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A Web Course Based on SAT Counseling Method Reduces Anxiety by Continuous Use

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Abstract – To keep good mental health of employees is one of the prioritized issues in corporate management recently. It increases the number of potential clients, and the number of existing medical doctors and counselors is not enough. Hence the growing need for self-care. Previously, a self-care course for mental health using virtual reality (VR) based on the SAT method of counseling and therapy techniques has been developed. In this study, we propose a web-based self-guided mental healthcare course (WEB course) that can be practiced by a smartphone to improve usability for continuous use. It enables a user to repeat the course easier. The user is expected to acquire a self-care skill to cope with daily stresses so that he/she can gradually stabilize emotional arousal by oneself and improve stress tolerance eventually.

In order to examine the stress reduction effect of the WEB course, we conducted an experiment to compare between one-time use of the WEB course, continuous use during 14 days, and a breath relaxation method as a baseline. We confirmed anxiety was reduced in the continuous use of the WEB course, and discussed the merits and demerits of the course.

Keywords: Self-guided mental healthcare, Healthcare course, SAT counseling method.

1 INTRODUCTION

Research of online courses on mental healthcare has become active, as the importance of keeping good mental health has been widely recognized. The stress check system to keep employees' good mental health in companies has even been legislated recently in Japan. This resulted in sudden increase of the number of potential clients for medical counseling most of whom are not in sick, whereas the number of industrial physicians specialized in psychology who usually carry out counseling does not increase. Thus, it is in high demand to provide the means to take care of their mental health by themselves.

A self-guided mental healthcare course [1][2] based on the SAT (Structured Association Technique) method [3], which

adopted virtual reality (VR) was proposed as one of such means. The course enables the user to carry out the self-guided therapy process by wearing a VR Head Mounted Display (HMD). It obtained good stress relief evaluation.

However, wearing a dedicated HMD is likely to put a burden on employees. Assuming the actual use in a company, they are required to move to a common space of the office where the HMD is installed when they carry out the course. Further, the number of users to use it simultaneously is limited. Removing these obstacles is desirable.

Further, from the viewpoint of the effect of therapy, such usability shall be also taken into consideration in terms of easiness of repeated course practice. In a SAT counseling session, a client practices the imagery work to stimulate the intuitive association and inspiration by images, with guidance of the therapist. The client is asked of watching the images used in the session as homework when he/she feels stress until the next session. Eventually, the stress tolerance of the client is increased through such session and homework [4][5].

The self-guided course with VR (VR course) showed the possibility for a user to practice a therapy process for oneself and get effect to reduce daily stresses.

In this research, we have developed a new web-based self-guided mental healthcare course (WEB course) that can be practiced by a popular device, a smartphone, using the same structure with the VR course, to improve the usability. It enables a user to repeat the course easier and acquire a self-care skill to cope with daily stresses so that the user can gradually stabilize the emotion for oneself and improve stress tolerance eventually. In order to examine the stress reduction effect of the WEB course, we conducted an evaluation experiment to compare the effect by one-time use of the WEB course and continuous use during 14 days with a breath relaxation method.

2 RELATED WORK

In recent years, researches have been conducted to apply psychotherapy to digital contents and use them with mobile devices as a complementary tool for treatment and counseling, or a training tool. Researches on one of major psychotherapy, Cognitive Behavioral Therapy (CBT) have especially progressed[6]-[8], and there are many commercially available mobile applications [9]. In the CBT session, the counselor modifies the negative cognitive distortion of the client through dialogue with the client to encourage positive thinking and behavioral change. After the session, clients are given a homework called the diary or column method in which they write their daily thoughts, and the counselor analyzes them in the next session for use in therapy. The CBT application is mainly digital content of this homework part and does not cover the entire CBT process. Therefore, it is hard for users to realize effect of stress reduction or stress problem solving in one-time use. While it may be an effective auxiliary tool for professional support, in case of using as a self-guided tool, users are required to be fully aware of the program and to maintain a high level of motivation to continue using it.

