

The effectiveness of an anger management program based on cognitive-behavioral approaches among undergraduate students: a randomized controlled trial

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Objective: To confirm the effectiveness of the anger management program designed by Oshima and Yoshida in 2018.

Methods: A randomized controlled trial was conducted with 179 participating university students. The intervention group received 8, 40-minute group education sessions. The outcomes consisted of 5 subscales in the Japanese version of the STAXI and were assessed at 3 time points: before the start of the program, immediately after the completion of the program, and 5–6 weeks after the completion of the program. The subjects of the effect analyses were 141 people whose outcomes were assessed at those timepoints.

Results: It was clarified that there were strong effects on all subscales immediately after the completion of the program. Furthermore, it was revealed that there were strong effects in the 4 subscales other than Anger Control for up to 5–6 weeks after the completion of the program.

Conclusions: Based on the retention of internal validity and statistical power, we could confirm that this program is effective to improve both the psychological state and coping skills related to anger and that the effects lasted for as long as 5–6 weeks. This study can be a helpful guide to determine the protocol, numbers of treatments, and types of treatment in anger management programs.

Key words: anger, intervention study, randomized controlled trial, cognitive behavior therapy, rational emotive behavior therapy

Introduction

This study aims to confirm the effectiveness of an anger management program that is based on cognitive-behavioral approaches. Oshima and Yoshida¹ designed an anger management program based on the knowledge derived from an anger management interventional study and the theory and techniques of rational emotive behavior therapy (REBT). The authors verified the effects of the program by a randomized controlled trial. However, the effectiveness of this program had not been adequately verified due to the small sample size and the lack of a follow-up survey. Therefore, the purpose of the present study was to overcome these issues and statistically verify the program's efficacy.

The significance of an anger interventional study

Anger has been pointed out as a dysfunctional emotion and has been studied extensively. Not only adversely affecting health, such as increased blood pressure,² but anger is also a major factor that causes aggressive and violent behaviors.^{3,4} Furthermore, anger is linked to depression and anxiety, as shown by Mahon et al.⁵

However, anger has not received much attention compared with that given to depression and anxiety. Searches for empirical studies in the primary database of PsycINFO and ERIC revealed 4,559 (67.5%) studies on depression, 1,909 (28.3%) on anxiety, and comparatively as few as 285 (4.2%) on anger. According to these data, empirical studies on anger amounted to only 1/16 of those on depression and anxiety, as of July 1, 2017. In other words, although problems related to anger have been recognized, there are far fewer empirical studies on

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anger than there are on depression and anxiety, suggesting that there is a need to actively conduct empirical studies on anger, especially interventional studies that improve the dysfunction in people, marriages and relationships, families, and societies, caused by anger.

Valid protocol

Saini⁶ performed a meta-analysis on the results of 96 studies and 139 interventions and showed that the effect size (Cohen's *d*) of all the interventions was 0.76, a medium effect. It is worthy to note that when judging the effect size, it is common to refer to the established standard,⁷ in which 0–0.2 is considered to have no effect, >0.2–0.5 is small, >0.5–0.8 is medium, and >0.8 is large.

The Saini⁶ meta-analysis also clarified that the effective protocol of an anger management program should consist of cognitive-behavioral approaches and 2 or more treatments in the orientation, 8 sessions, the use of a manual for intervention, and the use of a university or a community facility as the location of the program implementation. It revealed that cognitive restructuring, social skills training, relaxation techniques, exposure techniques, and stress inoculation are effective as single treatments.⁶ The meta-analysis reported that follow-up surveys were most frequently conducted 4–8 weeks after the completion of the programs.⁶

Types of treatment

Oshima⁸ discussed that the typical treatment models of anger are based on a cognitive-behavioral therapy method, in particular REBT and that the treatment should include exposure techniques and cognitive restructuring. As an example, DiGuiseppe and Tafrate⁹ state that the introduction of exposure techniques and cognitive restructuring is strongly recommended for the treatment of anger. In addition, the intervention study by Tafrate and Kassinove¹⁰ clarified that after 14 sessions that specialized in 2 factors, the REBT-focused cognitive restructuring (disputing techniques in REBT) and exposure techniques using images (REI [rational emotive imagery]), strong effects could be obtained in all 5 STAIX subscales,¹¹ when the subjects were compared before and after the intervention.¹⁰

Materials and Methods

Participants

University students were taught the theories and methods of coaching psychology that focus on improving performance and well-being in a career education class.

