

Suzanne de Veer, André Brouwers, Will Evers & Welko Tomic
The Open University, Heerlen

A Pilot Study of the Psychological Impact of the Mindfulness-Based Stress Reduction Program on Persons who Stutter

ABSTRACT

In general, people who stutter feel hampered in their communication with others and suffer from stress and anxiety when they have to speak. The Mindfulness-Based Stress Reduction (MBSR) program has proved to be successful in reducing stress, fear and anxiety in many studies involving a large variety of subjects.

The aim of this pilot study was to examine the psychological impact of the MBSR program on persons who stutter by reducing the subjects' stress and anxiety about speech situations and improving their self-efficacy beliefs, coping behavior, locus of control and attitude towards such situations.

37 persons who stutter (29 males and 8 females) completed the MBSR program. They were matched according to sex, age and education before being divided at random into two groups: a trained group and a waiting list group. The waiting list group also received training, but at a later date. Measurements were taken before the MBSR program began, immediately after it had ended and, finally, four weeks after its conclusion.

Stress was measured on the Perceived Stress Scale (PSS; COHEN, KAMARCK & MERMELSTEIN, 1983), anxiety about speech situations by means of the Speech Situation Checklist (SSC; BRUTTEN, 1975), stutterers' confidence for entering and maintaining fluency in a variety of speaking situations on the Self-Efficacy Scale for Adults who Stutter (SESAS; ORNSTEIN & MANNING, 1985), coping by means of the Perceptions of Stuttering Inventory (PSI; WOOLF, 1967), locus of control on the Locus of Control of Behaviour Scale (LCB; CRAIG, FRANKLIN, & ANDREWS, 1984) and attitude towards speech situations on the condensed S-scale (S-24; ANDREWS & CUTLER, 1974).

The results showed that immediately after the MBSR program and four weeks later, the program participants appeared to suffer less from stress and related complaints such as tension and fatigue; they showed less anxiety about speech situations, displayed more confidence in approaching speech situations (self-efficacy trust), felt more in control of life events (locus of control), increasingly used a decisive problem-oriented coping style (problem-oriented coping) and had a more positive attitude towards speech situations. The

effect sizes ranged from average (self-efficacy beliefs, coping and attitude towards speech situations) to large (stress, anxiety and locus of control).

The findings of the present study show that the participants suffered less than before from stress and anxiety about speech situations, had developed a more positive attitude towards speech situations, appeared to have improved levels of internal locus of control and showed a problem-focused coping behavior. Thus, it can be concluded that the MBSR program might offer a meaningful supplement to stuttering therapy.

Keywords: Mindfulness-Based Stress Reduction; Stutterers; Stress; Anxiety; Self-Efficacy; Coping; Locus of Control

Introduction

The present study examined the psychological impact of the Mindfulness-Based Stress Reduction (MBSR) program on persons who stutter by reducing stress and anxiety about speech situations and improving self-efficacy beliefs, coping behavior, locus of control and attitude towards speech situations. An extensive search in Medline, PsychINFO and Eric led to the conclusion that the MBSR program had never been examined for its effectiveness with persons who stutter. Nonetheless, since stress is believed to be a causal or conducive factor in stuttering, the MBSR program could be helpful (BLOODSTEIN, 1993; BRUTTEN & SHOEMAKER, 1969; CARUSO, 1994; CRAIG, 1990), particularly as persons who stutter have significantly higher scores regarding over-sensitivity to interpersonal stress than those who do not stutter (GREINER & FITZGERALD, 1985; TURNER, DITOMASSO, & MURRAY, 1980) and the MBSR program was specifically developed to reduce stress levels and train participants to be able to cope with stress (KABAT-ZINN, 1990).

Given the various interfering effects that stress has been found to have on the ability to speak fluently, stuttering therapy often involves relaxation exercises (GILMAN & YARUSS, 2000). Such exercises may be useful, but only if they are designed to do more than simply help develop self-control. Relaxation exercises can only be of use in stuttering therapy if they teach the one who stutters how to pay careful attention to what is happening when he or she speaks (GILMAN & YARUSS, 2000).