The Cognitive Bias Modification (CBM) approach has attracted attention as a counseling technique, mainly in Europe and the United States, and is being used extensively in research and psychology [10]. Cognitive bias refers to the assumption that people with high levels of anxiety or depression are more likely to negatively interpret vague information that can be interpreted positively or negatively. CBM-supported smartphone applications include Mood Mint, a training tool to reduce anxiety and depression [11]. In the Mood Mint, a screen displays a smile and three negative faces, all four of which are scored by immediately tapping the smile. Repeated implementation may increase the speed of response to positive images and reduce the focus on events with negative cognition. However, one-time use of Mood Mint is not intended to reduce stress or solve problems, so the user will continue to train repeatedly without knowing the stress-reducing effect. As with CBT applications, users themselves are required to maintain motivation. Mood Mint uses a system to provide point incentives for the token economy [12] as a method to encourage its use.

Mindfulness stress reduction using meditation (MBSR) and mindfulness cognitive therapy (MBCT) are also increasingly used in research and psychological clinics in Europe and the United States [13][14], and are widespread in Japan [15]. In the United States, changes in brain function were measured after 8 weeks of meditation, confirming the effectiveness of meditation [16]. MBSR refers to the "state of focus here," which is conducted in groups and individuals in combination with sedative meditation, walking meditation, and breathing techniques. Research and development on digital content of meditation has been advanced [17], and "Headspace" [18] is available in the smartphone application. In this application, courses are provided for each purpose, such as anxiety and depression, and the user performs 10 to 30 10-minute sessions per course in accordance with voice guidance. However, because some of the functions of therapy are implemented, and the main objective is to guide med-

itation, a single practice is not implemented with a sense of the effectiveness of stress reduction or problem solving. Thus, as with CBT and CBM applications, users themselves need to maintain high motivation. Some studies have found that meditation poses a risk of increasing discomfort and pain [19], and some aspects of the study aim require careful handling as a self-care tool.

This study aims to realize a self-care tool that assumes the use of a large number of employees with varying degrees of motivation to self-care. This program is to provide self-care measure when experiencing stress, to realize the effectiveness of stress reduction and problem-solving, and to realize a tool that can be used continuously to solve stress problems on a daily basis.

3 SELF-GUIDED WEB-BASED MENTAL HEALTHCARE COURSE

3.1 SAT Method

SAT counseling method is a structured and interview form counseling method proposed by Munakata. The SAT method has a wide effective range such as a mental disorder (such as Depression, bipolar disorder, obsessive compulsive disorder, personality disorder, schizophrenia, etc.) and various stress diseases. Unlike other conventional counseling methods focusing on the psychological aspects, the SAT method puts an importance on physicality, and approaches mental problems from the bodily symptoms. Therefore, instead of working thought by linguistic stimulus, use visual stimulus from the presented image. It is possible to grasp unconscious true feelings and an essential desire in a short time because it can functionalize an association and a flash and intuition well.

3.2 SAT Imagery Therapy

When a person who wants to have counselling recalls a stress scene, it is perceived as physical discomfort (such as Stomach shrinks, nervous, sweating hands, chest tightening). The SAT Imagery Therapy using light image is a technique to change the discomfort to a good feeling and reduce the stress by watching the light image selected and perceived as a pleasant stimulus [4].

The SAT Imagery Therapy using smile face image is a



Figure 1: The list of images in printed form used in SAT

technique for transforming the image for self to a good one by replacing the primitive land-scape (for example scenery that many yell at around childhood) in the interpersonal relationship of the consultant with the image of smile face symbolizing pleasure. In psychology research, it is generally known that influence on self-esteem of a person is influenced by how the child care attitude of a child career is positive or negative. By allowing the person to select an image of smile face with a sense of good feeling and recalling the image of a scene that makes a sense of security and providing a feeling of security, person perceives a sense that is safely protected, enhances self-esteem and encourages stress reduction.

3.3 Self-Guided Course based on SAT Method

SAT counseling method does not need a client to tell his/her traumatic episodes or secrets and uses visual stimulation by images of light and positive face representation instead of nuanced linguistic expressions. Also, it is well structured which can be practiced in relatively short time in 5 to 10 minutes. But, in the conventional SAT Imagery Therapy, the expert evokes client's association through hearing, counseling or presenting thumbnails on paper media without images (Fig. 1). In some cases, the image is not sufficiently evoked by merely looking at the image on the paper medium, and the counselor has a supplementary voice call or encourages eyes to close to arouse the image while seeing the reactions such as the words and expression. Therefore, counselors play an important role in their progress. In this research, we created a course as a technique that can make self-progression even without counselor guidance support by converting SAT method to digital content and using a smartphone.

