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Effectiveness of a Six Session Stress Reduction Program for Groups

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Abstract

This study set out to determine the effectiveness of a six-week cognitive-behavioral stress reduction course for groups. Two groups (intervention group N=47; matched control group N=47) completed questionnaires on stress, depression, anxiety, worrying, and stress management skills pre- and post-intervention, at six months and at one year follow-up. Results showed decline for all symptoms in the intervention group (linear trends *ps* < .05), whereas stress management skills remained stable. Clinically significant and reliable change for almost 30% of participants confirmed these findings. No such change was found for the control group. Overall, the data showed small but reliable, long-lasting effects.

Keywords: stress reduction, psychoeducation, cognitive-behavioral, intervention, matched control design

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1. Introduction

In 1984, Lazarus and Folkman [1] defined psychological stress as "*... a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being.*" Almost three decades later, chronic stress is considered a major burden in modern society, compromising both physical and mental health [2]. High levels of self-perceived stress are, for example, closely related to several adverse health conditions like metabolic syndrome [3] and coronary heart disease [4, 5, 6]. There is also a clear link between high levels of stress and the subsequent onset of mental disorders such as depression [7, 8].

Considering the scope of the burden of stress, no health service will ever be able to provide adequate treatment for all, even in more affluent countries [9]. This emphasizes the need for large scale prevention, for example by reducing stress in the general population. In mental healthcare, prevention can be situated within a stepped-care approach. This represents an attempt to maximize the efficiency of resource allocation in therapy: Low threshold and low cost interventions are offered first, and more intensive and costly interventions are reserved for those who are not sufficiently helped by the initial intervention [10]. A recent meta-analysis including a variety of programs confirmed that the average participant of a stress reduction program obtains a significant reduction of perceived stress. When long-term changes are considered, however, results are less clear. The limited number of studies that include follow-up for up to six months or less find mixed results [11].

The current study therefore aims at consolidating the evidence base for stress reduction programs, both in the short and long term. In the present case, we are interested in how the intervention performs in the real-life context of communities, resembling common practice. This provides a more accurate view of intervention effectiveness in everyday life. The intervention itself is a stress reduction program, developed within the cognitive-behavioral therapy (CBT) tradition as an adaptation of a program by White [12] that was originally developed to reduce anxiety. It is being offered to large groups of self-registering community

dwellers. Since they self-register, participants may have various initial complaints and motivations constituting a heterogeneous group of participants with 'typical' elevated stress symptoms, but also participants with low levels of stress whose main interest is to learn more about stress and how it may affect them. Whereas White's course was more focused on curing participants with elevated complaint levels, the current course has therefore more characteristics of a selective preventive intervention.

The goal of the program is to reduce stress by altering the relationship between the person and the environment. More specifically, stress reduction is intended to occur through two main routes. One focuses on strengthening the participants' resources through developing social and self-management skills. The other attempts to change cognitive representations through targeting negative appraisals and unhelpful perseverative thinking, such as worrying and ruminating which may mediate the relationship between stressors and psychopathology [13]. Because the program aims to initiate a learning process, the reduction of stress-related symptoms is expected to occur gradually and to continue in the months following the intervention.

Changes were assessed through self-report questionnaires. Stress scores were considered as the primary outcome measure, depression and anxiety as secondary outcome measures, and reduction in worrying and increase in stress management skills as the means for stress reduction. We used a pre-post matched control design with two follow-up moments, one after six and one after 12 months. Because participants needed time to process all the information and practice the skills taught during the course, it was hypothesized that in the months following the intervention, a steady, gradual decline in worrying and a gradual increase in stress management skills would be accompanied by a decline in stress and depression and anxiety. The strongest effect is expected to occur for those participants who present themselves with higher levels of initial symptoms.

2. Method

2.1. Recruitment and screening

In order to participate, respondents had to reside in one of three regions in Flanders (Belgium). In each region, local organizations were contacted to help distribute information leaflets through their own networks and communication channels, including general practitioners, (sports) clubs, libraries and local press. Exclusion criteria were defined and potential participants who met at least one of these were informed that the current intervention might not completely suit their needs and that additional professional help might be necessary. Subsequently, they could decide to continue following the course or not, but they were always advised to contact the local centre for ambulatory mental healthcare. The centers were informed about these potential contacts and agreed to give these requests priority. If participants continued to follow the course, they were removed from the study sample. The exclusion criteria were the answers on (1) question 15 of the Web Screening Questionnaire [14] indicating suicidal tendencies (Answering 'I would do it given the opportunity' on the question whether the idea of harming yourself or taking your life, recently came into their mind), (2) the General Anxiety Disorder Questionnaire-7 [15] showing they suffered from a severe generalized anxiety disorder (15+ on a 21 point scale), (3) three questions of the Alcohol Use Disorders Screening Test [16] pointing to problematic substance abuse (which could lead to alcohol induced violence, endangering fellow participants). During the course, participants could also be excluded if the teacher-therapist noticed signs of psychotic disorders or severe deviant behavior.