The Oshima-Yoshida¹ anger management program was implemented as a replacement of an emotion management program based on cognitive behavioral therapy (4 weeks of lectures), conducted each year for students who took this class, and the effectiveness was verified in the present study.

To convey the purpose of the study, all participants received an explanation of the research outline, purpose, and various matters concerning the protection of personal information, and written consent for participation in the study was obtained from each participant. We randomly assigned participants to the intervention group and the control group using the permuted block method (block size = 2) for 179 students (69 males, 111 females [18–24 years old]).

Figure 1 shows the flow diagram for the participants. The first and second times there were 179 and 161 participants, respectively, with a dropout rate of 10%; and at the third time, the follow-up survey, there were 141 participants, with a dropout rate of 11%.

Program overview

A well-known meta-analysis study⁶ was used to develop an effective protocol for the present anger management program. Using that protocol as a guideline, this study used a treatment consisting of several different elements: cognitive restructuring and exposure techniques, 8 group education sessions, and a manual preparation. The program was conducted in a university (Tables 1,2).¹

Before the first class on the subject of career education at the university started, we explained the outline of the whole subject, which included this program. We explained its purpose, and requested the participants to sign a consent agreement form. A total of 179 people participated in the preliminary briefing session, and everyone gave written consent. The participants were randomly assigned to an intervention group or the control group.

The intervention group attended the anger management program for 4 consecutive weeks. Each class was 90 minutes, divided into 3 parts, two 40-minute sessions, with a 10-minute break in between, for a total of 8 sessions. The classes in the intervention group were conducted by a class instructor based on a manual created by Y.O., the first author of the present study. The first author and class instructor have the relevant qualifications certified by a Japanese academic society on REBT (the Japanese Association for Rational Emotive Behavior Therapy: J-REBT). And the class instructor has been in charge of classes and training related to REBT-focused cognitive behavior approaches from 2006 in this

university.

Concurrently, during the same 4-week period, class times, and structure, the participants in the control group attended lectures on coaching psychology different from the cognitive-behavioral approaches. After which, both the control and intervention groups jointly attended classes on career development unrelated to emotions and cognitive-behavioral approaches for 5 consecutive weeks. Then, the intervention group took the lectures on coaching

psychology that were previously given to the control group, and the control group took the program that was previously given to the intervention group for 4 weeks. The teaching materials used in the control group were the same as those that had been used by class instructors every year, and the classes were taught by a teaching assistant who had been trained by those same class instructors.