The MBSR program is an eight-week training course consisting of two and a half hour sessions that focus on teaching its participants how to relax attentively (Kabat-Zinn, 1990). Although the MBSR program was originally developed for patients suffering from the stress and pain caused by physical complaints (KABAT-ZINN, 2003), it was later also used and studied in patients of various other medical settings. It became clear that the program was effective at treating chronic pain (KABAT-ZINN, 1982; KABAT-ZINN, LIPWORTH & BURNEY, 1985; SAGULA & RICE, 2004), anxiety and panic disorders (MILLER, FLETCHER & KABAT-ZINN, 1995; KABAT-ZINN, MASSION, KRISTELLER, PETERSON, FLETCHER, PBERT, LINDERKING & SANTORELLI, 1992), fibromyalgia (KAPLAN, GOLDBERG &

GALVIN-NADEAU, 1993), psoriasis (KABAT-ZINN & WHEELER 1998) and several cancer-related psychosomatic complaints (SPECIA, CARLSON, GOODEY & ANGEN, 2000; SAXE, HEBERT, CARMODY, KABAT-ZINN, ROSENZWEIG, JARZOBOSKY, REED & BLUTE, 2001; CARLSON, SPECIA, PATEL & GOODEY, 2003; TACON, CALDERA & RONAGHAN, 2004; MASSION, TEASDALE, HEBERT, WERTHEIMER & KABAT-ZINN, 1995). TEASDALE, SEGAL AND WILLIAMS (1995), who adapted the program to suit patients suffering from depression, found in their studies that subjects trained by this program had fewer depressive complaints and were less prone to suffer a relapse than the comparative group (WILLIAMS, TEASDALE, SEGAL & SOULSBY, 2000; MA & TEASDALE, 2004; TEASDALE, SEGAL, WILLIAMS, RIDGEWAY, SOULSBY & LAU, 2000; TEASDALE, POPE, MOORE, HAYHURST, WILLIAMS & SEGAL, 2002).

The psychological impact of the MBSR program is apparent with a number of variables. First, it reduced stress, anxiety and trait anxiety in both clinical and non-clinical groups (MILLER, FLETCHER & KABAT-ZINN, 1995; SHAPIRO, SCHWARTZ & BONNER, 1998; CHANG, PALESH, CALDWELL, GLASGOW, ABRAMSON, LUSKIN, GILL, BURKE & KOOPMAN, 2004; SHAPIRO, ASTIN, BISHOP & CORDOVA, 2005; KABAT-ZINN, MASSION, KRISTELLER, PETERSON, FLETCHER, PBERT, LINDERKING & SANTORELLI, 1992). Several studies have shown that persons who stutter feel more anxious than those who do not, appear to have more trait anxiety and stutter more due to these fears (EZRATI, 2004; CRAIG, 1990; FITZGERALD ET AL., 1992; LEITH, MAHR & MILLER, 1993). Stutterers would therefore seem to be persons who could benefit from the MBSR program.

Second, the MBSR program appears to be effective at improving self-efficacy beliefs. Studies have shown significant improvements in self-efficacy beliefs in various domains of functioning – and consequently in motivation and the self-evaluated skill of considering stressful situations as a challenges rather than a threat (KABAT-ZINN, 1993; CHANG ET AL., 2004). In view of both the relatively close relationship between self-efficacy scores and subsequent fear of speaking (JAREMKO, 1980) and the empirical finding that persons who stutter have less self-confidence in speech situations and in their ability to preserve fluency in such situations (ORNSTEIN & MANNING, 1985), persons suffering from speech-related disorders are likely to benefit from the MBSR program. Following ORNSTEIN AND MANNING (1985), the present study linked the self-efficacy beliefs of persons who stutter with two domains of functioning: (1) the ability to approach various speech situations and (2) the ability to maintain a certain degree of fluency in those situations.

Third, the MBSR program appears to be effective at helping people to tackle problems energetically. Empirical findings have shown that MBSR participants used more problem-focused and fewer emotionally-focused coping strategies (GROSSMAN ET AL., 2004; SAGULA & RICE, 2004). How persons who stutter respond to stress seems to be closely connected to their coping strategies (BLOOD ET AL., 1997), and they exhibit a wider variety of speech-related coping responses than those who do not stutter (VANRYCKEGHEM, 2004). It was therefore thought that stutterers could benefit from the MBSR program regarding these variables.