3.3.1 Course Composition

In the SAT method, first, a client is requested to answer psychological scales, and then gets to imagery therapy, and again answers the scales to check the effect of the therapy. During a session, a counselor conducts psychoeducation to deepen client's understanding of therapy if necessary (Table 1). According to this procedure, the composition of the self-guided course was designed as follows; (1) knowing their own mental condition (Assessment Part), (2) stress reduction (Solution Part), (3) knowledge and training to improve mental resistance (Learning Part). In the learning part, based on the analysis of the data obtained in the assessment part and the solution part, learning contents suitable for individual stress characteristics are provided. In this study, the assessment part and the solution part are developed prior to the learning part and the stress relief effect of image therapy in the solution part are investigated.

3.3.2 Assessment Part

In the assessment part, we conducted a mental characteristic check test (Table 2) using the SAT four psychological scale with the aim of measuring the mental condition and characteristics of the user and clarifying the changes before and after the use of the system.

Table 1: Self-guided course and SAT method content comparison

The course category	Content of self-guided course	Corresponded contents of the SAT method
Assessment Part	To know mental conditions and characteristics.	The SAT psychological scale used for health coaching by a SAT therapist
Solution Part	To carry out a therapy process to reduce stress.	The SAT imagery work using light image and smile face image
Learning Part	To learn the methodology of the SAT method and understand the course.	Psycho education conducted by a SAT therapist.

Table 2: Mental characteristic check test

Scale	Content	Total score range (SAT criterion)
State-trait anxiety inventory (STAI) (Spilberger 1970, Japanese version - Mizuguchi et al, 1982) [20]	The tendency to become anxious, not state anxiety that varies over time, but a vague degree of anxiety that reflects an individual's past experience.	20-80(20-31 lower/32-34mid/35-41higher/42-80 much higher)
Self-rating depression (SDS) (Zung 1965, Japanese version - Fukuda et al 1973) [21][22]	The depressive symptoms in mood, appetite, and sleep.	20-80(20-35 non/36-48 lower/49-68 higher, 69-80 painful)
Self-repression behavioral trait (Munakata, 1996) [23]	The behavioral characteristics that suppress one's own feelings and thoughts.	0-20(0-6 lower/7-10 average/11-14 slightly higher/15-20higher)
Difficulty in recognizing emotions (Munakata, 2001) [24]	The tendency to avoid feeling of one's own feelings, either subjectively or involuntarily. Higher scores tend to accumulate stress and become chronic with physical symptoms even if they are not aware of them.	0-20(0-5lower/6-8higher/9-20 much higher)

3.3.3 Solution Part

The solution part presents the set questions in order and is proceeded by the process that the user answers to reduce the stress. In the first half (Table 3), first, the user is asked to remember one of stress scenes in accordance with the question and make aware of how much stress it is. Next, by comparing the stress to color and form and making imagination as if the stress image compared by color and form are approaching the user oneself, the user is encouraged to perceive the physical discomfort. Furthermore, by specifying body part and type of the perceived physical discomfort, user is prompted to focus consciousness on the discomfort in the body. And then, by expressing the stress level caused by the discomfort as a numerical value (%), the user recognizes more clearly that the discomfort is occurred while feeling the stress.

In the second half, the course steps based on the process of SAT Imagery therapy using light image and smile face image (Table 4) are proceeded to decrease the stress level%, in short, relieve the discomfort and reduce the stress.