This protocol ensured that the intervention and the

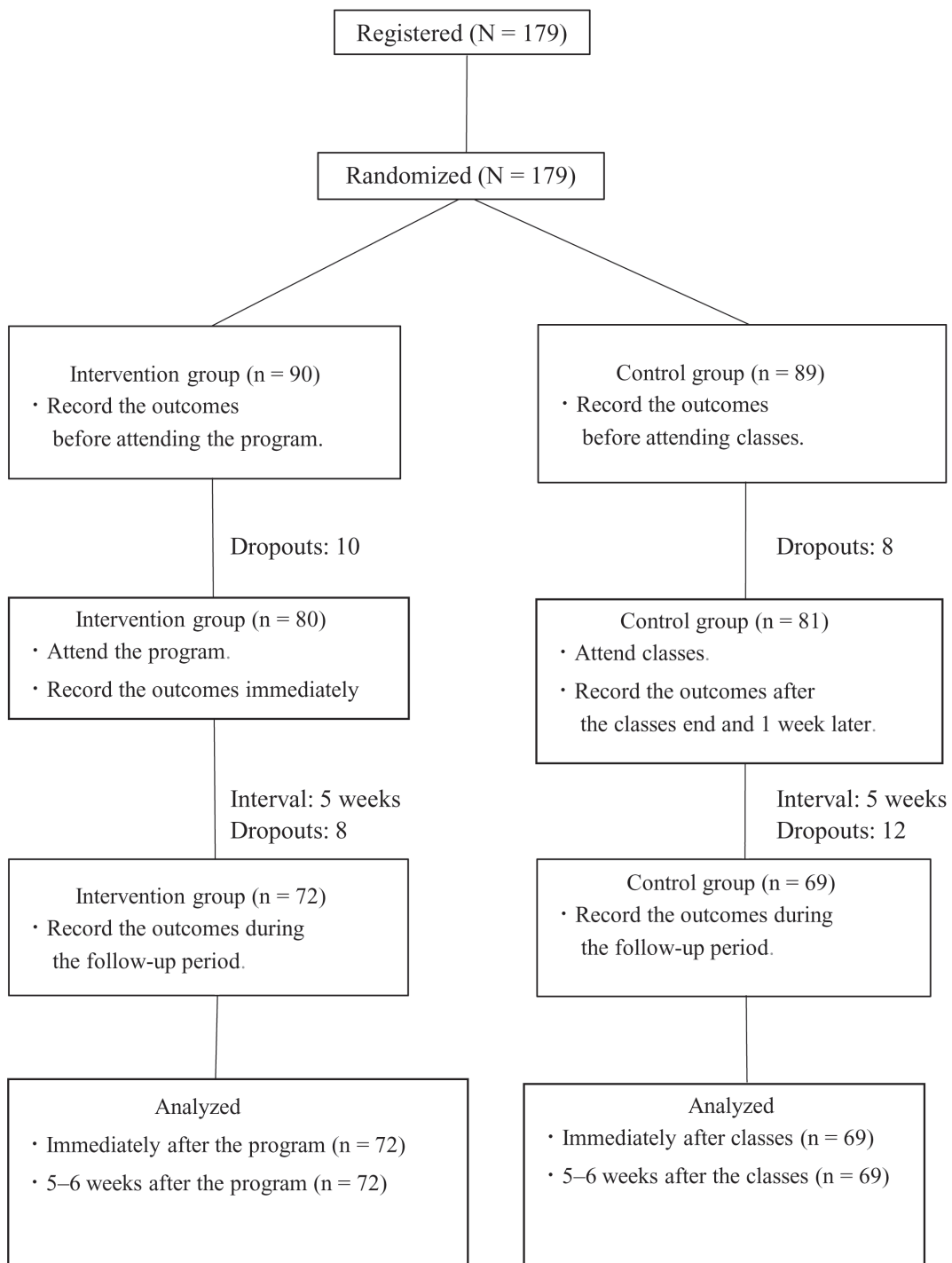


Figure 1. Flow diagram for participants

control groups received the same course content and was approved by the Kitasato University School of Allied Health Sciences Ethics Committee. The study is registered in the UMIN-Clinical Trials Registry (UMIN-CTR) (Test ID: UMIN000028209).

Outcomes

The Japanese version¹² of the State-Trait Anger Expression Inventory (STAXI),¹⁰ which is a standard survey on anger, was conducted. This survey is composed of 44 items, each of which is self evaluated on a 4-point

frequency scale contains a four-option evaluation (from not applicable at all to very applicable) in 5 subscales. The 5 subscales are: 1. Anger State (10 items), 2. Anger Trait (10 items), 3. Anger-in (8 items), 4. Anger-out (9 items), and 5. Anger Control (7 items). Anger State is the level of anger caused by a situation, and Anger Trait is how easy someone gets angry as a personality characteristic. Both of these subsets indicate the psychological state focused on anger. Anger-in is a tendency to keep anger inside, Anger-out is a tendency to express anger outwardly to individuals, or objects

Table 1. Outline of the program content

Introduction to the negative effects of anger and effective theory to control anger: Sessions 1 and 2	
●	Introduction to the previous studies and case studies on anger
●	The ABC theory of emotion (How to analyze emotional problems: A. Activating event; B. Belief; C. Consequences [emotion/behavior])
●	Teach the B–C connection (How thoughts and emotions are related)
Disputing techniques: Sessions 3–6	
●	Introduction to Beliefs about typical anger
●	Memorizing rational Beliefs
●	Exercise session on rewriting irrational Beliefs (iBs) to rational Beliefs (rBs)
Exposure techniques: Sessions 7 and 8	
●	Introduction to exposure techniques using images
●	Exercise session on imagining a scene that causes anger and getting used to that scene
●	Exercise on the emotional experiences with irrational/rational Beliefs in the context of an anger-evoking situation

