

Health and Disability

Coping With Strain (CWS) course – its effects on depressive symptoms: A four-year longitudinal randomized controlled trial

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The Coping With Strain (CWS) course is a modification of the Coping With Depression (CWD) course. CWD is by far the most studied psycho-educational intervention to reduce and prevent depression, but CWD has never been tested in a randomized controlled trial in the workplace. This study seeks to examine the extent to which CWS, on a short-term and a long-term basis, reduces depressive symptoms in employees. After advertising at workplaces, 119 employees were randomized into Intervention Group I (IG1), which immediately participated in CWS, or Intervention Group II (IG2), which functioned as a control group for six months until its participation in CWS. The follow up period lasted for four years in both IG1 and IG2. Linear mixed models were fitted to the data. Depressive symptoms were significantly reduced during the course. The reduction of depressive symptoms was maintained over a period of four years in both IG1 and IG2, although there is a slight increase towards the end of the follow-up period. CWS is effective in reducing depressive symptoms among employees. The effects are long lasting and may be maintained over a period of four years.

Key words: symptoms of depression, mental health, workplace, CWD, CWS.

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INTRODUCTION

Depression is a major public health problem and is predicted to be one of the top-three leading causes of illness by 2030 (Mathers & Loncar, 2006). Strategies to deal with this rising burden are an urgent priority for health systems in most parts of the world (Vos, Flaxman, Naghavi *et al.*, 2012). Subsyndromal and mild to moderate symptoms of depression contribute more than any other health condition to absence from work, active sick leave costs, and work disability pension in the welfare state (Henderson, Glozier & Elliott, 2005; Foss, Gravseth, Kristensen, Claussen, Mehlum & Skyberg, 2010; Knudsen, Øverland, Aakvaag, Harvey, Hotopf & Mykletun, 2010). In addition, depression is a substantial contributor to perceived strain and burden of disease from physical illness (Buist-Bouwman, de Graaf, Vollebergh & Ormel, 2005; Sareen, Jacobi, Cox, Belik, Clara & Stein, 2006; Merikangas, Ames, Cui *et al.*, 2007; Henderson, Harvey, Øverland, Mykletun & Hotopf, 2011).

This challenge has traditionally been met with interventions addressing single individuals in a mental health care setting. However, even if we could provide optimal treatment to all people who suffer from mental disorders, we would only be able to alleviate a small proportion of the burden of disease from mental disorders (Andrews, Issakidis, Sanderson, Corry & Lapsley 2004). Public health preventive approaches are potentially more effective at population level and are indeed needed. The workplace can be an effective location to prevent future ill health and support people in poor health (Vaughan-Jones & Berham, 2009). Such initiatives would greatly increase the availability of mental health services, and it would increase chances to reach people when the illness is still in an emerging state and is preventable (Muñoz, Schueller,

Barrera, Le & Torres, 2014; van Zoonen, Buntrock, Ebert *et al.*, 2014).

Mental health programs in the workplace can improve mental health and generate economic returns in reduced absenteeism and increased productivity (Matrix, 2013). OECD (2011) therefore recommends that organizations increase their investment in evidence-based workplace interventions. Most workplace-based programs alleged to improve employees' mental health, lack scientific documentation (Oxman, Bjørndal, Becerra-Posada *et al.*, 2010). Only a few randomized controlled trials on employees, with mild symptoms of depression, have been conducted to test whether attempts to reduce depressive symptoms in the workplace are effective (Corbière, Shen, Rouleau & Dewa, 2009; Martin, Sanderson & Cocker, 2009; Odeen, Magnussen, Maeland, Larun, Eriksen & Tveito, 2012; Tan, Wang, Modini *et al.*, 2014).

The aim of this study is to examine to what extent Coping With Strain (CWS) courses succeed in reducing symptoms of depression on workers. CWS is a group-based psycho-educative intervention aimed at teaching participants how to cope better with strains in real work settings and in daily life, by using cognitive behaviour therapy. CWS is a modification of the Coping With Depression (CWD) course (Lewinsohn, Weinstein & Alper, 1970; Lewinsohn, Antonuccio, Steinmetz & Teri, 1984; Muñoz & Ying, 1993). A variety of CWD-versions have been developed to target specific groups, for example, adolescents, parents, mother and child, and immigrants (Cuijpers, Muñoz, Clarke & Lewinsohn, 2009). CWD is by far the most studied psycho-educational intervention outside the health system, and CWD is effective in reducing and preventing depression (Cuijpers *et al.*, 2009; Muñoz, Schueller, Barrera, Le & Torres, 2014). The Norwegian version of CWD, from which CWS was developed,

has been shown to be effective in reducing symptoms of unipolar depression with sustained effect at 12 months follow-up (Dalgard, 2006). CWD has, however, never been tested in a randomized trial in the workplace. And, when CWD has been tested in other settings, the follow-up period has been relatively short, and not longer than two years.

