



Brief report: Feasibility of a mindfulness and self-compassion based mobile intervention for adolescents



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ARTICLE INFO

Article history:

Received 30 May 2016

Received in revised form 1 September 2016

Accepted 23 September 2016

Available online 1 November 2016

Keywords:

Adolescence

Mindfulness

Self-compassion

Technology

Mobile

App

ABSTRACT

The aim of the study was to test the feasibility of a mindfulness and self-compassion based program for adolescents, to be delivered through mobile phones. Twenty racially and ethnically diverse US adolescents enrolled in a study to use the app for 30 days, after which they provided satisfaction data and participated in focus groups to describe their experiences and offer suggestions for improving the app. Usage data were also captured. Results indicated that participants used the app on the majority of days over the intervention period, reported finding it helpful for managing stress, and provided suggestions for substantive areas for improvement. These findings suggest that a mobile app may be a feasible way to disseminate a mindfulness and self-compassion based program widely among adolescents.

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Adolescence is a challenging period characterized by rapid cognitive, physiological, and neurological changes (Giedd, 2008) as well as increasing emotional and social demands. Interventions that foster coping and well-being are particularly important during this period.

Constructs drawn from Eastern contemplative traditions such as mindfulness and self-compassion are associated with well-being (MacBeth & Gumley, 2012; Keng, Smoski, & Robins, 2011; Zessin, Dickhäuser, & Garbade, 2015) and may play a role in the pathway to emotional well-being in adolescents (Bluth & Blanton, 2013; 2014). Mindfulness focuses on awareness and attentiveness to immediate experience (Grossman, 2010), encouraging openness, curiosity and a compassionate acceptance of oneself. Interventions aiming to develop mindfulness skills in adolescents show a positive effect on a broad range of outcomes (Zoogman, Goldberg, Hoyt, & Miller, 2014) including decreased negative and increased positive affect (Broderick & Metz, 2009; Ciarrochi, Kashdan, Leeson, Heaven, & Jordan, 2011), as well as increases in well-being (Huppert & Johnson, 2010). Similarly, self-compassion emphasizes a compassionate way of relating to oneself through self-kindness, mindfulness and an appreciation of common humanity (Neff, 2003b) with an emphasis on self-soothing when encountering suffering (Germer, 2009). A controlled study of a mindful-self-compassion based intervention for adolescents resulted in greater self-compassion, greater life satisfaction, and significantly lower depression (Bluth, Gaylord, Campo, Mullarkey, & Hobbs, 2016).

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Mobile phone applications have a high potential for teaching these skills to a large number of adolescents. Almost three quarters of adolescents (73%) have or have access to a smartphone (Lenhart, 2015). Mobile interventions are effective at changing a range of health behaviors (Free et al., 2013). Thus, the aim of the current study was to test the feasibility of a novel approach to teaching mindfulness and self-compassion to adolescents through a mobile-based program.

1. Method

1.1. Recruitment and setting

Adolescents were recruited from an after-school organization providing employment in the arts to underserved youth. Inclusion criteria for the study were: (a) being enrolled at the organization; and (b) owning an iPhone or iTouch.

1.2. Intervention

Participants used the BodiMojo mobile app, with content based on Neff's (2003a; 2003b) conceptualization of self-compassion which includes 3 constructs: mindfulness (non-judgmental awareness of ones' thoughts and emotions); self-kindness (showing warmth and understanding towards oneself, especially in times of suffering), and common humanity (recognition that suffering and feelings of personal inadequacy are part of the shared human experience).

To facilitate engagement, the app features a customizable (color, facial features) partially animated "buddy" and consists of two daily activities: (1) tracking feelings and (2) reviewing/practicing a wellness tip. Tracking feelings involves selecting words that populate a "mood cloud," providing a visual representation of the participant's mood (PANAS; Watson, Clark, & Tellegen, 1988). The daily wellness tip prompts adolescents to engage in mindful acceptance, self-kindness and self-regulation and is sometimes linked to an audio relaxation. Daily wellness tips draw on self-compassion and mindfulness approaches and positive psychology (Bolier, Haverman, Westerhof, Riper, & Bohlmeijer, 2013; Kabat-Zinn, 2003, 1996; Neff, 2003a, 2003b). See Table 1.

1.3. Procedure

Participants provided signed parental consent and assent. Research staff met with the participants to download the app. During the 30-day intervention period, participants were instructed to open the app daily to: (1) record their feelings and review the personalized feedback; and (2) review a daily wellness tip. After the intervention period, participants completed a short satisfaction questionnaire prior to participating in a 30-min focus group. The goals of the focus groups were to: (1) explore adolescents' experience with the app; and (2) elicit suggestions for improvements. Focus groups were audio-recorded and transcribed. Participants were compensated with a \$50 gift card. The study was approved by the Northeastern University Institutional Review Board.