Fourth, several studies have shown that the MBSR program has a positive effect on the locus of control. At the end of the program, persons who stutter felt more in control of controllable situations and were better able to let go and accept situations beyond their control (ASTIN, 1997; TACÓN, CALDERA & RONAGHAN, 2004; TACÓN, MCCOMB, CALDERA & RANDOLPH, 2003; DOWNEY, 1991). Persons who stutter often describe stuttering as something that happens to them and claim that it is more or less beyond their control (VAN RIPER, 1971). Furthermore, for quite some time now an internal locus of control has been considered as an important factor indicating progress in stuttering therapy (DE NIL & KROLL, 1995; ANDREWS & CRAIG, 1988). It is therefore very important to examine whether participants in the MBSR program show a significant increase in their internal locus of control.

The present study also examined whether the MBSR program produced any changes in the subjects' attitude towards speech situations. It appears that in stutterers the evaluation of their own and of other people's communicative possibilities is consistently ineffective and inaccurate (WATSON, 1995). The less accurate the evaluations are, the less confidence these persons show when starting a conversation. Since the MBSR program reinforces both behavioral and mental performance (KABAT-ZINN, 1993; CHANG, 2004), MBSR participants can be expected to have a more positive attitude towards their own communicative capabilities and the communicative process in general.

The purpose of this study is to clarify, by empirical means, the psychological impact of the MBSR program on stutterers. Based on the foregoing studies on its effectiveness, the MBSR program can be expected to have significant positive effects on the participants regarding stress, anxiety about speech situations, self-efficacy beliefs, coping strategies, locus of control, attitudes towards speech situations and the way they assess their ability to speak fluently.

Method

Design

Two groups of persons who stutter were compared: an experimental group, hereinafter referred to as FTG (*first-trained group*), and a waiting list control group, who were trained later, hereinafter referred to as STG (*second-trained group*). FTG was subjected to the MBSR pro-

Table 1. Experimental design

Treatment condition	Time of measurement					
	T1	T2	T3	T4	T5	
First-trained group	O1A	X	O2A	4 weeks	O3	
Second-trained group	O1B	O2B	X	O4	4 weeks	O5

Note: T = time of measurement, O = observation, X = MBSR program conducted

gram between the pre-test (O1A) and the first post-test (O2A) (see Table 1). Four weeks after O2A, a second post-test was conducted (O3). The STG members were subjected to the MBSR program after FTG's O2A. In order to have the STG function as a control group, the members were tested at two different points in time (O1B and O2B) *before* they took part in the MBSR program, i.e. at the same time as FTG's O1A and O2A. As in the case of FTG, post-tests were conducted immediately after the MBSR program (O4) and four weeks later (O5). The same instruments were used in each case (O1-O5). The time lag between O1A and O2A was identical with the time lag between O2B and O4, that is eight weeks.

Participants

After the researchers had contacted institutions for stuttering therapy and patients' associations, 37 persons who stutter volunteered to participate (self-selected sample). The participants' mean age was 36.57 (SD = 12.97); 29 were men (78%) and 8 were women (22%). They were matched according to gender, age and education, and then divided at random into two groups, one of 19 persons (FTG), and one of 18 persons (STG). Compared to STG, FTG showed no significant differences with respect to gender ($\chi^2(1) = .51, p = .48$), age ($t = .84, p = .81$) or education ($\chi^2(1) = 2.85, p = .24$). Both groups were heterogeneous with regard to highest educational level and the type of therapy their members had already received. All participants had undergone speech therapy, psychotherapy and a number of different stutter therapies.

Instruments

Stress was measured on the Perceived Stress Scale (PSS; COHEN, KAMARCK & MERMELSTEIN, 1983). The PSS measures the perceived degree of stress as experienced one month prior to performance of the MBSR program, and consists of 14 items scored on a five-point Likert scale ranging from 0 (never) to 4 (very often). PSS scores were obtained by re-coding the scores of seven positive items and then adding up the scores of all 14 items. High scores suggested high levels of stress. Research by COHEN ET AL. (1983) and KOOPMAN ET AL. (2000) produced means varying between 23.18 and 25.00, and internal consistencies between .84 and .86. Cronbach's Alphas in this study were .83, .74, .57, .67 and .60 (observations 1 to 5). An example of an item is "How often have you been thinking about things you still have to finish?"

Anxiety about speech situations was measured using the Speech Situation Checklist (SSC; BRUTTEN, 1975), which measures the extent to which specific situations provoke negative feelings and/or non-fluency. It consists of two parts: Emotional Reaction (ER) and Speech Disruption (SD), of which only the first part (ER) was used. Participants were asked to indicate to what extent they perceive negative feelings in 51 situations. The items depict situations that usually raise negative emotions in persons who stutter. The degree of negative emotion is scored on a five-point Likert scale ranging from 1 (not at all) to 5 (very much). In a study on the reliability of the SSC, BRUTTEN (1975) found a Cronbach's Alpha of .96 for this part of the

instrument. Cronbach's Alphas in this study were .95, .96, .96, .98 and .95 (observations 1 to 5). An example of an item is "To order something in a restaurant."