In the current study we conducted a randomized controlled trial on employees in four municipalities in Norway. We hypothesized that CWS is effective in reducing depressive symptoms among employees, and that the effect is maintained for four years.

METHOD

The sample

All employees working in four public organizations in Norway were invited to participate. A standard invitation describing the course, including contact information of the course leaders, was distributed at the internal network and in banners and flyers at each workplace. In total approximately 19,000 persons in the four organizations had access to their internal network, but we do not know to what extent all of these workers use their network or how many who have read the invitation. The sample consisted of 119 self-recruited individuals; 59 in the Intervention Group I (IG1) and 60 in the Intervention Group II (IG2) (see Table 1).

Inclusion and exclusion criteria

All participants who applied were invited to participate regardless of their degree of depression, including none or minimal symptoms of depression. However, individuals with a depression score indicating severe symptoms of depression were recommended to consider clinical treatment. In total, 137 individuals responded to the advertisement for CWS and 18 people were excluded from the study before the randomization at (M_1), resulting in 119 participants who were assessed for eligibility in the final sample. In total, 15 individuals did not meet the inclusion criteria; three were severely depressed and were referred to clinical treatment; four were hospitalized or sick because of other illness and were not able to participate at the given time; eight individuals expressed lack of interest and motivation after discussing the content of CWS at the first meeting with the course leader ("CWS is not suitable for me" or "I thought it was more of a self-development course"). Three individuals were in the category of exclusion because of "other reasons."

Ethical standard

The course leaders were instructed to contact a health professional if they suspected there was a risk of suicide. Any ongoing treatment the participants received could continue unaffected throughout the study. The informed consent was obtained from all the individuals participating in this study. This project was approved by The National Committee for Research Ethics (REK) in South-East of Norway.

Measures

The participants reported on several outcome measures; burnout, depressive symptoms, self-efficacy, quality of life, self-esteem, social support, negative life events and sick leave. In this study we report the results on depressive symptoms.

Symptoms of depression were assessed with the Beck Depression Inventory (BDI). BDI measures the degree of severity of depression (Beck, Ward & Mendelson, 1961). The depression scale contains 21 items, each with response categories coded with numbers from 0 to 3, where a high score indicates a high degree of depression. Examples of response categories are: "I don't feel sad" (0), "I do feel sad" (1), "I am sad all the time and I can't let the feeling go" (2), and "I am so sad and miserable that I can't stand it" (3). A BDI score in the range 0–9 indicates none or minimal symptoms of depression, 10–18 indicates mild symptoms of depression, 19–29 indicates moderate symptoms of depression, and 30–63 indicates severe symptoms of depression. BDI has demonstrated high validity and reliability (Lasa, Ayuso-Mateos, Vázquez-Barquero, Díez-Manrique & Dowrick, 2000).

Additionally, on the first page of the questionnaire, we designed questions asking for age, education, medicine use, psychological treatment and whether the participant is on sick leave.

Intervention

CWS is a modification of the Coping With Depression course (CWD) (Lewinsohn *et al.*, 1970; 1984; Muñoz *et al.*, 1993). CWS was developed by Børve, Nævra, and Dalgard (2009) to be used in workplaces, and is a group-based cognitive behavioral intervention aimed at teaching participants how to cope better with strains at work and in daily life.

Like CWD, CWS consist of eight weekly sessions, each lasting two and a half hours with eight to 12 participants in each group. There are two booster sessions within one or two months after the last of the eight ordinary sessions. As in CWD, the participants have to fill in home assignments in the CWS work manual, for example, every day completing the ABC model (commonly used in cognitive behaviour therapy; Ellis, 1985, 1994; Lazarus, 1991), and to identify ways of reducing the perceived strains. Also like CWD, CWS has a standardized manual for the course leaders and a text book for the participants. CWD and CWS are based on being delivered by one trained therapist and one assistant. The therapists had received training at a non-profit academy in Norway which educates course leaders in a diversity of course leader educations.