Table 3: First half of solution part

Order	Question
1	Please remind me again what you are concerned about now
2	What is it like? Please choose (Choose from 34 sources of stress such as your future, family health etc.)
3	How much is that degree? Please choose (Choose from 3 stages "not so" to "very much")
4	Does that stress comparable to color? (Choose from red, brown, black, gray, purple, navy blue, light blue)
5	If you compare the stress to the shape? (Square, rugosum, muddy, fluffy, pointed, flat, selected from spheres)
6	Close your eyes, thinking about where this thing comes and imagining this image, where do you feel strangeness in your body?
7	How is that strangeness? (Choose from throbbing, cold, heavy, dull, sore, tight, numb, stretch)
8	What is the stress level of current discomfort? (answer from 0%~100%)

Table 4: Second half of solution part

Order	Question
1	The part that feels that discomfort is healed by which color light is being protected?
2	Please choose a comfortable face that came into your eyes. Do you have anyone who smiled easily?
3	Looking at that face, what percentage of stress is the same as before? (Answer from 0%~100%)
4	What kind of character are you going to be when you see these people?
5	If such a personality, in the situation of stress, how can you handle it? It's okay with what you came up with intuition.
6	What do you think is the result if you do that?
7	Who is the most interested of those who have chosen?
8	What message will you give me?
9	How will you feel?
10	How did you feel about the stress that first came up when you were watching all the faces of these people?
11	How has the degree of stress changed? (Choose from 3 stages "not so" to "very much")

3.4 Implementation of WEB course

The WEB course using smartphones was developed in accordance with the composition of the digitized SAT method. It is constructed as a web site that can be realized with multiple platforms so as to flexibly respond to users' usage situations. Therefore, it can be accessed by using PC, smartphone, etc. In this research, we will describe contents assuming use on smartphones.

In the VR course, the immersive feeling image fits the SAT imagery therapy and can be as one of factors to bring effect on the stress reduction. However, such effect is not



Figure 2 VR screen to view a light image

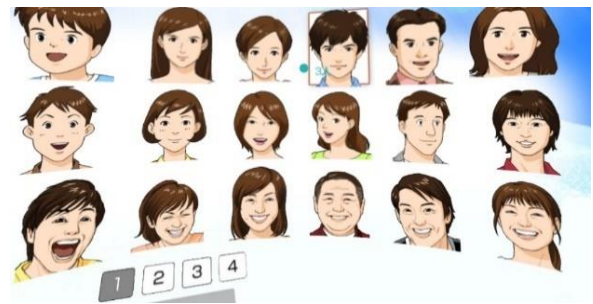


Figure 3 VR screen to select smile face images



Figure 4 Smartphone screen to view a light image

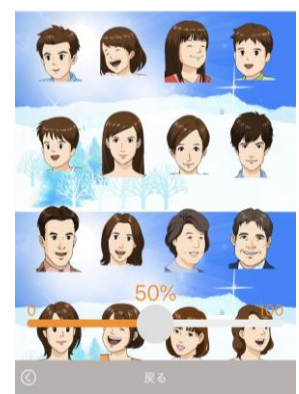


Figure 5 Smartphone screen to select smile face images

expected with the small flat display of the smartphone. In particular, it is assumed that the surface expressivity of the screen in the scenery of viewing light image is very different between the 360-degree screen of the VR (Fig. 2) and the small flat screen of the smartphone (Fig. 4), which will affect the stress reduction effect. On the other hand, from the viewpoint of operability, swiping and tapping operation on smartphone is easier and more familiar than moving the head to manipulate the cursor on the VR screen. In the setting of the scenery of selecting a facial image, VR requires moving the head from many facial images displayed on the front of the eye (Fig. 3), but users can easily select with the fingertips on the smartphone screen (Fig. 5). In the SAT therapy process, it is desirable to intuitively perform selection operation in a short time rather than carefully selecting using long time. By using a smartphone, relatively complicated operations such as button selection, cancellation, page advancement and return can be performed more intuitively and quickly.

When a user logs in using the ID and password on the login page, a start page is displayed. The user selects either the button of the Assessment part or the Solution part.

The mental characteristic check test is displayed in the assessment part.

When the user selects the button of the solution part, the page shown in Fig. 6. In this screen, the user is requested to recall the stress scene (Table 3, Question 1), and select from the list of prepared stress sources (such as things of own future, family health etc.) the one closer to the problem of the stress scene (Table 3, Question 3). Then choose from 3 options for the degree of stress. In the scene where stress is compared to color and shape (Table 3, Question 4), make a selection from the image list. Returning to the chat screen, while recognizing the color and shape of the selected color, perceiving physical discomfort and specifying the part and type (Table 3, Questions 6, 7) (Fig. 7). Finally, answer by entering% of stress received by physical sense of discomfort.