Self-efficacy beliefs about approaching speech situations and maintaining fluency in such situations were measured on the Self-Efficacy Scale for Adults who Stutter (SESAS; ORNSTEIN & MANNING, 1985). The SESAS measures the confidence stutterers have in both their ability to approach various speech situations (approach attitude) and their ability to maintain fluency in these situations (fluency performance). The SESAS consists of two sub-scales, i.e. the approach attitude and the fluency performance, each consisting of the same 50 items, scored on a ten-point Likert scale ranging from 10 to 100. ORNSTEIN AND MANNING (1985) found in their SESAS study that persons who stutter have significantly lower scores in both dimensions than those who do not stutter. In this study, Cronbach's Alphas in the approach attitude dimension were .96, .98, .97, .98 and .96 (observations 1 to 5); Cronbach's Alphas in the fluency performance dimension were .97, .97, .98, .99 and .98, respectively. An example of an item is "To ask a friend to take you to the airport."

Coping was measured on the "avoidance" sub-scale of the Perceptions of Stuttering Inventory (PSI; WOOLF, 1967). This sub-scale consists of 20 items each scored with "true" or "not true." WOOLF (1967) used the following standard for this sub-scale: light (0-7), light to moderate (8-11), moderate to serious (12-15) and serious (16-20). The PSI is a variation of ROTHENBERG'S (1963) "Perceptions of stuttering"; Rothenberg found a test-retest reliability for this sub-scale of .89. Cronbach's Alphas in this study were .81, .80, .79, .83 and .82 (observations 1 to 5). An example of an item is "To choose a job or hobby that is characterized by little speech."

Locus of control was measured on the Locus of Control of Behavior Scale (LCB; CRAIG, FRANKLIN & ANDREWS, 1984). The LCB measures the degree of responsibility a person shows regarding the way he or she copes with personal problems, and shows the individual's internal-external locus of control ratio. The LCB consists of 17 statements on personal convictions that are measured on a six-point Likert scale ranging from 1 (disagree very much) to 6 (agree very much). Ten statements relate to the external, seven to the internal locus of control. Before scaling, items referring to the external locus of control were re-coded. High scores referred to high levels of internal locus of control. PATRAKA (2000) found a one-week test-retest reliability of .90 among a non-clinical group, and a six-week test-retest reliability of .73 among a waiting list group. Cronbach's Alphas in this study were .63, .81, .77, .69 and .70 (observations 1 to 5). An example of an item is "People are victims of circumstances that they can't alter a bit."

Attitude towards speech situations was measured on the shortened S-scale (S-24; ANDREWS & CUTLER, 1974), which is in turn based on ERICKSON'S S-scale (1969). The S-scale measures to what extent an individual's negative attitude plays a role in verbal communication. The shortened S-scale is made up of 24 statements that were scored with "true" or "not true". Total scores were obtained by re-coding negatively formulated items and then adding up all scores. The higher the individual's score, the more positive his attitude towards himself and his speech.

Cronbach's Alphas in this study were .75, .84, .79, .85 and .71 (observations 1 to 5). An example of an item is "I feel nervous when I am speaking."

Procedure

A recruitment advertisement was placed on the website of the patients' association Demosthenes and the Dutch Federation on Stuttering, and redirected to contacts of self-help groups and stutter therapists working for stuttering centers in the Netherlands. In addition, the key Dutch institutions for stuttering therapy were contacted. The contact persons were asked to draw their clients' attention to the study. Prospective participants had to meet certain criteria: thorough command of the Dutch language, at least 16 years of age, not addicted to alcohol and/or drugs and not suffering from psychopathological disorders such as schizophrenia or other psychotic symptoms. Participation was voluntary. Every individual who applied was interviewed upon his or her admission by the first author of this paper and the MBSR trainer. The topics discussed in the interview included the influence of stuttering on the person's daily routine, education and experiences with stuttering therapy.

