



Can a Mood Tracker Improve Young People's Mental Health?

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ABSTRACT

Background: Today, mental health is a primary concern among all age groups. Japan is the only country among G7 countries where suicide is the most significant cause of death among youths 10-19 years old. However, many people find it difficult to confide in others about private mental health issues.

Objective: We pilot-tested a "Mood Tracker" tool to help users record, reflect upon, and exercise control over their emotions to assess its acceptability and explore its impact among Japanese university students.

Methods: The participants were 20 medical students recruited at Fukushima Medical University. They were given a calendar and a paper listing 16 different emotions, with instructions to designate a different colour for each emotion on the list and to colour each day of a month according to that day's overall emotion. In addition, participants filled out a questionnaire before, right after, and a month after mood tracking for self-assessment of mental state and satisfaction with the tool.

Results: All participants except one completed the intervention and provided positive comments. Although not statistically significant, the proportion of delighted students with their school life increased from 25% before the intervention to 42% one month after.

Conclusion: This small-scale pilot test suggested that mood tracking was well accepted among Japanese medical students and is worth further investigation for its potential to impact mental health positively.

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1. Introduction

In Japan, suicide is the most significant cause of death among people 15 to 39 years old.¹ Japan's Ministry of Health, Labour and Welfare reported a national suicide rate that is the highest among G7 countries, and Japan is the only country where suicide is the most significant cause of death among youths 10-19 years old. Over 30% of Japanese youths' suicides were attributed to problems related to school life.² Globally, mental health disorders have been deemed as the primary cause of suicides.³ However, mental health disorders may be hidden due to people's stigma and negative perceptions. Besides, people sometimes cannot even notice their mental health problems because of this.

In this context, we considered the potential value of people visualizing their day-to-day mental health with a "mood tracker" tool. Mood tracking is like mandala colouring, an art therapy using pre-printed geometric patterns, about which potential benefits regarding subjective health and spirituality have been reported.⁴ Similarly, a previous meta-analysis reported the potential benefits of journaling as a low-cost and low-side-effect strategy to manage one's mental health in a primary care setting.⁵ While mandala colouring and journaling are

organized mainly for adults, a mood tracker is utilized for

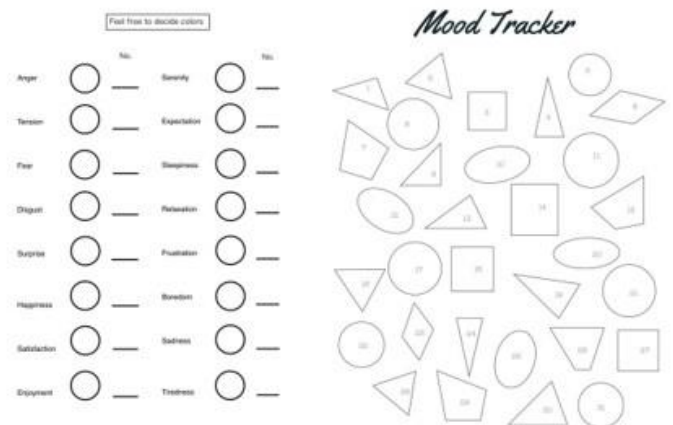


Figure 1 Color-decision paper and mood tracker

children in primary schools to assess their mental health, especially in Western countries. People can easily find mood trackers on many websites.

This colouring tool, however, is not standard in Japan, nor could we find much-related research. Originating in Japan. Therefore, we designed a pilot study to assess the acceptability of a mood-tracking tool among Japanese university students and to explore to what extent it might make it easier for users to recognize their mental conditions

and whether it might have positive and/or negative effects on them.

2. Methods

2.1. Study Overview

This study occurred at Fukushima Medical University (FMU) in Fukushima City, Japan. Subjects were 20 medical students at FMU consisting of 1 third-year, one fifth-year, and 18 fourth-year students in a six-year curriculum. Snowball-bowling recruited all, starting with the first author's close friends. As each participant followed a different schedule, mood tracking was unaffected by having the same exams or rotating in the same clinical clerkships.

