Never too old to learn : the effectiveness of the Coping with Depression course for elderly

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Predictors of response to the Coping with Depression course for Older Adults. A field study

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Abstract

Background

This field study explored the prognostic factors of the immediate and long-term effects of the Coping with Depression course for older adults (CWD). With the aim of both indicated as well as secondary prevention, the course is provided by the prevention departments of the community mental health care in the Netherlands.

Method

A total of 317 course participants (age 55 - 85 years; 69% female) took part in this study; 41% had a major depressive disorder (MDD). A variety of demographic, clinical, psychosocial and treatment factors of possible relevance for secondary and indicated prevention at short- and long-term were investigated. Random coefficient regression models and logistic regression models were used to examine their contribution to the immediate and maintenance effect.

Results

The course was beneficial for all participants, and the level of depression reached at the end of the course was maintained over the next 14 months. Current MDD, high levels of anxiety, less previous depressive episodes, and more education predicted a larger benefit.

Conclusion

However, the clinical significance of these predictors was too small to justify further triage. Further treatment should be considered for the participants with a post-treatment score $\geq$ 16. Group-membership was not a significant predictor of the variation in effect.

Introduction

Depression is a common psychiatric disturbance in late life, with a prevalence rate between 8 and 15 % for sub-threshold depressive disorder and around 3% for major depressive disorder (MDD) (Beekman et al., 1999; Blazer, 1998; Karel & Hinrichsen, 2000). To reach the depressed older community-living adult effective low threshold outreach programs have been developed (Cuijpers, 1998a). Lewinsohn's 'Coping with Depression'course (CWD) (Lewinsohn & Clarke, 1984) was adapted for the Dutch seniors and broadly implemented in the prevention arm of the community mental health care system of the Netherlands (Voordouw and Kramer, 2001). The threshold set by the community mental health centres (CMHCs) for enrolment is low, and the course participants vary widely in their level of depression between only slight symptoms to being severely depressed. The majority of the course participants had a lifetime MDD, and 40% met the criteria of the diagnostic and statistical manual for mental health (DSM-IV; American Psychiatric Association, 1994) for a current MDD (Haringsma, Engels, Beekman, & Spinhoven, 2004). The course, as it is used by the Dutch CMHCs, can be classified as either indicated prevention for those at risk for a new MDD or treatment for those with a current MDD. In the original public health classification system the latter would be classified as secudary prevention (Institute of Medicine; Mrazek & Haggery, 1994).

A randomized clinical trial (RCT) in a sub-sample of participants of the CWD course showed that compared to a waiting list condition the course was effective for participants with mild-to-severe depression (Haringsma, Engels, Cuijpers, & Spinhoven, 2006). However, for a large proportion (62%) of the elderly participants, the level of depression at post-treatment measured with the Centre for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977) was still above the recommended cut point of 16. This variation in outcome in this heterogeneous sample merits the examination of client factors that could predict course effectiveness. Knowledge of prognostic factors can be helpful to ensure better triage of the depressed elders into the most suitable intervention which can result in a higher level of treatment outcome.

Extensive research has focussed on prognostic factors of the development of MDD, and a wide range of socio-demographic, illness-related and psychosocial variables have been identified as related to the incidence, severity, course and remittance of depression. However, in a recent review (Hamilton & Dobson, 2002), only a few of these factors have also been identified as predictors of response to cognitive-behavioural treatment of current depression. A high chronicity, a higher number of previous episodes, a younger age of onset, higher dysfunctional attitudes and marital status (unmarried/divorced) proved to be associated with an unfavourable outcome. Moreover, evidence is accumulating that predictors of poor response to cognitive therapy of current depression may be partly different from those of relapse in recurrently depressed patients when in remission (Bockting et al., 2004). Although fewer previous episodes predict better recovery in the secondary treatment of an acute major depressive episode, the outcome of interventions to prevent relapse in euthymic

patients with a history of previous depressions was significantly better in patients with a higher number of previous depressive episodes (Bockting et al., 2004; Ma & Teasdale, 2004; Segal, Pearson & Thase, 2003). Consequently, it seems worthwhile to investigate predictors of indicated prevention (development of MDD) separately from those of secondary prevention (remission from MDD).

