Kabat-Zinn, J., 2003. Mindfulness-based interventions in context: past, present, and future. *Clin. Psychol. Sci. Pract.* 10 (2), 144–156. <https://doi.org/10.1093/clipsy.bpg016>.
- Kabat-Zinn, J., Lipworth, L., Burncy, R., Sellers, W., 1986. Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: treatment outcomes and compliance. *Clin. J. Pain* 2 (3), 159.
- Kabat-Zinn, J., Massion, A.O., Kristeller, J., Peterson, L.G., Fletcher, K.E., Pbert, L., Lenderking, W.R., Santorelli, S.F., 1992. Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *Am. J. Psychiatry* 149 (7), 936–943. <https://doi.org/10.1176/ajp.149.7.936>.
- Katz, E., Blumler, J.G., Gurevitch, M., 1973. Uses and gratifications research. *Public Opin. Q.* 37 (4), 509–523 (JSTOR).
- Kaytoue, M., Silva, A., Cerf, L., Meira Jr., W., Raïssi, C., 2012. Watch me playing, I am a professional: a first study on video game live streaming. In: Proceedings of the 21st International Conference on World Wide Web, pp. 1181–1188. <https://doi.org/10.1145/2187980.2188259>.
- Kladnitski, N., Smith, J., Allen, A., Andrews, G., Newby, J.M., 2018. Online mindfulness-enhanced cognitive behavioural therapy for anxiety and depression: outcomes of a pilot trial. *Internet Interv.* 13, 41–50. <https://doi.org/10.1016/j.invent.2018.06.003>.
- Kladnitski, N., Smith, J., Uppal, S., James, M.A., Allen, A.R., Andrews, G., Newby, J.M., 2020. Transdiagnostic internet-delivered CBT and mindfulness-based treatment for depression and anxiety: a randomised controlled trial. *Internet Interv.* 20. <https://doi.org/10.1016/j.invent.2020.100310>.
- Krägeloh, C.U., Medvedev, O.N., Taylor, T., Wrapson, W., Rix, G., Sumich, A., Wang, G. Y., Csako, R., Anstiss, D., Ranta, J.T., Patel, N., Siegert, R.J., 2019. A pilot randomized controlled trial for a videoconference-delivered mindfulness-based group intervention in a nonclinical setting. *Mindfulness* 10 (4), 700–711. <https://doi.org/10.1007/s12671-018-1024-y>.
- Krusche, A., Cyhlarova, E., Williams, J.M.G., 2013. Mindfulness online: an evaluation of the feasibility of a web-based mindfulness course for stress, anxiety and depression. *BMJ Open* 3 (11), e003498. <https://doi.org/10.1136/bmjopen-2013-003498>.
- Laurie, J., Blandford, A., 2016. Making time for mindfulness. *Int. J. Med. Inform.* 96, 38–50. <https://doi.org/10.1016/j.ijmedinf.2016.02.010>.
- Lomas, T., Medina, J.C., Ivtzan, I., Rupperecht, S., Eiroa-Orosa, F.J., 2018. A systematic review of the impact of mindfulness on the well-being of healthcare professionals. *J. Clin. Psychol.* 74 (3), 319–355. <https://doi.org/10.1002/jclp.22515>.
- Low, T., Conduit, R., Varma, P., Meakim, H., Jackson, M.L., 2020. Treating subclinical and clinical symptoms of insomnia with a mindfulness-based smartphone application: a pilot study. *Internet Interv.* 21, 100335. <https://doi.org/10.1016/j.invent.2020.100335>.
- Marlatt, G.A., Kristeller, J.L., 1999. Mindfulness and meditation. In: Integrating Spirituality Into Treatment: Resources for Practitioners. American Psychological Association, pp. 67–84. <https://doi.org/10.1037/10327-004>.
- Piet, J., Würtzen, H., Zachariae, R., 2012. The effect of mindfulness-based therapy on symptoms of anxiety and depression in adult cancer patients and survivors: a

- systematic review and meta-analysis. *J. Consult. Clin. Psychol.* 80 (6), 1007. <https://doi.org/10.1037/a0028329>.
- Sjöblom, M., Hamari, J., 2017. Why do people watch others play video games? An empirical study on the motivations of Twitch users. *Comput. Hum. Behav.* 75, 985–996. <https://doi.org/10.1016/j.chb.2016.10.019>.
- Spectiv. n.d. Retrieved from <https://spectiv.co/>.
- Teasdale, J.D., Segal, Z.V., Williams, J.M., Ridgeway, V.A., Soulsby, J.M., Lau, M.A., 2000. Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *J. Consult. Clin. Psychol.* 68 (4), 615–623.
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., Stewart-Brown, S., 2007. The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Qual. Life Outcomes* 5, 63. <https://doi.org/10.1186/1477-7525-5-63>.
- Weber, B., Sala, L., Gex-Fabry, M., Docteur, A., Gorwood, P., Cordera, P., Bondolfi, G., Jermann, F., Aubry, J.-M., Mirabel-Sarron, C., 2017. Self-reported long-term benefits of mindfulness-based cognitive therapy in patients with bipolar disorder. *J. Altern. Complement. Med.* 23 (7), 534–540. <https://doi.org/10.1089/acm.2016.0427>.
- Wylde, C., Mahrer, N., Meyer, R., Gold, J., 2017. Mindfulness for novice pediatric nurses: smartphone application versus traditional intervention. *J. Pediatr. Nurs.* 36, 205–212. <https://doi.org/10.1016/j.pedn.2017.06.008>.
- Zgierska, A.E., Burzinski, C.A., Cox, J., Kloke, J., Stegner, A., Cook, D.B., Singles, J., Mirgain, S., Coe, C.L., Bačkonja, M., 2016. Mindfulness meditation and cognitive behavioral therapy intervention reduces pain severity and sensitivity in opioid-treated chronic low back pain: pilot findings from a randomized controlled trial. *Pain Med.* 17 (10), 1865–1881. <https://doi.org/10.1093/pm/pnw006>.