The MBSR program

The MBSR program consisted of eight weekly sessions of 2.5 hours each (KABAT-ZINN, 1990), during which the participants did the following exercises: (1) a body scan, meant to get them to pay systematic attention to the whole body and simultaneously perceive sensations in various parts of the body, (2) yoga exercises involving stretching and striking poses to increase awareness of the muscular system and (3) sitting meditation, during which the participant's attention is drawn to breathing, physical sensations, thoughts and emotions. After the first, third and fifth session the participants were also given a compact disc with the body scan, yoga and sitting meditation exercises. In a personal admission interview preceding the MBSR program, participants were told that they were expected to spend at least 45 minutes a day, six days a week doing one or more of the exercises. The MBSR training was conducted by the first author; she had previously undergone an MBSR trainer program and practiced the MBSR exercises every day.

Results

Effects on the first post-test

To find out whether the first-trained group (FTG) differed from the second-trained group in the first FTG post-test (O2; Table 1), the researchers also computed repeated ANOVA measurements (Table 2). The ANOVA results of the mean scores at O2A and O2B (dependent variables), the mean scores at O1A and O1B (covariates) and the condition (FTG or STG) as a fixed factor revealed significant differences in stress ($F = 16.95$, $p < .001$), anxiety about speech situations ($F = 13.81$, $p < .01$), self-efficacy trust ($F = 10.66$, $p < .01$), locus of con-

Table 2: Means, standard deviations and ANOVA results (N = 37)

Variable	Condition	O1A & O1B M (SD)	O2A & O2B M (SD)	O3 M (SD)	O4 M (SD)
Stress	FTG	25.29(6.91)	19.35(3.74)	17.82(4.28)	
	STG	24.72(6.57)	25.28(5.58)		19.17(4.41)
Anxiety	FTG	2.39(.37)	1.99(.32)	2.10(.52)	
	STG	2.68(.61)	2.53(.62)		2.31(.63)
Self-efficacy trust	FTG	66.28(9.81)	72.23(11.75)	72.43(9.90)	
	STG	62.63(9.99)	57.66(13.35)		64.80(10.81)
Self-efficacy fluency	FTG	57.42(9.07)	63.80(8.79)	67.73(10.59)	
	STG	58.17(10.93)	58.61(10.89)		64.10(14.14)
Locus of control	FTG	72.92(5.50)	75.00(7.59)	75.38(8.37)	
	STG	78.50(8.26)	67.69(7.79)		74.92(6.62)
Coping	FTG	12.00(4.11)	13.26(3.57)	14.58(3.81)	
	STG	12.44(4.44)	12.00(4.23)		13.00(4.16)
Attitude towards speech situations	FTG	9.32(4.37)	12.11(4.67)	11.95(4.63)	
	STG	8.22(4.08)	7.44(4.51)		11.77(5.60)

Note. FTG = first-trained group; STG = second-trained group; O1A & O1B = pre-test of first-trained group and first trained group; O3 = second post-test of first-trained group; O4 = first post-test of second-trained group;

trol ($F = 11.83, p < .01$), coping ($F = 5.05, p < .05$) and attitude towards speech situations ($F = 14.47, p < .01$). However, no significant difference was found in self-efficacy fluency ($F = 3.29, p = .08$). In other words, immediately after the training the first-trained group appeared to have significantly higher mean scores regarding “confidence in their ability to approach different speech situations” (Self-Efficacy Trust), but not with respect to “confidence in their ability to continue fluency in these situations” (Self-Efficacy Fluency).

Since the sample comprised persons who have put themselves in the sample, it was impor-

		Comparison between first-trained group and not-yet-trained group at post-test 1				Comparison between the two trained groups at post-test 1			Comparison between the two trained groups at post-test 2		
	O5 M (SD)	ANOVA			Cohen's <i>d</i>	ANOVA			ANOVA		
		F	df	p		F	df	p	F	df	p
	17.50(4.30)	16.95	1,35	<.001	1.07	.02	1,35	.89	.05	1,35	.82
	2.23(.51)	13.81	1,35	<.01	1.16	3.45	1,35	.07	.07	1,35	.77
	63.64(8.64)	10.66	1,35	<.01	0.55	2.64	1,35	.12	5.38	1,35	<.05
	63.43(10.75)	3.29	1,35	.08	0.71	3.29	1,35	.08	1.85	1,35	.19
	73.63(6.40)	11.83	1,35	<.01	0.76	.20	1,35	.66	.57	1,35	.45
	13.67(4.35)	5.05	1,35	<.05	0.48	.11	1,35	.74	.76	1,35	.39
	11.94(4.21)	14.47	1,35	<.01	0.62	.62	1,35	.42	2.13	1,35	.15