Subsequently, questions are presented according to the latter half of the solution part (Table 4). The user is asked to select light images (Table 4, Question 1) from the light image list (golden, green, peach, orange, blue, white, cream, yellow color, provided based on the light image of SAT method), and then select smile faces from the smile face list (Table 4, Question 2). These selected images are displayed (Fig. 8). After that, select a representative from the selected smile face images and deepen the feeling of being protected by imagining speaking. Finally, it asked the user to answer how stress level against stress source confirmed in the first half has changed, and it ends.

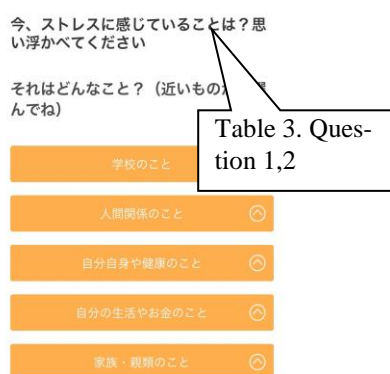


Figure 6: The Stress source list screen

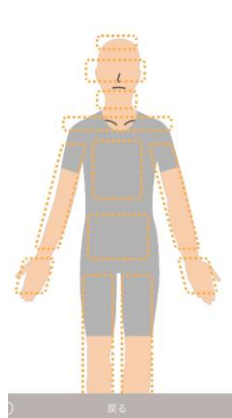


Figure 7: Identifying physical discomfort



Figure 8: Selecting light image and face images



Figure 9: Breathing exercise practice guide screen

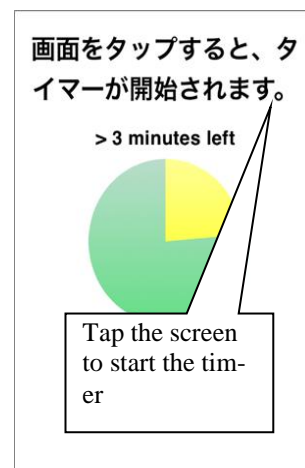


Figure 10: 5 minutes timer screen

4 EXPERIMENT

In this research, the evaluation experiment was carried out with the approval of the ethics review committee in Faculty of Library Information and Media Science, University of Tsukuba (Notification No. 29-109)

In order to examine the stress reduction effect of one-time use and continuous use of WEB course and the difference of the effect, an evaluation experiment to have the subject continue to use this course for 14 days and to compare it with the breath relaxation method.

4.1 Breath Relaxation Method

We prepared a course to carry out the breath relaxation method as a control group.

The breath relaxation method is a training method aiming at improving the function of the mind and the body by breathing. It is introduced in the data of the Ministry of Education, Culture, Sports, Science and Technology in Japan [25] etc. as a relaxation method to consciously control breathing. It has been also reported that it is a technique that can be instructed safely and effectively in clinical practice [26]. Even a busy worker can do with a little time hanging on a chair and does not need special physical strength.

This method intends to increase the mobility of the diaphragm, and the respiratory movement that emphasizes the process of expiration is performed at a speed of 3-4 times per minute with the eyes closed and sitting on the chair [27] [28]. First, take about 4 seconds, breath in through your nose and inflate your abdomen. Next, after 1-2 seconds between switching from inhalation to exhalation, pull out the lower abdomen while drawing slowly and slowly for about 8 seconds. In this experiment, according to this method, the subjects in the control group were asked to perform this method.

We created a website (BREATH course) to guide the experiment subject's breathing practice. This has a screen (Fig. 9) for presenting the implementation method and a timer screen (Fig. 10) for displaying the execution time.