SD, standard deviation

Table 2. Descriptive statistics for the outcomes of the 5 STAXI subscales

Outcomes	Groups	Number of Participants	Before Program		After Program		Follow-up period	
			Mean	SD	Mean	SD	Mean	SD
Anger State	Control	69	24.00	3.71	24.07	4.42	24.94	3.62
	Intervention	72	24.08	4.24	16.74	5.13	16.90	4.49
	Total	141	24.04	3.98	20.33	6.03	20.84	5.73
Anger Trait	Control	69	24.62	4.23	25.30	4.07	25.30	4.23
	Intervention	72	25.75	4.69	17.25	5.06	17.57	5.12
	Total	141	25.20	4.49	21.19	6.11	21.35	6.09
Anger-in	Control	69	22.96	2.54	22.77	2.63	22.54	2.68
	Intervention	72	23.13	3.04	19.82	4.16	19.58	3.26
	Total	141	23.04	2.80	21.26	3.78	21.03	3.33
Anger-out	Control	69	21.00	3.56	21.55	4.27	21.87	3.51
	Intervention	72	21.28	3.98	14.86	3.86	15.35	4.31
	Total	141	21.14	3.77	18.13	5.26	18.54	5.11
Anger Control	Control	69	20.75	2.76	19.03	2.51	20.33	2.76
	Intervention	72	21.21	2.39	21.71	3.94	21.53	3.65
	Total	141	20.99	2.57	20.40	3.57	20.94	3.29

through physical or verbal behaviors, and Anger Control is a tendency to control the outward expression of anger. These subsets show the coping skills related to anger.

Table 2 shows the descriptive statistics of the 5 STAXI subscales for each group before and after the implementation of the program. The subscale reliability (Cronbach's alpha coefficient) before the intervention was .83 for Anger State, .84 for Anger Trait, .65 for Anger-in, .79 for Anger-out, and .77 for Anger Control, suggesting that reliability could be maintained. The subscale score is the total rating score for each item. A higher value indicates a stronger tendency. The values of the means divided by the number of items for each subscale were: 2.52 for Anger Trait, 2.40 for Anger State, 2.88 for Anger-in, 2.35 for Anger-out, and 2.99 for Anger Control before the implementation of the program. The intermediate level (evaluation from "not applicable" to "applicable") of the four-option self-assessed evaluation (1–4) is 2–3, and all the subscales were included in the range. The effect size of the intervention was calculated for each subscale. The outcomes were measured at 3 timepoints: before the start of the program, immediately after the completion of the program, and 5–6 weeks after the completion of the program. The first evaluation sheet was distributed to the participants before the 1st session and collected at the 1st class. The second evaluation sheet, immediately after the program, was distributed immediately after the 4th class (8 sessions for

the intervention group) and was collected at the 5th class. The follow-up evaluation sheet was distributed immediately after both groups jointly had attended 5 consecutive weeks of classes (i.e., the 9th class) and collected at the 10th class.

Results

Statistical power

An effect analysis was conducted of 141 participants who participated in all 3 surveys. The statistical power was 90%, as calculated by G*Power 3,¹³ statistical power analysis software, with a total sample size of 141 using one-way ANOVA (analysis of variance) with 2 groups of medium statistical sizes. Therefore, the sample size was sufficient to confirm the effect size.

Internal validity

A randomized controlled trial was conducted to improve the internal validity of the intervention effect. The average score of the outcome before the intervention was tested before calculating the effect size, to confirm that there were no significant differences between the average values of the intervention group and those of the control group (Table 2). The results for Anger State ($F = 0.15$, ns), Anger Trait ($F = 2.24$, ns), Anger-in ($F = 0.13$, ns), Anger-out ($F = 0.19$, ns), and Anger Control ($F = 1.10$, ns), confirmed that there were no significant differences

Table 3. Effect sizes after the program ends

Outcomes	Effect Size (Cohen's d)	95% CI	Effect Size (Cohen, 1988)
Anger State	1.53	1.12 – 1.91	Large (>0.8)
Anger Trait	1.75	1.37 – 2.14	Large (>0.8)
Anger-in	0.85	0.50 – 1.19	Large (>0.8)
Anger-out	1.64	1.26 – 2.03	Large (>0.8)
Anger Control	-0.81	-1.15 – 0.47	Large (>0.8)

CI, Confidence Interval

Table 4. Effect sizes in the follow-up survey

Outcomes	Effect Size (Cohen's d)	95% CI	Effect Size (Cohen, 1988)
Anger State	1.97	1.57 – 2.37	Large (>0.8)
Anger Trait	1.65	1.27 – 2.03	Large (>0.8)
Anger-in	0.99	0.64 – 1.34	Large (>0.8)
Anger-out	1.66	1.28 – 2.04	Large (>0.8)
Anger Control	-0.37	-0.70 – 0.04	Small (0.2 – 0.5)

in any of the 5 subscales. These results support the retention of internal validity through random assignment.