pre-test of second-trained group; O2A & O2B = first post-test of first-trained group and second pre-test of second-trained group
O5 = second post-test of second-trained group

tant to supplement significance testing with information about effect sizes. Cohen's *d* was computed to determine the magnitude of the differences between the pre- and post-tests. COHEN (1977) defined *d* as the difference between the means divided by the standard deviation of either group. As Table 2 shows, these differences range from average to large. The effects on anxiety, stress and locus of control were large ($d = 1.16$; 1.07 ; and 0.76 , respectively); average differences were found on self-efficacy trust, coping and attitude towards speech situations ($d = 0.55$; 0.62 ; and 0.48 , respectively).

Durability of the effects

To determine the durability of the effects after a four-week time lapse, *t*-tests were performed on the first-trained group's scores in the two post-tests. The means were not expected to differ significantly, or if they did, only in such a way that the differences could be interpreted as an increased effect on the relevant variable. As expected, the means of the following variables of the first-trained group in the first post-test did not differ significantly from those in the second post-test: anxiety ($t = 1.65$, $p = .12$; $M = 1.99$, $SD = .32$ and $M = 2.10$, $SD = .51$, respectively), self-efficacy trust ($t = .18$, $p = .86$; $M = 72.23$, $SD = 11.75$ and $M = 72.43$, $SD = 9.90$, respectively), locus of control ($t = 3.15$, $p = .76$; $M = 75.00$, $SD = 7.59$ and $M = 75.38$, $SD = 8.37$, respectively) and attitude towards speech situations ($t = .42$, $p = .68$; $M = 12.11$, $SD = 4.67$ and $M = 11.95$, $SD = 4.62$, respectively). Likewise, the results obtained for the following variables also appeared to be in line with the expectations, as they showed significant differences, for example that the means of the second post-test were improved as compared to those of the first post-test: stress ($t = -2.78$, $p < .05$; $M = 19.35$, $SD = 3.74$ and $M = 17.82$, $SD = 4.28$, respectively), self-efficacy fluency ($t = -2.40$, $p < .05$; $M = 63.80$, $SD = 8.80$ and $M = 68.15$, $SD = 10.82$, respectively) and coping ($t = -2.65$, $p < .05$; $M = 13.26$, $SD = 3.57$ and $M = 14.58$, $SD = 3.81$, respectively). Stress was significantly lower, whereas both self-efficacy fluency and coping levels were significantly higher in the second post-test than in the first post-test.

The same analyses were performed on the scores obtained by the second-trained group in both post-tests. As expected, the means of the following variables of the second-trained group in the first post-test did not differ significantly from those in the second post-test: self-efficacy trust ($t = .44$, $p = .67$; $M = 64.80$, $SD = 10.81$ and $M = 64.58$, $SD = 9.65$, respectively), self-efficacy fluency ($t = -.05$, $p = .97$; $M = 64.10$, $SD = 14.14$ and $M = 64.13$, $SD = 12.96$, respectively), locus of control ($t = -3.56$, $p = .73$; $M = 74.92$, $SD = 6.62$ and $M = 73.63$, $SD = 6.40$, respectively), coping ($t = 1.94$, $p = .07$; $M = 13.00$, $SD = 4.16$ and $M = 13.67$, $SD = 4.35$, respectively) and attitude towards speech situations ($t = .96$, $p = .35$; $M = 11.77$, $SD = 5.60$ and $M = 11.65$, $SD = 3.95$, respectively). Likewise, the results obtained for the following variables were also in line with the expectations, as they showed significant differences, for example that the mean scores in the second post-test were once again improved as compared to those in the first post-test: stress ($t = 2.76$, $p < .05$; $M = 19.17$, $SD = 4.41$ and $M = 17.50$, $SD = 4.30$, respectively) and anxiety about speech situations ($t = 2.43$, $p < .05$; $M = 2.31$, $SD = .63$ and $M = 2.23$, $SD = .51$, respectively).