Table 5: Stress characteristic check scores

Scale	Course	Day 1-Before Average \pm SD	Day 1-After Average \pm SD	Day 14 Average \pm SD	N	Chi-Square	df	Asymp. Sig. *2
STAI	WEB	42.95 \pm 9.23	41.85 \pm 11.03	36.88 \pm 9.52	15	6.621	2	0.037*
	BREATH	37.68 \pm 6.57	33.84 \pm 6.91	33.67 \pm 8.51	18	11.514	2	0.03*
	p-Value *1	0.080	-	-	-	-	-	-
SDS	WEB	32.48 \pm 13.04	33.05 \pm 11.26	29.50 \pm 7.67	15	2.621	2	0.270
	BREATH	31.16 \pm 7.37	30.37 \pm 4.97	27.83 \pm 6.44	18	2.303	2	0.316
	p-Value *1	0.964	-	-	-	-	-	-
Self-repression behavioral trait	WEB	10.00 \pm 2.67	9.85 \pm 3.30	8.75 \pm 2.08	15	1.750	2	0.417
	BREATH	9.79 \pm 3.33	10.21 \pm 3.88	9.22 \pm 3.74	18	3.085	2	0.214
	p-Value *1	0.743	-	-	-	-	-	-
Difficulty in recognizing emotions	WEB	9.24 \pm 2.74	9.40 \pm 3.32	8.00 \pm 2.63	15	2.327	2	0.312
	BREATH	8.63 \pm 4.19	9.26 \pm 5.30	8.94 \pm 4.28	18	0.818	2	0.664
	p-Value *1	0.548	-	-	-	-	-	-

*1 Man-Whitney's U test, *:p<0.05 *2 Friedman Test *: p<0.05

Table 6. Post hoc analysis in Stress characteristic check scores changes

Course	Measured point in time	Z	Bonferroni adjusted p-Value
WEB	Day 1-Before to Day 1 After	-1.549 ^b	0.363
	Day 1-Before to Day 14	-2.592 ^b	0.030*
	Day 1-After to Day 14	-2.624 ^b	0.027*
BREATH	Day 1-Before to Day 1 After	-2.927 ^b	0.009*
	Day 1-Before to Day 14	-1.987 ^b	0.141
	Day 1-After to Day 14	-0.332 ^b	1.000

a. Wilcoxon Signed Ranks Test *: p<0.05

b. Based on positive ranks.

4.2 Procedure

33 college students and 7 office workers were selected as participants and randomly assigned to two groups, the WEB course group (N=21) and the BREATH course group (N=19). On Day1, the subjects were given the guidance on either the SAT method course or the breath relaxation method course. Before actually using the course, they took the mental characteristic check test. After using the course, they took the same test again.

After Day 2, participants were asked to take the assigned course once a day, which was also reminded by an email. They were again asked to take the same check test after Day 14.

4.3 Measurement

Stress was evaluated using the stress characteristic check test (Table 2). Four psychological measures (State-Trait Anxiety Inventory, Self-rating Depression Scale, Self-

repression behavioral trait, Difficulty in recognizing emotions) used in the usual SAT method were used.

With regard to the obtained data, the difference of stress before using the courses between two groups was tested by Man-Whitney's U test at 5% significance level. In addition, the difference of stress before using each course was tested by Friedman Test at 5% significance level and post hoc analysis by Wilcoxon's signed rank test with a Bonferroni adjustment applied at 5% significance level. IBM SPSS Statics Ver. 25 was used for the statistical analysis of this study.

5 RESULT

First, we performed Man-Whitney's U test to determine whether there were differences in stress status before the course between the two groups in the WEB course group and the BREATH course group (Table 5). No significant difference was found in any of the scale scores.

Then, Friedman test was performed on the four psychological scale scores of both groups to analyze whether changes