CWS differs from CWD in that the standardized material is more comprehensive, and the examples and home materials more relevant for workplaces. The CWS manual is directed more towards teaching the participants coping strategies against strains in the workplace. The CWS material refers less frequently to "depression," which is not mentioned in the titles of the course, manual or text books, and is substituted with the word "strain" in most of the remaining text.

While CWD is most frequently administered in some kind of clinical context, for example, primary health care to fight depression, CWS has been offered in Norwegian workplaces for several years to reduce employees' sub-threshold psychological distress. In this study, CWS is interpreted to be an initiative which seeks to reduce mild symptoms of depression as such symptoms are highly frequent in the working population (Henderson *et al.*, 2005; Foss *et al.*, 2010; Knudsen *et al.*, 2010).

Table 1. *N*, the participants (percentages in parenthesis)

	Paid sick leave	Main age group	Higher education >3 years	Use of anti-depressive medicine	Treated by a psychologist
Intervention group I	23 (39)	41–50 years: 19 (32) 51–60 years: 20 (34)	40 (68)	12 (21)	15 (26)
Intervention group II	25 (42)	41–50 years: 21 (34) 51–60 years: 20 (33)	36 (60)	12 (21)	10 (18)

Study design and procedure

We studied two CWS groups; Intervention Group I (IG1) and Intervention Group II (IG2). IG1 started immediately on CWS, and IG2 waited for six months until they attended CWS. The inclusion of IG2 permitted a delayed intervention design, which allowed us to assess whether there were spontaneous changes in the outcome measures over time, and spontaneous changes over time from the effect of the CWS course. In addition, the design allowed us to test whether CWS had long-term effects as both intervention groups were followed up over a period of four years.

Figure 1 shows the study design with timeline and measurement points. At the first meeting with the course leader, participants were interviewed and completed questionnaires.

After baseline data collection for each group of participants (about 20 in each group), questionnaires were arranged in random order and numbered. All participants whose questionnaires had odd numbers were included in one of the two intervention groups and all with even numbers were included in the other. IG1 started the course on average four weeks after the BDI interview (M_1) was conducted and ended eight weeks later (M_2). IG2 started its course on average six months after the start of IG1. In this way, IG2 served as a delayed intervention until IG2 was started. Participants in IG2 were assessed at the beginning of their course (M_3) and on the last day eight weeks later (M_4). After the two interventions had been completed, the follow-up period started. In the follow-up period, the participants answered questionnaires by e-mail or post eight months after the course ended (M_5), and three more times during the next three year follow-ups (M_6 – M_8).

Statistical analyses

The data were analyzed using linear mixed models – also referred to as multilevel models – in SPSS 20.0 (SPSS, I., 2011) and R 3.1.2 (R Core Team, 2015). The participants who dropped out when not responding to the questionnaires were not excluded from analysis, because multilevel modeling is a flexible statistical approach that can handle non-balanced data with missing entries and repeated observations (Jackson, 2010; Kwok, Underhill, Berry, Luo, Elliott & Yoon, 2008). Missing data varied over the measurement times, but were particularly highly frequent at M_5 due to technical problems with the hyperlinks.

All models were fitted using full information maximum likelihood, and an unstructured covariance matrix for the random effects. Three linear mixed models were fitted to the data. In the baseline model, only fixed and random intercepts were included, allowing depression levels to vary across participants, but not across time. In model 2, we added the effect of time, while with model 3 we assessed whether a specific effect of the CWS course significantly improves model fit beyond what can be accounted for by the passage of time. Akaike's information criterion (AIC; Akaike, 1974) was used to compare the overall fit of the models on a smaller-is-better basis. Nested models were also compared by Δ -2LL as this difference follows a chi-square distribution with degrees of freedom equal to the difference in number of parameters between the models.

An important consequence of including a delayed intervention group is that it allows us to differentiate between the reduction in depressive symptoms that can be attributed to the CWS course, and that which can be attributed to the passing of time in the absence of an intervention. Specifically, changes in levels of depressive symptoms in the intervention group over the 8 weeks that the course lasts can be thought of as the summed effect of the intervention as well as the change that would have occurred even in the absence of an intervention. In order to disentangle these two sources of influence, we differentiated between time elapsing before the intervention was completed (subsequently referred to as "pre-completion time"), and time afterwards (subsequently referred to as "post-completion time"). Pre-completion time was defined as running from M_1 until the last day of the course – M_2 and M_4 for the participants in the intervention and delayed intervention groups respectively, while post-completion time was defined as time passed from the last day of the course and until the end of the assessment period.