Comparison of effects between the two trained groups

To find out whether the effects of the MBSR program were identical in both groups, the researchers computed repeated ANOVA measurements using the means of scores in the first (O2A and O4 in Table 1) and second post-tests (O3 and O5 in Table 1) (dependent variables), the pre-tests (O1A and O2B in Table 1) (covariates) and the condition (fixed factor). As Table

2 shows, there were no significant differences regarding stress ($F = .02$, $p = .89$ and $F = .05$, $p = .82$, respectively), anxiety about speech situations ($F = 3.45$, $p = .07$ and $F = .07$, $p = .77$, respectively), self-efficacy fluency ($F = .22$, $p = .64$ and $F = 1.85$, $p = .19$, respectively), locus of control ($F = .20$, $p = .66$ and $F = .57$, $p = .45$, respectively), coping ($F = .11$, $p = .74$ and $F = .76$, $p = .39$, respectively) and attitude towards speech situations ($F = .62$, $p = .42$ and $F = 2.13$, $p = .15$, respectively). Likewise, in the first post-tests, self-efficacy trust did not differ significantly between the two groups after they had participated in the program ($F = 2.64$, $p = .12$). In the second post-tests, however, the difference was significant ($F = 5.38$, $p = .03$). The first-trained group showed an increased effect on self-efficacy trust in the four-week period between the two post-tests, whereas the second-trained group showed a slight, but not significant weakening of the effects.

Discussion

The present study examined the psychological impact of the MBSR program on persons who stutter with respect to stress, anxiety about speech situations, self-efficacy beliefs, coping, locus of control and attitude towards speech situations. The results showed that immediately after the eight-week MBSR program as well as four weeks later, the participating persons who stutter suffered less from stress and related complaints such as tension and fatigue, appeared to have less anxiety about speech situations, had more confidence in their ability to approach speech situations (self-efficacy trust), perceived themselves to be more in control of life events (locus of control), were less likely to avoid certain situations or problems (improvement in problem-focused coping) and had a more positive attitude towards speech situations. However, the stutterers trained were not significantly more confident in their ability to retain fluency in speech situations (self-efficacy fluency) than those who were not trained (but received training later).

Immediately after the MBSR training, the participating persons who stutter appeared to suffer significantly less than before from stress and anxiety about speech situations. Although stress and anxiety had already decreased considerably (Cohen's d 's were 1.07 and 1.16, respectively), the reduction was even increased four weeks later. The effects of the program on stress and anxiety were also the same for both groups. The finding that stress and anxiety had diminished considerably corresponds with the results of studies by MILLER, FLETCHER & KABAT-ZINN (1995); SHAPIRO, SCHWARTZ & BONNER (1998); CHANG ET AL. (2004); SHAPIRO, ASTIN, BISHOP & CORDOVA (2005) and KABAT-ZINN, MASSION, KRISTELLER, PETERSON, FLETCHER, PBERT, LINDERKING & SANTORELLI (1992). It means that persons who stutter may indeed benefit from the MBSR program, because the less stress and anxiety they experience, the more fluently they speak (LEITH, MAHR & MILLER, 1993).

After participating in the MBSR program, persons who stutter appeared to have more confidence in their ability to manage speech situations (i.e. Self-Efficacy Trust). With regard to this

particular domain of self-efficacy beliefs, the effect of the MBSR program was of average magnitude (Cohen's $d = .55$). Although the participants also showed higher means in the other domain of self-efficacy beliefs (Self-Efficacy Fluency), the scores were not significantly higher than those obtained before the training. Except for Self-Efficacy Trust, the effects of the MBSR program regarding either domain of self-efficacy beliefs did not differ significantly between the two trained groups. The fact that participation in the MBSR program resulted in an increase in self-efficacy beliefs, i.e. in the trust domain, concurs with other research on the MBSR or similar programs (JUNKIN, KOLOWALSKI & FLEMING, 2007; OMAN, SHAPIRO, THORESEN, FLINDERS, DRISKILL & PLANTE, 2007; KABAT-ZINN, 1993; CHANG ET AL., 2004). The fact that speech fear appears to be related to the stutterer's self-efficacy beliefs (JAREMKO, 1980), and the effect the program has on Self-Efficacy Trust show that persons who stutter may indeed benefit from the MBSR program.