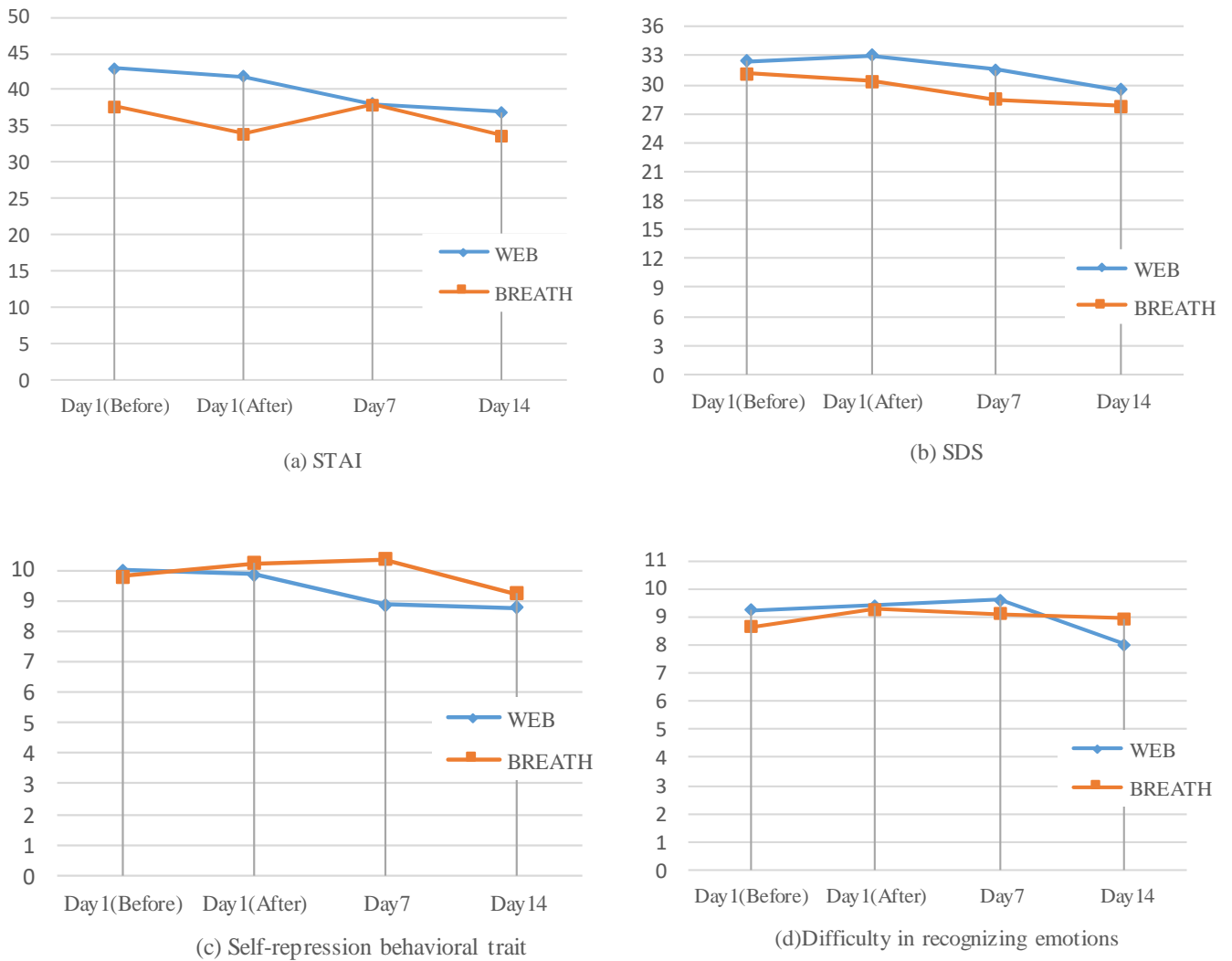


Figure 11: The changes in 4 psychological measures

in the scores affected the frequency of use (Table 5). It was found that there was a significant difference in the STAI score change of each group (WEB course: $\chi^2(2) = 6.621$, $p = 0.037$, BREATH course: $\chi^2(2) = 11.514$, $p = 0.03$). Subsequently, Wilcoxon's signed-rank test with Bonferroni adjustment for the difference in the STAI scores between two measured points confirmed the significant difference in the reduction of Day 14 score to Day 1-Before score of the WEB course ($Z = -2.592$, $p = 0.030$) and in the reduction of Day 14 score to Day 1-After score of the WEB course ($Z = -2.624$, $p = 0.027$). Also, a significant difference was found in the reduction of Day 1-After score to Day 1-Before score of the BREATH course ($Z = -2.927$, $p = 0.009$) (Table 6). The changes are graphically presented in Fig. 11.

6 DISCUSSION

First, it was confirmed that there was no significant difference between the BREATH course group and the WEB course group in the four scale scores before the course was

implemented, indicating that the groups were not with different stress characteristics.

The STAI score of both groups show a gradual decrease for 14 days (Fig. 11(a)). The STAI score of the WEB course group is within “much higher” level when the score before the course on Day 1 is compared with the SAT evaluation criteria (Table 2), suggesting that the group is much anxious and sensitive to stress. The STAI score of the BREATH course group is in “high” level and is also anxious. Comparing with the difference between before and after the course on Day 1, the STAI score of both groups decreased, but a significant difference was observed only in the BREATH course. On the other hand, after continuous use during 14 days, the STAI score in the WEB course group decreased to “high” level indicating a significant reduction in anxiety.