As data is collected in the intervention groups only twice until the end of the course, we were only able to model constant (linear) effects of time in this interval. However, post-completion contains a total of four measurements in both groups, allowing us to model both linear as well as non-linear (quadratic) effects of time during the follow-up period.

Large samples often give significant results even when the effects are small. While our sample size was modest, we also report pooled effect size (Cohen, 1988) across the various time points to facilitate comparison with previous studies on alternative versions of CWD. The number of observations was too low to allow for estimation of intervention effects for men and women separately.

RESULTS

Descriptive statistics

A substantial proportion of the participants had a BDI score indicating mild depressive symptoms at M_1 in both IG1 (37%) and in IG2 (47%). Furthermore, 32 percent in the IG1 and 27 percent in IG2 had a BDI score indicating none or minimal depressive symptoms at M_1 . Fewer of the participants were found to suffer from moderate depressive symptoms (27% and 22%, respectively), and severe depressive symptoms (3% and 5%). Table 2 shows that there was decline in all BDI mean-scores after M_1 in both intervention groups. At M_8 , however, the mean scores increased in both intervention groups.

Figure 2 shows that there was a substantial decline in symptoms of depression following the CWS course in both groups; from M_1 to M_2 in IG1, and from M_3 to M_4 in IG2. After the completion of the course, there was a more marked reduction in the depression level, but slower decline over time, until a slight

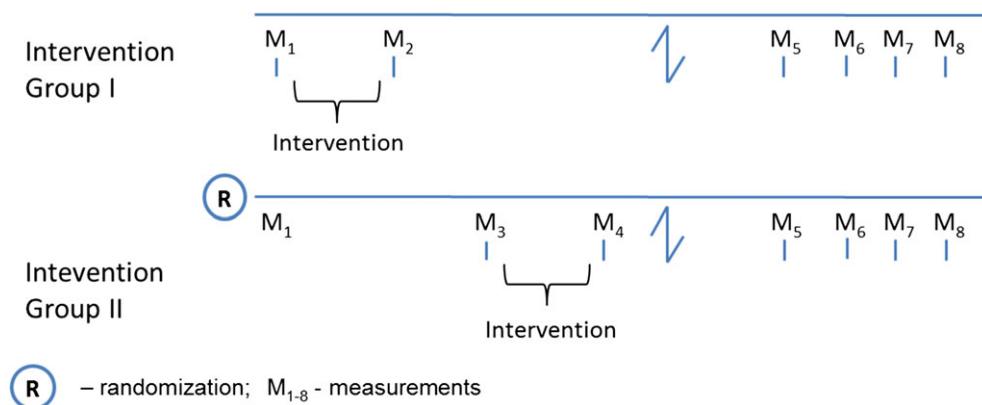


Fig. 1. Study design.

Note: The start of the follow-up period has been illustrated by a shift in the timeline.

Table 2. *N*, mean BDI-score and SD (in parenthesis) in intervention Groups I and II over time (weeks)

		M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	M ₇	M ₈
Intervention group I	N	59	47	–	–	8	22	33	30
	Mean	14.3 (8.3)	10.3 (7.4)	–	–	5.6 (3.1)	6.1 (6)	4.9 (6.1)	8.6 (6.3)
	Weeks	0	12.0	–	–	47.5	89.8	161.2	196.7
Intervention group II	N	60	–	45	34	5	21	25	29
	Mean	14.6 (8.5)	–	13 (8.7)	9.9 (6.7)	8.6 (7.5)	6.6 (6.7)	6.9 (6.4)	9.4 (7.7)
	Weeks	0	–	24.4	32.9	52.8	88.6	159.1	205.8