1.4. Measures

Participants provided age, race, ethnicity, and gender. Two outcomes were obtained: (1) usage data, (number of days that participants used the app); and (2) a nine-item satisfaction questionnaire assessing overall enjoyment, helpfulness, value of the program, and opinions about the design and preferences for features in the app.

1.5. Statistical analyses

Descriptive statistics were calculated for usage and satisfaction. Qualitative data were analyzed using a modified version of Braun and Clarke's (2006) guidelines for thematic analysis. Specifically, two members of the team read the transcripts and

Table 1
Sample content messages.

Self-compassion construct	Sample messages
Self-kindness	Life is impossible to get through without some embarrassment, [[username]]. When you feel shame, place your hand over your heart and (say ouch this hurts and) wish yourself well. Are you too hard on yourself? Me too. Tell yourself what you'd say to a good friend who needs support.
Common humanity	When something goes wrong, it's easy to think you're the only one going through it. You're not alone. Others have felt the same way. Hang in there and stay hopeful!
Mindfulness	Ever find yourself saying, "FAILED," when something doesn't go your way? Laugh at yourself. It's just part of being human! Take a deep breath, [[username]]. Does breathing in feel cool or warm? What about breathing out? Can you feel the air moving in your body? Where? Look around and notice one beautiful thing. The light on a tree, the feel of the wind on your face, the color of the sky. Name what you see.

independently developed categories of responses to the two main questions (experience with the app and suggestions for improvements). Agreement on the proposed categories was reached through discussion.

2. Results

2.1. Participants

Twenty participants were enrolled: 65% ($n = 13$) female, mean (SD) age = 16.9 (1.3); range 13–22 years. Seven participants identified as African American; three as Black Latino; two as Hispanic; two as Asian; one as Native American; one as Latino; and four as Caucasian. Four participants were unable to participate due to incompatible devices, thus 16 participants completed the 30-day study.

2.2. Main outcomes

2.2.1. Usage

Overall, participants used the app on the majority of the 30 days, mean (SD) = 16.8 (6.4), with a range of 6–26 days. During the 30 days, participants tracked their mood 13.8 (SD = 6.1) days, ranging from 6 to 26 days, and reviewed the daily wellness tip 14.4 (SD = 7.4) days, ranging from 3 to 25 days. Please see Table 2 for details about individual usage.

2.2.2. Satisfaction

The majority (92.3%) rated the question “How much did you enjoy using the program?” a 6 or 7 (using a scale where 1 = not at all and 7 = very much). Ratings were also high for ease of navigation and understanding, with 72% and 86% of participants rating at 7 or above on a scale from 1 to 9 (1 = hated it, 9 = totally liked it). Regarding the design, 29% rated the design and graphics a 7 or above on the 1–9 scale, and 50% rated them above average. Participants' ratings of specific features of the app are presented in Table 3. Seventy-one percent of participants found the program to help them to focus on their feelings, while 64% of participants reported that the program helped them to learn new relaxation skills. Regarding perceived value, 64% the participants indicated they would be very likely to continue to use the program if available and would recommend it to a friend.

2.2.3. Focus group findings

The purpose of the focus groups was to gain an understanding of the participants' experiences using the app and to gather suggestions for improvements. With respect to experiences, two major themes emerged. One, participants found the app to be soothing and relaxing, particularly the audio relaxations (e.g., “I was on the bus when I actually figured out the meditation thing ... all of a sudden I heard voices. It was really cool, it was really soothing, relaxing and I actually listened to them and started paying attention to my surroundings and it was really nice.”). Two, participants reported that the app's positive tone led them to feel happiness and/or gratitude (e.g., “Just by reading the boosts [daily wellness tips] I would say because that's mostly what I did and paid attention to. They just really helped me. I had to think about deep things like my surroundings and the important people in my life.”).

Regarding potential improvements, three main themes emerged. One, participants wanted more specific content (e.g., “I wanted a more detailed description on how to get into the feeling. If I was happy I wanted to know if there were other ways to

Table 2

Participants' use of BodiMojo app features during the 30-day intervention period.