To study long-term effects, the original goal was to randomly allocate participants to a stress management course or to a one-year non-intervention control group. This, however, raised practical and ethical concerns in local partners endangering course implementation: local partners were reluctant to advertise the study when half of the participants would be denied treatment for twelve months or would receive some kind of placebo treatment. A matching procedure was therefore used to collect control data instead of using randomized

non- or pseudo-intervention controls. In the matching procedure, a large sample was recruited from the general population through local newspapers, answering an advertisement to participate in a questionnaire study concerning their general well-being. Subsequently, a selected number of them were matched one-on-one to the course participants according to predetermined criteria: stress scores, depression and anxiety, as well as age, socioeconomic status and gender. Participants in this control group were not aware of the intervention and had not expressed an explicit desire to participate in the stress course. This design proved to be acceptable for local partners. It was subsequently also approved by the ethics committee of the Faculty of Psychology and Educational Studies of the University of Leuven. Controls received € 10 per data collection wave for participating.

2.2. Intervention

The intervention was an adaptation of a program called "Stress Control" [12, 17]. Teachers were trained psychologists from local centers for ambulatory mental healthcare. They led this course, which comprised six weekly lessons of two hours during which participants mostly listen and are not required to interact. In lesson 1, participants were offered general information on stress; it served as a general course introduction, followed by two homework assignments. For the first homework assignment participants needed to evaluate their own stress level, reaction patterns, and general well-being. This was followed by determining concrete goals they wanted to reach during the time of the course. A second homework assignment implied reading an overview of basic self-help tips and techniques that could help them with short–term stress reduction, including distraction, practicing sports, breathing exercises, and a proper diet. The goals of these homework assignments were to familiarize participants with the course, to help them apply the general information to their own personal situation, and to create a personalized frame of reference for the course content. This allowed course participants to select specific, relevant techniques presented in the following lessons. During lesson 2 they focused on the effects of stress on the body and controlling bodily sensations. After some theoretical background, participants learned the techniques of progressive relaxation and breathing exercises. Furthermore, the importance of active recreation was emphasized. In lesson 3 cognitive techniques were demonstrated and

participants focused on becoming aware of fallacies and challenging dysfunctional thoughts. In lesson 4 techniques were taught from problem-solving and participants learned how to confront their fears, end safety behaviors, and increase their assertiveness. In lesson 5 and the first part of lesson 6 the knowledge from Lesson 1 and the techniques learned in the previous lessons were rehearsed. These were subsequently applied those to problems of anxiety, panic, sleeping disorders and feelings of depression, and tension and burn-out. In the second part of Lesson 6, guidance was provided on how to control future stress.

2.3. Measures

The Depression Anxiety Stress Scales-21(DASS-21) [18], Dutch version by de Beurs, Van Dyck, Marquenie, Lange, and Blonk [19] is a 21-item self-report questionnaire measuring stress (7 items, α = .89) in the past week. Symptoms of depression (7 items, α = .94), and symptoms of anxiety (7 items, α = .91) are also considered as secondary outcome measures.

The Penn State Worry Questionnaire (PSWQ) [20], Dutch version by van Rijsoort, Vervaeke, and Emmelkamp [21] is a 16-item self-report questionnaire used to measure worrying on a five point Likert scale ranging from 1 ‘Not at all typical for me’ to 5 ‘Very typical of me’. The questionnaire has a high internal consistency both for normal (α = .90) and clinical (α = .86) populations.

The Coping Strategies Indicator (CSI) [22], Dutch version by Bijttebier and Vertommen [23] is a 33-item self-report questionnaire that measures three coping styles: problem-solving (11 items, α = .87), social support seeking (11 items, α = .90), and avoidance (11 items, α = .73). Because the course supports problem-solving and social support seeking and tries to diminish avoidance when faced with stress, this questionnaire is therefore suited to evaluate the change in stress management skills. The questionnaire uses a three point Likert scale (3 ‘a lot’, 2 ‘a little’, 3 ‘not at all’). The higher the scores, the more commonly a strategy is used. High scores are therefore considered positive for problem-solving and social support seeking, and negative for avoidance.