Although a substantial amount of treatment is delivered in a group format, the specific characteristics of group processes as a factor affecting outcome are rarely studied (Burlingame, MacKenzie & Strauss, 2003). The group format of the CWD course is not emphasized as an important factor by Steinmetz, Lewinsohn and Antonuccio (1983), and its impact on outcome has never been studied.

The present field study is part of a multi-centre effectiveness research program set up to investigate how the CWD course works out in the Dutch mental health care system. The following questions will be addressed: (a) which client characteristics predict initial severity of depression and reduction of depression immediately after the conclusion of the course and at 2 and 14 months follow-up; (b) is there a differential effect for client factors predicting indicated prevention or secondary prevention at 14 months following the end of the course; and (c) is treatment effect predicted by group membership?

Given the lack of knowledge of factors predicting outcome on the short- and long-term we included a wide variety of psychosocial, demographic, treatment and clinical factors of possible relevance for secondary and indicated prevention.

Method

Participants

Eligible for this study were older adults participating in 46 CWD courses provided by 13 CMHCs in the Netherlands. Recruitment by the CMHCs occurred via announcements in the local media; no referral was needed. Acceptance criteria were: the presence or a history of depressive symptomatology, and a minimum age around 55. Reasons for exclusion from the course were: cognitive impairment, current bipolar disorder, schizophrenia, current substance disorder, recent bereavement, hearing impairment, and insufficient command of the Dutch language. To be included in the study an additional research criterion was used: no concurrent other form of psychological treatment. Hence, not all the participants taking the course could participate in the study. The use of psychotropic medication was permitted. After a complete description of the study, written informed consent was obtained before enrolment into the study. The Medical Ethics Committee of the Leiden University Medical Centre approved the study.

Procedures

A full description of the diagnostic assessment and the treatment conditions have been reported (Haringsma et al., 2006). Clinical diagnoses were determined with the Mini International Neuropsychiatric Interview (M.I.N.I.: Sheehan, et al., 1998a; Overbeek,

Schruers & Griez, 1999) by trained interviewers (recently graduated psychologists). With this structured interview the most prevalent axis I disorders according to the diagnostic and statistical manual of mental health (DSM-IV; American Psychiatric association [APA], 1994) were assessed Sheehan, et al., 1998b). All face-toface interviews were recorded on audiotape, a random selection of 45 tapes were rated by the first author. Inter-rater reliability (Kappa) was .95 for MDD, 1.00 for Dysthymia, and .61 for previous MDD. The interviewers also inquired after the number of previous major depressive episodes and the duration of the current MDD; chronic MDD was defined as a major depressive episode lasting more than two years (DSM-IV criterion). This information resulted in a dichotomous variable for previous episodes/chronicity (1 ≥ two episodes or chronically depressed).

The treatment was the the CWD course for older adults – the Dutch version (Cuijpers, 1998b; Lewinsohn & Clarke, 1984), a skills-training based on a social learning view of depression.It consists of 10 weekly two-hour group sessions, followed two months later by a reunion session. Self-report measures, all completed at home, were collected in the two weeks prior to the start of the course, two weeks after its conclusion, and at two and 14 months follow-up (FU). The 14 months FU was concluded with a telephone administration of the depression section of the disgnostic interview (the MINI), a mode of interviewing considered reliable in two studies (Rohde, Lewinsohn & Seeley, 1997; Wells, Burham, Leake & Robbins, 1988).

Depressive symptoms

Primary outcome measure (administered at every assessment was the Dutch version of the CES-D, a 20-item self-report questionnaire on depressive symptoms experienced during the past week (Radloff, 1977). The total scores range from 0-60. A score of ≥ 16 indicates the presence of clinically relevant depression. In the present sample the alpha coefficients (α) ranged from .86 - .92.