Participant	Number of days feelings recorded	Mean number of times per day feelings recorded	Number of days wellness tip accessed	Total days with any activity
01	16	1.3	22	22
02	8	1.4	9	9
03	9	1	15	17
04	11	1	9	17
05	6	1	5	8
06	26	2	25	26
07	12	1.1	7	13
08	23	1	21	23
09	20	1.6	24	26
10	13	1.1	13	15
11	17	1.4	25	25
12	15	1.7	15	15
13	6	1.2	10	11
14	16	1.6	15	17
15	6	1.2	3	6
16	17	1.2	8	19
Mean	13.8	1.3	14.1	16.8

Table 3
Preference for BodiMojo App features.

App feature	Mean response ^a
Health tip	7.92 (1.50)
Mood Cloud	7.86 (1.51)
Mini Meditations	7.71 (1.54)
Feelings tracker	7.71 (1.49)
Quizzes	7.36 (1.74)
Personalizing their buddy	6.07 (1.98)

^a Note: Participants provided their preference for each feature using a scale from 1 (“hated it”) to 9 (“totally liked it”).

Table 4
Examples of participant quotes to support themes.

Theme	Supporting quote
App is soothing and relaxation	“I was on the bus when I actually figured out the meditation thing. I didn’t know it said anything. I just pressed the button and then it just started a timer and I had no idea and my headphones were in and then all the sudden I heard voices. It was really cool, it was really soothing, relaxing and I actually listened to them and started paying attention to my surroundings and it was really nice.” “Yeah. Well, one day I think the tip was like focus on some things around you, like you don’t need to rush like to where you’re going. When I was walking back home from the bus, I just like stood there and looked around like my surrounding.”
App associated with feelings of happiness and gratitude	“I liked to think about the people around you or the important people in my life and appreciate the smaller things that you might forget alone. Yeah that helped me I guess relax and feel better about myself” “I feel it changed my life. I started like focusing more on like positive things rather than like letting stress get to me. I like go into the app and the first thing I go to was the meditations”
More content needed	“Some of the comments that we got on the feelings, it wasn’t as in-depth. It felt as if there was a reiteration of what I already knew and I wanted a more detailed description on how to get into the feeling. If I was happy I wanted to know if there were other ways to make myself be more happy. It that had few words in a sentence and it said something like it’s good that you’re feeling happy.” “there were some that were just like oh that’s great or cool. I liked the ones that had a long thing.”
Desire for more personalized experience	“Maybe if you poke it, it would do a little ... Interaction is always great, especially with the mascot. Maybe change the background a bit because it’s kind of just there” “Maybe the clouds change during the day so if you go to the app at night it’ll be like nighttime on the app” “I think it’d be nice if it got to know you personally like when you open the app it would call you by your name or maybe reflecting on emotions like it would ask you are you still tired from yesterday or something like that.”
Desire to share moods with others	“Be able to connect with Instagram or Twitter or Facebook ... or if you want to screenshot your feeling or something like that you could automatically link it without having to take a picture of it and look through your camera. That would be cool.” “Maybe like ... not make it into ... maybe like the social kind of thing. Like you can see these beautiful feelings, then if like they decided to share it kind of thing.”

make myself be more happy.”). Two, participants desired a more personalized experience (“I think it’d be nice if it got to know you personally like when you open the app it would call you by your name or maybe reflecting on emotions like it would ask you are you still tired from yesterday”). Finally, participants were interested in sharing their experience with others (e.g., “Be able to connect with Instagram or Twitter or Facebook so ... if you want to screenshot your feeling or something like that you could automatically link it without having to take a picture of it and look through your camera.”). See supporting quotes in [Table 4](#).

3. Discussion

This study tested the feasibility of a mobile app designed to increase mindfulness and self-compassion in adolescents. Our findings indicate that adolescents used the app on most days of the month and enjoyed the experience. Satisfaction and focus group data suggest that adolescents found the program easy to use and believe that they benefited from the suggested activities. In addition, the adolescents made useful suggestions for improving the app, including increasing personalization of features, expanding content, and sharing via social media.

This proof-of-concept study is limited by participant characteristics and sample size ($n = 16$) that impact generalizability beyond the study. In addition, while satisfaction was high, no outcome efficacy data were obtained. Furthermore, while the goal here was to assess whether adolescents would use the app, larger efficacy studies should assess daily usage in minutes per day. Nevertheless, our preliminary findings suggest that a mobile app would be a timely and feasible way to disseminate a mindfulness and self-compassion intervention among adolescents. Future research will aim to increase engagement with the app based on suggested improvements and evaluate the efficacy of the app in supporting positive well-being among adolescents.

Funding

This work was supported by the National Institutes of Health: 2 R44 DK085748-02.

Acknowledgements

The authors want to express their appreciation for the assistance provided by Rich Frank and the students from Artists for Humanity who participated in this study.

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