The results not only reveal a decline in stress and anxiety about speech situations and an increase in Self-Efficacy Trust, they also show an increase in both problem-focused coping and locus of control. The effect is almost average for problem-focused coping (Cohen's $d = .48$) and almost strong on locus of control (Cohen's $d = .76$). The effects on problem-focused coping and locus of control do not differ between the two groups after both had received MBSR training. The effects correspond with earlier research on the MBSR program examining problem-focused coping (GROSSMAN ET AL., 2004; SAGULA & RICE, 2004) and locus of control (ASTIN, 1997; TACÓN, CALDERA & RONAGHAN, 2004; TACÓN, MCCOMB, CALDERA & RANDOLPH, 2003; DOWNEY, 1991). The increase in both problem-focused coping and locus of control shows that persons who stutter may well benefit from this program. After all, it is generally understood that persons who stutter consider stuttering as something beyond their control (VAN RIPER, 1971). Moreover, research has shown that the way they respond to stress is closely related to their coping behavior (BLOOD ET AL., 1997), and stress plays a considerable role in the fluency of persons who stutter (LEITH, MAHR & MILLER, 1993).

The participants appear to have developed a more positive attitude towards speech situations, a possible indication of their increased self-confidence and speech abilities. This effect of the MBSR program was moderate (Cohen's $d = .62$) and did not differ between the two groups receiving training. In other words, it seems that stutterers who have attended an MBSR program not only enter a conversation with more confidence but also feel in control of speech situations and are convinced of their ability to speak fluently.

One crucial question is which mechanisms are responsible for the effects of the MBSR program. After all, the program consists of a number of components and elements, each of which may contribute to the improvements (WILLIAMS, KOLAR, REGER & PEARSON, 2001; REIBEL, GREESON, BRAINARD & ROSENZWEIG, 2001) such as the body scan, sitting meditation, yoga positions and the other exercises. Beside these formal exercises, a number of therapeutic group intervention factors may play a role such as getting support from the trainer and group members, and being able to express one's emotions during the group sessions taking place after

the various parts of the program. The question is to what extent these elements played a role in inducing the training effects found. A study involving psoriasis patients (KABAT-ZINN, WHEELER, LIGHT & CROPLEY, 1998) showed that, in addition to the therapeutic factors, the practice of mindfulness per se can lead to beneficial effects. In this study, the participants listened to audio cassettes with recorded mindfulness instructions while receiving treatment in a light-booth. Although the intervention did not provide any social support, it appeared that the practice of mindfulness was per se effective. Nevertheless, the psychological impact of the MBSR program requires further investigation (ARCH, 2006), for example by examining a single part of the program such as the body scan (DITTO, ECLACHE & GOLDMAN, 2006; CROPLEY, USSHER & CHARITOU, 2007), but also the other individual MBSR practices.

The present study did not only involve an experimental group (the first-trained group), but also a control group (the second-trained group). A comparison of the effects of the MBSR program on the two trained groups revealed no significant differences except for self-efficacy trust, and that only in the second post-test. These findings suggest that the effects of the MBSR program are not accidental, but require the implementation of a training protocol that can be applied equally by various trainers.

The results of this study must be considered in the light of a number of limitations. First, a substantial number of the participants were highly educated, which means that the effects cannot be generalized for the entire population of stutterers. It is possible that highly educated persons who stutter will benefit more from the MBSR program than the less educated. For example, highly educated persons who stutter may experience more daily stress because of their greater ability to intellectualize (CARLSON, URSULIAK, GOODEY, ANGEN & SPECA, 2001).

Second, the participants in the MBSR program were self-selected. On the other hand, they were divided at random into the two groups and matched according to gender, age and education. To complement the results obtained by significance testing, effect sizes (Cohen's *d*'s) were computed.

Third, the effect criteria were measured by means of questionnaires only. In other words, no objective measures such as blood pressure, heart rhythm variability or other tests to determine the level of stress or relaxation were used. Moreover, stuttering was not measured objectively. Participants were asked to assess their own ability to speak fluently. Future studies on the effectiveness of the MBSR program should avoid this omission.

Fourth, the final post-test took place four weeks after the MBSR program had ended. Thus, no data were available on the long-term effects after three, six or twelve months. This study showed that both stress and anxiety levels were higher four weeks after the program had ended than immediately after conclusion of the program. The question is how high the scores might have been after a longer period of time. Further research is required to determine the lasting effects of the MBSR program.

The findings of this study showed that the participating persons who stutter suffered less from stress and anxiety about speech situations, had developed a more positive attitude towards

such situations, had improved their internal locus of control and showed a problem-focused coping behavior. We therefore conclude that the MBSR program could offer a meaningful supplement to stuttering therapy.

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Correspondence address:

Welko Tomic

Department of Psychology

The Open University

P.O. Box 2960, NL-6401 DL Heerlen, The Netherlands

Phone +31 45-5762539

E-mail: welko.tomic@ou.nl