2.4. Course implementation

The intervention was implemented using a framework called empowerment

implementation. This strategy offers interventions room to be flexible to local needs, while still maintaining adherence to strict implementation guidelines. More details on the actual implementation and the underlying framework can be found in Van Daele, Van Audenhove, Hermans, Van den Bergh, & Van den Broucke [24].

2.5. Statistical analysis

All data were analyzed using SPSS (SPSS 16.0, IBM). Group by time interaction was evaluated using a generalized linear model (GLM) and compared self-reported symptoms and skills at each measurement point of the design. Furthermore, when group by time interactions were at least marginally significant ($p < .10$), group by trend-over-time interactions were also conducted, testing for linear and quadratic trends in the time variable.

Reliable and clinically significant changes were used as secondary measures for course effectiveness. According to Jacobson and Truax [25], the optimal way to determine clinically significant change is according to 'criterion C'. This method assumes that both the normal and the clinical population are normally distributed. In order to achieve clinically significant change (CSC), symptoms severity of participants should be closer to the mean score of the normal population than to those of the clinical population. Therefore, a cut-off score is determined. Because such a cut-off score is arbitrary and small changes may also lead to a change from one side of the cut-off score to the other, reliable change (RC) is used as an additional criterion. RC indicates that the change reported is larger than expected by chance. Both types of change are independent of one another, but the change aimed for is one that is both reliable and clinically significant. For this analysis, DASS-stress-scores were used to determine treatment effects, because for this questionnaire Dutch normative data were available both for the normal (M = 8.5, SD = 8.0) and clinical population (M = 15.8, SD = 9.8).

3. Results

3.1. Participants

Questionnaires were administered pre-intervention, post-intervention, after six months, and

one year after course completion. A total of 77 participants completed the first questionnaire. Two participants who had completed the first questionnaire dropped out after the first session, one due to lack of interest, the other due to unexpected surgery. Furthermore, based on the exclusion criteria, one participant with a suicide risk was informed that the intervention might not suit her needs and she was referred to a local centre for ambulatory mental healthcare. This participant nevertheless decided to continue following the course, but was removed from the study sample. Overall, 75 participants from three different locations (N = 28, N = 34 and N = 13) completed the course, of which 47 participants (63% of the completers) filled in the questionnaires at all four times. Their mean age was 44.1 years (*SD* = 10.1, range 21-63).

From a total of 158 controls that completed the questionnaire at pre-intervention, 139 (88%) completed the questionnaires at all four times. From these 139 controls, 47 were matched with the intervention participants within one standard deviation on depressive, anxiety and stress scores, as well as for age, socioeconomic status and gender. The mean age was 39.2 years (*SD* = 13.4, range 20-69). Other socio-demographics for both groups can be found in Table 1.

3.2. Missing data

By the end of the study 28 (37%) of the 75 completers had not returned one or more questionnaires and were therefore left out of the final analyses. These non-responders were compared to responders on pre-intervention scores for the DASS, PSWQ, and CSI. Only for stress management skills, a significant difference was found with non-responders having higher problem-solving scores, CSI-problem-solving: $F(1,73) = 4.20$, $p = .04$. Other measures did not show a difference between both groups. Overall, these analyses showed little difference between both groups, which makes the results outlined below relevant for the group of participants as a whole.

3.3. Course effectiveness

An overview of the data for all measurements can be found in Table 2. Analyses apply to all four repeated measures, which were done over the course of one year. Detailed results of all these group by time interactions, group by trend over time interactions and trend over time interactions can be found in Table 3, together with Cohen's *d*s for the intervention group at

post and one year follow-up.

Stress, depression and anxiety. When the group by time interaction was evaluated using GLM, no significant effect on stress scores was found. For the secondary outcome measures, a significant effect was found for depressive symptoms, but not for anxiety. Additionally, the group by trend-over-time interactions did show a clear trend for stress scores with a linear decline in the intervention group, which was absent in the control group. This was also the case for depressive symptoms, with a linear decline in the intervention group, whereas the control group remained stable. No such changes were found for anxiety.

Furthermore, the intervention group could be split into two: one group with higher and one group with lower initial symptoms. For each measure, the split value is determined as the value of the intersection point between the distributions of the normal and clinical population (Figure 1). When low (N = 12) and high (N = 35) stressed participants were compared using GLM, there was a strong group by time interaction, $F(3, 135) = 4.24$, $p = .007$. Similar results were found for low (N = 22) and high (N = 25) depressed participants, $F(3,135) = 4.70$, $p = .004$, and for low (N = 25) and high (N = 22) anxious individuals, $F(3, 135) = 6.05$, $p = .001$. Additional analyses on the group by trend-over-time interaction showed clear linear trends for stress $F(1, 45) = 9.61$, $p = .003$, depression, $F(1, 45) = 11.39$, $p = .002$, and anxiety, $F(1, 45) = 6.76$, $p = .013$, with participants with high levels of initial symptoms showing a decline, whereas patients with low initial levels remained stable or showed a limited increase.