Predictor variables

The self-report questionnaires covered anxiety, physical health, personality pathology, negative life events, post-traumatic stress, social support, self-efficacy, and coping style. The level of anxiety was measured with the subscale of the Dutch version of the Hospital Anxiety and Depression Scale (HADS-A; Zigmund & Snaith, 1983). A cut-off of 8 is recommended to distinguish between high and low anxiety levels. The α in this sample was .80.

As an indication of physical health the presence of chronic medical conditions was assessed at pre-treatment and at the 14-month FU; this was done with a checklist of nine chronic medical conditions covering cardiovasculair diseases, pulmonary conditions, brain damage, diabetes, rheumatism, arthrosis, dysplasia (Central Bureau of Statistics, 1989). Furthermore, the scales for pain and physical functioning of the Medical Outcome Study Short Form General Health Survey (MOS-SF-20; Kempen, 1992; Stewart & Ware, 1988) were used as indications of physical health.

Personality pathology was assessed with the Questionnaire of Personality Traits - VKP (in Dutch: Vragenlijst voor Kenmerken van de Persoonlijkheid), an inventory with items based on the DSM-IV and ICD-10 definitions and criteria of personality disorders (Duijsens, Eurelings-Bontekoe, & Diekstra, 1996; Duijsens, Haringsma, & Eurelings-Bontekoe, 1999). At pretrreament the DSM-IV section which consisted of 149 items (including the passive-aggressive and the depressed personality disorders) was administered. The VKP yields a diagnosis and a dimensional score for each specific personality disorder (PD). The latter can be summed into a dimensional score for each cluster and into a total sumscore (PD-NOS). The cluster scores and the sum score were used as predictor variables.

The experience of negative life events at pretrreament was measured with a checklist based on the Negative Life Events Questionnaire used by Kraaij and de Wilde (2001). It covers different developmental periods, such as childhood, adulthood, and events in the past year. A sumscore was calculated for the whole life span.

Current posttraumatic stress was assessed with the Dutch version of the Impact of Event Scale (IES; Brom, Kleber, & Defares, 1986; Horowitz, Wilner, & Alvarez, 1979). It has 15 items; in this sample the α was .94. Social support was assessed with the abbreviated version of the Social Support List-Interaction (SSL112-I), which is intended for use with elderly adults (Kempen & van Eijk, 1995). The sum scale in this sample had an α of .86. Self-efficacy was measured with the Dutch version of the General Self-Efficacy Scale (GSES; Schwartzer, 1997, 1998), a 10-item questionnaire. In our sample α was .89. The habitual coping style, one of the targets in the course was measured with the Utrechtse Coping List (UCL; Schreurs, Willige, & Brosschot, 1993). It has 47 items and measures seven coping strategies: active-problem-solving (α =.79), palliative-responses ((α = .71), avoidance-strategies (α =.74), seeking-social-support ((α = .79), depressive-reaction-pattern (α = .74), expression-of-emotions (particular anger) (α = .55), and comforting-cognitions (α = .60).

New negative life events were checked at every assessment; these were summed to get an estimate of adverse events experienced since the conclusion of the course. The 14-month FU assessment also contained a checklist for newly developed medical conditions. Stress-buffering effects of positive life events and improved physical health that may protect against depression were similarly checked.

Statistical Analysis

Preliminary analyses included checks for normality and the computation of descriptive statistics. All variables except those considering personality pathology (cluster A, cluster B, Cluster C, and PD-NOS) appeared to be distributed acceptably close to normal. Distributions of personality pathology variables were improved by applying square root transformations, which were used in the analyses. Only variables that showed significant ($p < .05$) effects will be reported.

Prediction of decrease in depression symptoms

Random coefficient regression models (RCRMs) were used to examine the contribution of the various predictor variables to the immediate and maintenance effect. Rrepeated measures were considered to be nested within individuals, nested within CWD-groups.