2.2. Mental health assessment

Before mood tracking, participants self-assessed their mood states with three indicators: *Subjective well-being inventory*, *Perceived stress scale* (14-item version), and *School life satisfaction*. In order to shorten the assessment form, we extracted and used three subscales of the subjective well-being inventory: *General happiness*, *Upsetability*, and *Confidence in coping*, along with seven positive elements of the perceived stress scale. The assessment was repeated immediately after and one month after a month of mood tracking. In addition, we asked *whether they would like to use the mood tracker again* and *whether the mood tracker provided insight into their feelings*, with space provided to express their opinions freely.

2.3. Mood tracking

The tool used in this pilot study is shown in Figure 1. For colouring a calendar, each participant decided individually which colour to assign to which emotion and indicated their choices on the left side of the mood tracking sheet. There were 16 emotions listed (anger, tension, fear, disgust, surprise, happiness, satisfaction, enjoyment, serenity, expectation, sleepiness, relaxation, frustration, boredom, sadness, and tiredness) based on previous research on the categorization of emotions. Participants were provided with 16 coloured pens (black, grey, red, pale pink, rose pink, orange, yellow, violet, light purple, green, light green, lime green, light jasper green, navy, blue, and sky blue) and decided on their own which colour would fit which emotion. The matching of the colours and emotions is listed on the left side of Figure 1. Participants then started colouring the chart on the right side of Figure 1 to reflect their overall feeling of the day before going to bed. The chart was numbered akin to days on a calendar to facilitate a review of and reflection on the recorded emotions over 31 days.

2.4. Statistical analysis

We analyzed data with Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA) and STATA 14 (StataCorp et al., Texas, USA). When visualizing the mood tracking sheets, we classified sixteen emotions into four categories according to the modified version of a pleasure-arousal plane, with four dimensions suggested by Yan and colleagues.⁶ The group suggested a "modified pleasure-arousal plane with four emotional quadrants" as follows: anger, tension, disgust, and fear are classified into "stress"

(coloured in red in our figure), surprise, happiness, satisfaction, and enjoyment into "excitement" (green), frustration, boredom, sadness, and tiredness into "depression" (purple), and serenity, expectation, sleepiness, and relaxation into "calm" (blue). When comparing the changes in mental health indicators before, right after, and one month after the intervention, we used the Wilcoxon signed-rank test with Bonferroni correction.

3. Result

All participants, except for one, actively tried the mood-tracking intervention. Figure 2 is a visual display of their records. Sixteen emotions were aggregated into four categories according to the modified version of a pleasure-arousal plane, with four dimensions suggested by Yan and colleagues.⁶

Table 1 shows changes in mental health indicators. Although not statistically significant after Bonferroni correction, a notable change was observed in satisfaction with school life: 25% of participants before the intervention, 26% of them right after the intervention, and 42% of them one month after the intervention answered: "very satisfied." The average score for subjective health did not change significantly: 28 before the intervention, 29 right after, and one month after the intervention. Similarly, the average score for perceived stress did not change significantly: 15 before the intervention, 14.5 right after, and 16 one month after the intervention.