Worrying. An analysis of the group by time interaction with GLM showed a strong effect on worrying. This was confirmed with an analysis on the group by trend-over-time interaction which showed a clear decline for the intervention group whereas the control group remained stable.

Stress management skills. When the group by time interaction was evaluated using GLM, a significant effect was found for problem-solving in which scores for the intervention group increased from pre to post followed by a limited decline at follow-up whereas those of the control group remained relatively stable. No such differences were found for social support or avoidance. Analyses on the group by trend-over-time interaction for stress management

however, were not significant for problem solving, social support seeking, nor avoidance.

3.4. Clinical significance

Clinical significance was evaluated using reliable and clinically significant change. DASS-stress-scores were used to determine treatment effects. The cut-off score for clinically significant change was determined at 11.7, which indicated that anyone above this score was considered within the range of the clinical population and anyone below this score was within the range of the normal population. Furthermore, in order for a change to be considered reliable – not attributable to chance – it had to be larger than 6.3. Initially, 85% of all participants reported stress symptoms within the range of the clinical population. At post intervention, 13% of these participants showed both a reliable and clinically significant change. After six months this number had increased to 23% and by the one year follow-up, 28% of the participants had undergone a reliable and clinically significant change. Because clinically significant change implied that participants had to be within the range of the clinical population, it is not surprising that 92% of the participants that underwent a clinically significant and reliable change were part of the group with higher initial symptoms mentioned earlier.

4. Discussion

This study aimed to investigate whether a six-week CBT stress reduction course for groups was effective in the long term in reducing stress and depression and anxiety, in decreasing worrying, and in increasing stress management skills. The results of the trend analyses indicated a linear decline of stress and depression in the intervention group from pre-intervention to post-intervention and further on through follow-up. These effects were not observed in the non-intervention group. There was also a strong linear decline in worrying, but only little change in stress management skills. Furthermore, measures of clinical significance showed that almost 30 percent of all course participants experienced a clinically significant and reliable change in the year following the course. Finally, the strongest effect occurred for those participants who presented themselves with higher levels of initial

symptoms.

The overall modest mean effects seem to be due to the high amount of variation on all measures between participants. Evidence for this explanation can be found in the comparison of stress, anxiety and depression between participants with low and high initial symptoms, in which participants with high initial levels show a much stronger continuous and gradual decline of symptoms, whereas participants with low initial symptoms remained stable. This is in line with other stress management programs that intend to realize long-term changes and which find effects up to four years after the intervention [26, 27]. The course therefore appears to initiate a long-term process characterized by gradual declines in self-reported symptoms. However, these declines were not strong enough to find significant effects for all symptoms at all times using a GLM. Furthermore, participants who present themselves with higher initial symptoms might have chosen to follow the intervention at a time of high life stress, which then would have subsided naturally, anyway, even without participating. Such competing factors and life experiences that might affect these aspects in a person's life can never be ruled out completely.

Promising however is the fact that the reduction in symptoms was also accompanied by a strong decline in worrying, one of the two mechanisms deliberately targeted by the intervention. The other mechanism focused on the improvement in stress management techniques of participants, which showed little difference. The absence of an effect could be because the CSI might not be that well suited as a questionnaire to measures general changes in stress management skills. Since participants were asked to report how they managed a specific problem they encountered in the month preceding the time of completing the questionnaire, it might be that stress management in highly specific situations was reported, as opposed to the more general stress management skills that were intended. An alternative explanation is that the primary focus of the intervention was on psychoeducation and less on the actual skill training: participants were expected to practice at home in real life situations. Since this was not a controlled environment, feedback could not be delivered immediately and teachers had little control over whether course participants actively used the acquired stress management techniques in their home situations, an intervention aspect that should be

improved in future versions. This would imply that it might be the reduction in worrying that is primarily responsible for the decline in symptoms. Because the current design does not allow making causal inferences, a focus for future research would therefore be to determine the mechanisms through which the symptom reduction is accomplished and potentially improve the skill training component in order to make it (more) effective.