Because this research focuses on: (1) the immediate effect; and (2) the maintenance effect, it was decided to study the two corresponding trajectories in two different linear models, instead of fitting a less adequate non-linear trend over four time points. The model for the immediate effect covered the first three measurements (pre-, post- and two-month FU). The maintenance effect was modelled using the post-treatment, two-month FU and 14-month FU measurements. Hence, data on two time points – post-treatment and 2-month FU measurements – were used twice. In the model for the first trajectory, intercept and slope can referred to as average pretrreament score and average improvement rate, respectively. In the second trajectory they can be referred to as average post-treatment score and average change rate, respectively. Both models contained variance components estimating the amount of variation of individual (linear) trends around these average lines.

Predictor variables for both models were selected in a three-step approach. The first step was testing each predictor variable separately by adding it to the model with Time as the only predictor (referred to as the baseline model). Time was measured in weeks; pre-, post-, two-month FU and 14-month FU had the values of 1, 10, 20 and 72 respectively. The variables showing a significant weight ($p < .05$) were retained for the final model. The final model was simplified using likelihood-ratio tests (χ^2 derived from deviance values) and tests for separate fixed effects. Finally the most appropriate model was selected. Fixed effects were tested using one-tailed *t*-tests. Variance components were tested using likelihood-ratio tests as well.

Potential predictors for the immediate effect were socio-demographic, mental health, and physical health variables, the sum of adverse life events, and coping variables; all variables were assessed at pre-treatment. Stable characteristics unlikely to have changed during the time of the course, for instance socio-demographic variables and the variables pertaining to mental health history and to coping resources, were selected as predictors for the maintenance effect. The effects of unpredictable events that might have influenced the level of depression at 14-month FU, such as new chronic illness, new stressful life events, improved physical health and positive life events were also analyzed.

The possible contribution of CWD-group differences to the variance of the response variable was examined by estimating the intra-class correlation.

Prediction of diagnostic status at 14-month's FU

Hierarchical logistic regression models were used to predict diagnostic status at the 14-month FU. Two subgroups were formed to study the different prevention goals. First, the participants who were at risk for developing a MDD (indicated prevention)

were selected. Risk factors were the report of at least one previous major depressive episode or a CES-D score ≥ 16. After the removal of ten participants, who did not fulfil these criteria, this subgroup counted 180 persons. Second, participants with a MDD at pre-treatment were selected (n = 128) to predict remission of MDD at the 14-month FU (secondary prevention). In both groups the response variable was absence of MDD at the 14-month FU (remission MDD) was regressed on predictor variables that showed (borderline) significant relationship ($p \leq .10$) in bivariate analyses. The regression was built up by entering in the first step socio-demographic variables and mental health indices. In the second step the remaining predictor variables were entered using the forward conditional procedure.

The RCRMs were fitted using the multilevel analysis software package MLwiN 1.10 (Rasbach et al, 2000). For all other data analyses the SPSS 11.1 package was used.

Results

The CMHCs accepted 414 persons into the program, 55 (13%) refused to join the study or were not eligible for the study (age < 55, or concurrent psychological treatment). Another 41 were excluded by the researchers because of concurrent mental health treatment (35 at the interview and 6 at the post-treatment assessment). Pre-treatment data of one participant were incomplete.

Our final intention-to-treat (ITT) sample included 317 participants, of whom 53 (17%) dropped out of the course (reasons: medical [9], course not suitable [3], improvement [3], deterioration [2], and unknown [36]). Thirty participants left the study (not the course): 5 before post-treatment, 16 before 2-month FU and nine more before 14-month FU (reasons: [3], death [3], depression [2], and unknown [16]). At the 14-month FU 234 participants had returned the questionnaires, of which 232 were reached for the telephone interview. Dropouts (n=53) differed significantly from completers (n=264) on the level of education, but not on any of the other demographic, psychiatric history or pre-treatment dependent variables. In the dropout group 24.5% reported a higher level of education (i.e., ≥ 11 years), compared to 46% in the completers group (χ^2 (1, n = 314) = 8.30, p = .004). Participation rate for the completers was high, with a mean number of attended sessions of 9.27 (SD = 0.95). The 30 participants who left the study reported a significantly lower level of physical functioning than those who stayed (t(262) = 2.75, p = .006). They did not differ on any of the demographic, psychiatric history or other pre-treatment variables.