All SDS scores before the course on Day 1 of both groups fell within “non” level, indicating no depression. However, in both groups, the SDS score was further reduced by Day 14. The SAT method interprets anxiety as a barometer of stress, with persistent high STAI scores increasing stress,

depression, and elevated SDS scores [3]. Both groups have high STAI scores but do not yet increase SDS scores, indicating that stress may not accumulate.

Comparing with STAI and SDS scores which indicate the presence or absence of stress and are relatively variable, Self-repression behavioral trait score and Difficulty in recognizing emotions score are harder to be changed than STAI and SDS as representations of the personality traits that produce stress. In the clinical setting of the SAT method, improvement of these indicators is one of the objectives of reducing stress, solving problems, and increasing stress tolerance. For Self-repression behavioral trait score before the course on Day 1, both groups are in “average” level, and the tendency to suppress their opinions and feelings is moderate and not at the level of special attention. On the other hand, both scores on Difficulty in recognizing emotions tend to be quite high and not to feel their own feelings. High levels of stress are said to be more likely to be manifested by physical illness, not mental illness. In both groups, Self-repression behavioral trait score and Difficulty in recognizing emotions score decreased at 14 days on average, but no significant difference was found, and no improvement was seen as the criteria changed.

The breath relaxation method itself has traditionally been shown to be effective in calming the autonomic nerves, relaxing the nerves, and reducing anxiety and depression [26][29]. However, the use of the BREATH course developed in this study showed a reduction in anxiety with one-time use, but no significant difference was found in the effect after continued use. Because breath function itself cannot be complemented with digital contents, the BREATH course remains in a guidance of the breath relaxation method. The first use in this study was enthusiastically tackled because the participants gathered together and started using it simultaneously. However, since the second and subsequent use, the significant effect could not be confirmed because the motivation could not be maintained by themselves. In addition, the breath relaxation method does not include cognitive changes, awareness of their own issues, and problem-solving processes, such as those used in the WEB course. Indeed, in the VR course, significant differences have been observed not only in anxiety and depression, but also in the stress personality traits, such as Self-repression behavioral trait score and Difficulty in recognizing emotions score in our latest study. Because the breath relaxation method does not include a process that promotes cognitive alteration, it is not expected to produce such changes.

Although the continuous use of WEB course demonstrated its effect in anxiety reduction, the one-time use did not. It is one of the differences from VR course, and it might come from the smaller screen size of a smart phone. However, just because of its screen size, WEB course could be more acceptable in daily life. Thus one usage scenario could be using VR course to gain the sense and feeling of its effect, followed by continuous use of WEB course. It is possible that combinational use of this type brings higher effect.

Because repetitive use is needed in WEB course, to maintain the motivation of use is one of the challenges. A good aspect to this goal is that the WEB has better usability than the VR, which makes it easier for continual use. More im-

portant factor to be motivated is that the user realizes the stress reduction in every use and expects to get better if used continually. Showing the changes in the psychological or physiological scales such as heart rate before and after the use of the course may help, even when the effect cannot be experienced by the user. For the other users who are not motivated to use the course from the beginning, it may need a mechanism to actively encourage their use. Prompting by a chat bot rather than simply waiting for their launch is an option. We will deepen our research from a multifaceted perspective regarding motivation in the future.

7 CONCLUSION

We developed a self-guided mental healthcare course based on the SAT counseling method aiming at long-term and continuously available self-guided mental healthcare tool, using a simplicity of smartphone and intuitive operation of web-based self mental healthcare course.

In this research, we conducted an experiment to have the subjects continue to use the course over 14 days and examined the stress reduction effect of one-time use and continuous use.

As a result, although stress-relieving effect in one-time use was not seen, there was a possibility of anxiety and stress reduction effect by continued use for 14 days. It is suggested that it may be effective in improving mental health by continuously using this system. On the other hand, no significant improvement in the stress characteristics to be cause stress has been confirmed, which will be a future research subject.

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