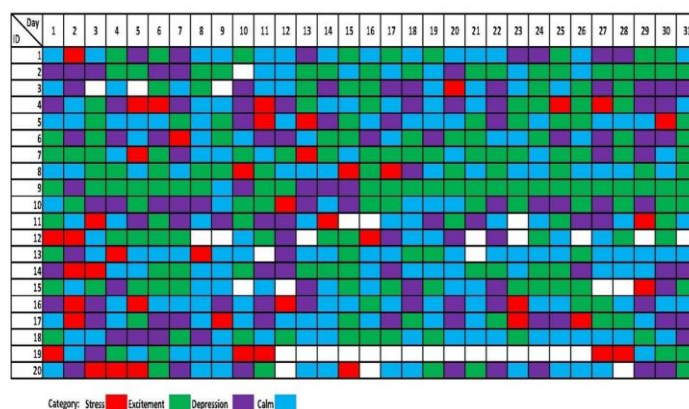


Figure 2 Coloring map

When asked whether they would like to use the mood tracker, again, 15 % of participants answered "yes, definitely", 75 % answered "perhaps" right after the intervention, and 35 % answered "yes, definitely", and 55 % answered "perhaps" one month after the intervention. Interestingly, the proportion of those who answered "yes, definitely" increased. In addition, when participants were asked whether the mood tracker provided insight into their feelings, 95% answered "yes, definitely" and "perhaps" right after and one month after. Sixteen participants provided their free opinions; a few wrote that it was tough to continue for a month but were primarily positive. One student wrote, "As I expressed the difference of my moods in my daily life by colouring, I could recognize my mental health. This was good for me since I can use this as an

advantage for upcoming events." Another student wrote, "It was easy to just colour the mood tracker instead of journaling to review how I felt each day."

4. Discussion

In this pilot study, all 20 volunteers participated in this 2-month-long intervention without dropping out. In previous research about mindful colouring, only 27 of 39 participants fully completed the task.⁷ Also, our participants' school life satisfaction became higher than before, and right after they tried mood tracking, they recorded many positive messages indicating that the tool allowed them to review their events or feelings each day.

In previous research, children and university students using mandala colouring showed a significant decrease in test anxiety.^{8,9,10} Recently, the concept of self-compassion has been gaining attention for understanding people's psychopathology and resilience.¹¹ Neff defines self-compassion as "being touched by and open to one's suffering, not avoiding or disconnecting from it, generating the desire to alleviate one's suffering and to heal oneself. With kindness."¹² Mood tracking can be considered a practical tool to enhance self-compassion.

Table 1. Comparison between before and one month after the intervention

	N (%) or median (min, max)			p-value ^d		
	1. Before the intervention (n=19) ^a	2. Immediately after the intervention (n=20)	3. One month after the intervention (n=20) ^a	1 vs. 2	2 vs. 3	1 vs. 3
Satisfaction with school life (% of 1; score range 1-5) ^b	5 (25%) 2 (1, 4)	5 (25%) 2 (1, 3)	8 (42%) 2 (1, 2)	0.414	0.046 (0.138)	0.056 (0.168)
Subjective health (SUBI; score range 17-51) ^c	5 (25%) 2 (1, 4)	5 (25%) 2 (1, 3)	8 (42%) 2 (1, 2)	0.935	0.720	0.903
Perceived stress (PSS-14 positive; score range 0-27) ^c	28 (21, 40)	29 (18, 39)	29 (18, 38)	0.808	0.970	0.332

However, there are limitations to acknowledge. First, participants were limited to medical students at one university. Second, mental health indicators were made too concise for practical reasons of pilot testing. For further research, efforts are needed to increase the sample size and the variety of participants' backgrounds and to add more detailed mental health assessments. Moreover, we need to consider whether it is appropriate to solicit feelings just before going to bed. The peak-end rule is a psychological heuristic in which people judge an experience based mainly on how they felt at its peak.¹³ In contrast, the colours recorded in this pilot may be affected by significant events or things happening around bedtime. One possible alternative would be to use digital technology to ask participants to record their colours at random times of day, after which averages could be recorded.

5. Conclusion

Although conducted on a small scale, our trial of applying mood tracking among Japanese medical students suggested that the method was well accepted in the group and worth exploring for its potential positive effect on mental health.

Ethical Approval

Before the trial, informed consent was obtained from volunteers and documented in writing. The study was approved by the Ethics Committee of Fukushima Medical University (General 55 2021-033).

Conflicts of Interest

The authors declare no conflicts of interest.

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Author Contributions

Conceptualization and methodology, IK, AG, and KEN; data collection, IK; data analysis, IK and AG; writing—original draft preparation, IK; writing—review and editing, IK, AG, and KEN.

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