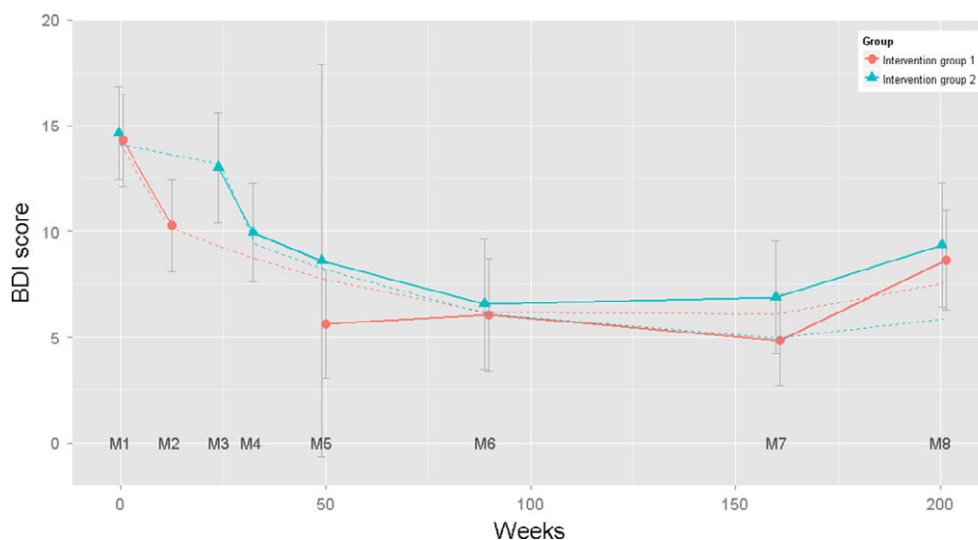


Fig. 2. Line diagram of the observed depression scores over time, as well as the expected levels based on the best fitting model.

Notes: —●— The Intervention Group 1 (IG1) stops at M₂ and starts again at M₅ because the participants in IG1 does not fill in questionnaires at M₃ and M₄ when —▲— The Intervention Group 2 (IG2) starts- and complete CWS, and fills in their questionnaires. Stippled lines: the estimated BDI scores.

increase in BDI score is evident toward the end of the assessment period.

Reduction in BDI scores over time

Fit statistics for the linear mixed model are shown in Table 3. Estimates from (the baseline) model 1 show that there were significant differences in BDI levels between participants, when equating all measurement points. Model 2 introduces the effect of time. In model 3 we added the specific effect of intervention. Overall, model 3 was found to have the best fit as determined by the lowest AIC. Furthermore, the difference in -2LL between the models 2 and 3 indicates that the latter fits significantly better ($\chi^2(1) = 17.51$, $p < 0.001$). Across groups, participants on average experienced a reduction of 3.46 points on the BDI scale in the 8 weeks the course lasted ($p < 0.001$). As we defined the pre-completion period to last until the final day of the course, the effect of pre-completion time was no longer significant when the effect of intervention was added. Both the linear and quadratic effects of post-completion time were significant. Immediately after the completion of the CWS course, the effect is dominated by the linear term, and BDI symptoms decreased approximately 0.08 units per week. Over the extensive follow-up period, the quadratic term eventually counteracted the negative linear effect, and towards the end of the assessment period, this resulted in a slight increase in BDI symptoms.

Table 3. Predictors of change in BDI scores

	Model 1 Est.	Model 2 Est.	Model 3 Est.
Fixed effects			
Intercept	11.35***	13.86***	14.10***
Pre-compl. Linear		-0.13***	-3.78E-02
Post-compl. Linear		-9.72E-02***	-7.77E-02***
Post-compl. Quadratic		4.03E-04***	3.38E-04***
Intervention			-3.46***
Random effects			
Residual	31.76***	20.96***	19.67***
Intercept	35.40***	38.64***	37.65***
Post-compl. Linear		1.80E-05	2.85E-5
Model fit indices			
-2LL	2322.85	2227.55	2210.04
AIC	2328.85	2241.55	2226.04

Pre-compl. = pre-completion time of the interventions (M1 to M2/M4). Post-compl. = weeks after intervention (M2 & M4–M8)., Post-compl. squared = weeks after intervention squared., Intervention = 8 weeks CWS course. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Pooled effect sizes

Table 4 shows the pooled effect sizes over time, whereas M2–M3 is the pooled effect size between the two intervention groups.

Table 4. Pooled effect sizes

	M ₁ –M ₂	M ₁ –M ₃	M ₁ –M ₄	M ₃ –M ₄	M ₁ –M ₅	M ₁ –M ₆	M ₁ –M ₇	M ₁ –M ₈	M ₂ –M ₃
Intervention group I	0.51		–		1.10	1.06	1.24	0.74	0.35
Intervention group II		0.15	0.59	0.40	0.71	0.99	0.96	0.63	

Notes: Cohens (1988) division of effect sizes: 0.0–0.2 none or low effect; 0.3–0.5 small effect, 0.6–0.8 moderate, and 0.8 and more constitutes a high (large) effect.