Finally, the present study did not make use of random allocation of participants, because looking into the long-term effectiveness of the intervention would have required withholding (wait list) control participants from following the course for over a year, which was not acceptable for the organizations promoting the course locally. In addition, random allocation to an intervention or control group is difficult for any study planning to do a long-term follow-up. A matched control design therefore turned out to be the most practical and ethical solution. While in a randomized controlled trial (RCT) initial conditions in both groups are equalized, including the motivation to participate in a course, the latter aspect was not present in our control group. Neither did they receive some kind of bogus or placebo treatment. However, we used a matched control design in which we tried to control for a wide range of variables related to participant's initial level of symptoms, as well as their socio-demographics. Balancing both the need for long term follow-up and randomized allocation of participants to non-intervention conditions may prove to be a difficult task.

Overall, the main conclusion of this study is that there are preliminary indications that the intervention has substantial long-term effects on participants' stress and anxiety and depression, especially for those who have higher initial symptoms and as far as up to one year after the intervention. It furthermore also shows that the effectiveness of "interventions in the field" that focus on self-registering community dwellers should be interpreted carefully. The heterogeneous groups they attract might not only include people who participate in order to obtain an immediate reduction of high symptoms, but also those who have low level symptoms and follow the course in order to prevent future symptoms. Especially the latter group could be responsible for an underestimation of intervention effectiveness if they are not specifically taken into consideration, as this might cause floor effects.

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Table 1

Sociodemograpics for intervention group (N = 47) and matched control group (N = 47) in percent

		Group	
		Intervention	Matched control
Marital status	Not married	13	49
	Married or living together	68	36
	Widowed or Divorced	19	15
Degree	Lower secondary education (or less)	8	6
	Higher secondary education	26	28
	Higher education	66	66
Gender	Male	17	17
	Female	83	83

Table 2

Evolution of intervention group (N = 47) and matched control group (N = 47)

	May '10		June '10		December '10		June '11	
Questionnaire	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*
Intervention group								
DASS								
Stress	17.5	(9.4)	15.2	(8.3)	14.0	(9.0)	13.7	(9.9)
Depression	11.2	(9.2)	9.9	(9.1)	9.2	(9.5)	7.7	(8.3)
Anxiety	8.5	(8.0)	7.2	(6.1)	7.1	(8.3)	7.0	(8.4)
PSWQ (worrying)	56.5	(12.7)	52.6	(11.7)	51.7	(12.9)	49.2	(10.7)
CSI (coping)								
Problem solving	24.1	(6.0)	26.0	(5.7)	25.8	(4.7)	24.9	(4.8)
Social support seeking	23.6	(6.4)	24.9	(4.1)	24.9	(5.3)	24.5	(4.3)
Avoidance	18.9	(4.6)	17.4	(4.1)	18.7	(4.2)	20.1	(2.7)
Matched control group								
DASS								
Stress	12.6	(7.9)	11.4	(6.4)	11.8	(8.4)	13.4	(7.4)
Depression	7.5	(8.5)	5.4	(5.4)	7.5	(8.5)	7.8	(7.3)
Anxiety	5.9	(5.5)	5.7	(5.8)	5.4	(6.3)	5.0	(6.3)
PSWQ (worrying)	48.4	(12.2)	49.2	(11.4)	49.1	(12.0)	48.7	(11.9)
CSI (coping)								
Problem solving	23.5	(4.4)	23.9	(5.5)	21.5	(5.8)	23.6	(4.5)
Social support seeking	22.8	(5.8)	23.4	(5.5)	22.7	(5.5)	22.5	(5.9)
Avoidance	17.3	(3.9)	16.1	(3.6)	17.4	(4.5)	16.9	(4.2)

Table 3

F-values for group by time interactions, group by trend over time interactions and trend over time interactions and Cohen's d for the intervention group at post and 1-year follow-up for each of the subscales.

	Analyses					
	Group by		Trend over time		Cohen's *d*	
Questionnaires	Time	Trend over time	Intervention	Control	at post	at follow-up
DASS [1, 2, 5, 5]						
Stress	2.1	5.3 *	7.6 *	< 1	.14	.40
Depression	2.7 *	5.4 *	7.1 *	< 1	.18	.18
Anxiety	< 1	< 1			.26	.39
PSWQ (worrying) [1, 2, 5, 5]	5.6 ***	13.2 ***	21.1 ***	< 1	.32	.62
CSI (coping) [3, 4]						
Problem solving	2.95 *	< 1			.41	.20
Social support seeking	< 1	1.2			.24	.16
Avoidance	2.3	3.1			.34	.32

* $p < .05$, ** $p < .01$, *** $p < .001$, [1] $df = 276$, [2] $df = 92$, [3] $df = 264$, [4] $df = 88$, [5] df = 46