Effect size

The effect size (Cohen's d)¹⁴ in each subscale was calculated based on the number of samples in the intervention group and control group, the mean, and the standard deviation (Tables 1,2). It was clarified that all variables had a large effect immediately after the completion of the program (Table 3). Anger State and Anger Trait indicate the psychological states that focus on anger, and Anger-in, Anger-out, and Anger Control indicate the anger coping skills. I.e., this study revealed that the intervention group had a lower level of anger as an internal state than did the control group and was better at coping with anger.

Furthermore, it was clarified that the effect was strong in 4 subscales, but not in Anger Control, at 5–6 weeks after the completion of the program (Table 4). Also, the tendency to keep anger from showing was found to be slightly affected. Therefore, the results show that the effects of this program lasted for up to 5–6 weeks after the completion of the program.

Discussion

Effectiveness of the intervention protocol derived from the meta-analysis

The present study clarified that the protocol derived by Saini⁶ was highly effective for all 5 subscales immediately after the completion of the program. The internal validity and statistical power were maintained. Therefore, we confirmed that the protocol derived by Saini⁶ is effective to improve both the psychological state and coping skills related to anger.

Effectiveness of cognitive restructuring and exposure techniques

The cognitive restructuring and exposure techniques revealed that the effects were high in all the subscales immediately after the completion of the program. The internal validity and statistical power were maintained. Therefore, we confirmed that the protocol derived by Saini⁶ can be effectively used to improve both the psychological state and coping skills related to anger.

Sustainability of the effects

There were strong effects in 4 of 5 scales for up to 1 month or longer after the completion of the program. The result suggests that the inclusion of cognitive restructuring and exposure techniques as the protocol

and treatment extracted from the meta-analysis is also important for sustaining the effects.

Participant size in each session

All the sessions were implemented without dividing the intervention group of 80 students into smaller groups, and large effects were shown. This suggests that the program is beneficial in terms of reducing program implementation costs and feasibility of implementation.

Limitations

The first limitation is the consideration of the number and types of treatments that need to be added in addition to cognitive restructuring and exposure techniques. A meta-analysis revealed the effects of cognitive restructuring, social skills training, relaxation techniques, exposure techniques, and stress inoculation as a single treatment⁶ (Table 4). It is necessary to examine the effectiveness of a program that adds social skills training, relaxation techniques, and stress inoculation to the cognitive restructuring and exposure techniques.

The second limitation is the need to extend the period of the follow-up survey. According to the meta-analysis by Saini,⁶ although the effect size was smaller after 4–8 weeks and 12–16 weeks, when compared with that immediately after the intervention, the effect size after 1 year was almost the same as that immediately after the intervention. In previous studies, most follow-up surveys were done 4–8 weeks after the completion of the program, and there were very few follow-up surveys conducted for longer periods. Therefore, more follow-up surveys beyond 8 weeks are warranted to clarify the sustainability of the effects and the affecting factors. Only the outcomes in Anger Control showed the effect size in sustainability decreased to "small" 5–6 weeks after the end of the program. This suggests a need to consider the sustainability of the effects and their related factors separately for each of the 5 outcomes.

Conclusions

By maintaining the internal validity and statistical power, the program was confirmed to give strong effects to improve both the psychological state and coping skills related to anger, and that the effects afforded by the program lasted up to at least 5–6 weeks. This study can be a useful guide in the implementation of anger management programs. The program should consist of orientation in the form of cognitive-behavioral therapy, types of treatment that make use of cognitive restructuring and exposure techniques, group education for at least 8 times, and a prepared manual. The program's efficacy

was demonstrated to last for at least as long as 1 month.

Conflicts of Interest: None

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