While participating in the CWS course, effect sizes in IG1 (M₁–M₂) and II (M₃–M₄) showed some effect, respectively 0.51 and 0.40. In IG2 there was a low effect (0.15) while the participants were waiting for the course to start (M₁–M₃). The effect size revealed some effect (0.35) between IG1 at M₂ and the delayed intervention (IG2) at M₃. The effect size showed moderate or high effect on all follow-ups in both intervention groups after participating in the CWS course. The reductions in depression score as given in SD units are shown in Table 4.

DISCUSSION

Reduction in symptoms of depression – main findings

Our findings indicate that the Coping With Strain (CWS) course significantly reduces symptoms of depression among those who participate, and the effects are maintained four years after the intervention. The effects of CWS in reducing depressive symptoms were estimated from three models, including calculation of effect sizes.

The inclusion of a delayed intervention (IG2) allowed us to differentiate between the natural reductions in depressive symptoms from the reduction caused by CWS. According to the pooled effect sizes, IG2 showed low reduction in symptoms of depression before participating in CWS. Without participating in the study, the symptoms of depression may not have been reduced.

The main reduction of depressive symptoms occurred while the participants attended CWS. The significant reduction in depressive symptoms in both groups from M₁ to the final course day demonstrates an immediate effect of the course. Participants on average experienced a reduction of 3.5 points on the BDI scale in the eight weeks that the course lasted. In studies of clinically depressed participants, a BDI 6-point reduction is regarded to be clinically significant (Bright, Baker & Niemyer, 1999; Dalgard, 2006). However, in a sample of participants with low initial levels of depressive symptoms, a change of 3.5 may be regarded as substantial.

The inclusion of IG2 allowed us to compare changes between the groups in the follow-up period. The two groups showed similar depression levels over time. However, the changes in depressive symptoms were unlikely to stay constant throughout the research period. There was sufficient information in the four measurements to include both a linear and a quadratic term when modeling the effect of post-completion time. These estimates were significant. While incorporating the changes in depression level over time in a quadratic term, the estimated depression level is seen as a reflection of a more real-life situation with changes in

depression levels rather than depression levels represented as a straight line over time. However, even though a linear term is not as flexible as the quadratic term, the linear time is also significant. This indicates a magnitude in the reduction in depressive symptoms over four years after the assessment of CWS.

Discussion of the relevance of the findings

The effect of CWS is in accordance with studies on other CWD interventions aimed at treatment of depression; for example, the Cohen's *d* on BDI was 0.47 in the study of CWD in Norway (Dalgard, 2006). Cuijpers *et al.* (2009) reported 18 studies which compared CWD treatment and control groups, and when examining the effect sizes on the ones with BDI, the mean effect size was 0.47 here as well.

This study has a larger effect size than other interventions in workplaces aimed at preventing depression. The review of Tan *et al.* (2014) with six randomized controlled trials (RCT) showed a pooled difference of 0.12 standard deviations between the Cognitive Behavior Therapy (CBT) and the control groups. This indicates that CWS might have impact on mild symptoms of depression in the workplace. The study of Allart-van Dam, Hosman, Hoogduin and Schaap (2007) showed that the group of subclinically depressed participants were the only ones who appeared to benefit in the long term from CWD course participation. Making CWS techniques available to employees who are dealing with mild symptoms of depression may turn out to be a beneficial long-term investment.

This study contains the longest – to our knowledge – follow-up period of any randomized, controlled study of CWD style courses. In a four-year follow-up trial, we were able to show that even four years after the completion of an eight-week CWS, the beneficial effect on the participants' levels of depression was sustained. In this study the participants were mainly self-recruited through responding to an advertisement of CWS in the workplace. Motivation might be relevant in explaining the four-year long-term effect of CWS. Another possible explanation of the long-term effects might be that most of the participants had three years or more higher education. The participants might have been more likely to actually do the homework assignments they were given in the eight-week course and more likely to be able to manage the practical use of CWS. Even though the anti-depressive effect seemed to taper off at the fourth year, the level of depression was still lower than the first measurement in both groups before intervention (M₁). Perhaps the effect of CWS would be sustained even longer if booster sessions had been included over time. Altogether, this indicates that CWD-style courses – specifically the CWS course – may have effects sustaining over very long periods of time.

This study is – again to the best of our knowledge – the first randomized, controlled study of a CWD style course adapted to the workplace. The results show that, even when adapted to the workplace and not explicitly addressing symptoms of depression, but rather addressing employees' ability to cope with everyday strain, long-term reduced level of depression may be achieved. This is an important finding for several reasons. First, subsyndromal and mild to moderate depression today represent a far larger risk to sickness absence and disability benefits, than do severe depressions (Knudsen *et al.*, 2010). Paradoxically, this is also the group which is least likely to be offered or to seek adequate and cost-effective help for their complaints. An easily available, cost-effective tool for this group to cope with their difficulties would be a major public health advantage. The CWD, tailored to be distributed at the workplace, would be such a tool. However, mental disorder tends to be stigmatized in many environments (Corrigan, 2005; Pescosolido, Martin, Lang, Medina, Phelan & Link, 2010). Revealing at the workplace that one has a mental health challenge might be a sensitive matter. CWS has been developed to circumvent such stigma. By framing it in a positive way – learning to cope with everyday life strain – and toning down the focus on mental problems, participation in a CWS course may be perceived as less stigmatizing than participation in a course on coping with depression.

Therefore, the workplace can be an effective arena for reducing depressive symptoms immediately and maintaining long-term effects. NICE guidelines conclude that there is lack of evidence for group-based therapies for depression (NCCMH, 2010). Our study presents, however, evidence of the effect of a group-based program. CWS might contribute to the availability of mental health services, raising awareness of the normality of mild symptoms of depression, and be part of the strategy to confront depression and the rising burden of depression.

Limitations and Strengths

One concern is whether the reduction in the depression level we observed could be due to the selective attrition of participants who experienced no change or an increase in their symptoms. However, at M_3 barely a quarter of the participants in IG2 dropped out, but the mean BDI score was only reduced by two points, which indicates that the effect of the selective drop out was not strong. There were markedly fewer participants at M_5 ($n = 13$) than at M_7 ($n = 57$). However, the mean BDI score was higher at M_5 than M_7 , while we would expect a stronger decline in the number of respondents after four years. This might indicate that the selection effect at M_5 is not strong. Further, there was a relatively large number of participants at M_7 and M_8 ; 58–59 of the 104 that started on the interventions (and of the 81 participants on their last intervention day; M_2 and M_4). Therefore, there seems to be no strong selection effect and the results with regard to both the short-term and long-term effects are likely to be valid. Further, the participants that drop-out at M_8 shows lower levels of depression at M_1 than participants that do not drop-out. The difference is not significant, but it may indicate that there is an increased level of attrition among participants with lower levels of depression, which could have contributed to the increase in BDI scores at M_8 . However, parameter estimates in mixed

linear models are relatively unaffected by data that is missing at random (MAR), such as data where the likelihood of dropping out only depends on past history.

Unfortunately, we did not obtain a measurement in IG2 at the exact time when IG1 completed their course (M_2). Conversely, we did not obtain a measurement from IG1 at the exact time when IG2 started their course (M_3). The 10-week delay that occurred between M_2 and M_3 might have impacted the validity of the effect size across the groups, and we believe that the reported effect size between M_2 and M_3 is somewhat underestimated. If we had a measurement in IG1 at the same time as the second intervention started, the BDI scores would most likely have decreased further in group 1 at M_3 as well, as the estimated lines in Figure 2 illustrate. Further, the lack of a control group to compare the follow-ups in IG1 and IG2 makes us unable to rule out the possibility that other factors may have contributed to the observed long term reduction in symptoms of depression.

This study has several strengths. First, while evaluation studies of similar programs only have a follow-up period spanning from six months to two years (Cuijpers *et al.*, 2009), participants in our study were assessed over a period of four years. A traditional RCT-study would have been limited to a six months' follow-up period (the start of IG2). We were able to estimate effects of two CWS interventions over a longer period of time. Second, the inclusion of a delayed intervention group (IG2) may have allowed us to estimate the extent of recovery from mild levels of depression that spontaneously occur over time independent of participation in a CWS course. Furthermore, to the best of our knowledge, this is the first study of the effects of a CWD-version which targets the workplace.

In conclusion, CWS teaches employees cognitive behavioural techniques at their workplace to be used on problems at work and in daily life. The course significantly reduces symptoms of depression and has both an immediate and a long-term effect. However, there is a slight increase in symptoms of depression at the end of the assessment period. Although this study has promising results, there is a need of more research with larger samples.

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