The mean age in the intention-to-treat sample (ITT) (N =317) was 65.78 years (SD = 7.2; range 55-85). The majority was female (73%) and of Dutch origin (91%), 47% were cohabiting with a partner or children. Just over half (58%) had less than 11 years of education. The four levels of income per month were evenly distributed: 21% less than € 900, 31% from € 900 - € 1350 euro, 23% from € 1350 - €1800, and 25% more than € 1800. The majority (70%) reported the presence of at least one chronic medical condition.

Preliminary analyses

The mental health characteristics are summarized in Table 1. Table 2 gives an

Table 1. *Mental Health Characteristics and Physical Health Indices*

Variable	*N*	(%)	Mean (*SD*)
Axis I Disorders:			
No axis 1 disorder	129	(40.7)	
Axis 1[a], but not MDD	61	(19.2)	
MDD	60	(18.9)	
MDD + anxiety disorder[b]	67	(21.1)	
Depressive disorders			
MDD	127	(40.1)	
Anxiety disorders[b]	128	(40.4)	
MDD history			
Never an MDD	50	(15.8)	
Remission	140	(44.2)	
First episode	54	(17)	
Recurrent	73	(23)	
≥ 2 prior episodes or chronic MDD	189	(59.6)	
Personality Pathology			
Cluster A			10.10 (7.47)
Cluster B			10.58 (7.34)
Cluster C			13.78 (9.11)
PD-NOS			36.45 (22.98)
Antidepressants[c] and/or sedatives	169	(53.5)	
HADS-anxiety	317		9.92 (4.19)
Physical health			
≥ 1 chronic disease	222	(70)	
MOS-pain	317		46.85 (32.16)
MOS-phys funct			55.68 (33.31)

MDD_{pre} MDD = major depressive disorder at pre-treatment; Cluster A = Paranoid + Schizoid + Schizotypical personality disorders; Cluster B = Anti-social + Borderline + Histrionic personality disorders; Cluster C = Avoidant + Dependent + Obsessive-Compulsive personality disorders; PD-NOS = Cluster A + Cluster B + Cluster C + Depressive + Passive-Aggressive personality disorders; HADS anxiety = Hospital Anxiety and Depression Scale anxiety scale; MOS-pain = Medical Outcome Study Short Form General Health Survey pain scale; MOS-phys funct = Medical Outcome Study Short Form General Health Survey physical functioning scale. [a] can be more than one axis 1 disorder, such as dysthymia, anxiety orders, manic episode, substance dependency, psychotic disorder, eating disorder; [b] can be more than one anxiety disorder. [c] includes St John's Wort

overview of changes in depression symptoms, clinical diagnosis and medication use between pre-treatment and the14 month FU. The scores on the CES-D decreased from pre- to post-treatment (Mean difference = 7, *SD* = 9.5; effect size [ES] 0.72), and then leveled out over the FU assessments. The difference between pre-treatment and the 14 month FU had a moderately large *ES* of 0.61. Computed according to Jacobson and Truax (1991), the reliable change on the CES-D was a change ≥ ± 8.6. Based on this

Table 2. *Changes over time in CES-D scores, clinical diagnosis and medication use*

	N	Pre-treatment	Post-treatment	2-month FU	14-month FU
CES-D	228				
Mean (*SD*)		24.56 (9.79)	17.70 (9.35)	18.96 (10.62)	18.27 (10.88)
CES-D ≥16		188 (83%)	127 (56%) [a]	130 (57.5%) [b]	131 (58%)
MDD	232	94			32
Medication	227	114	98[b]		76[b]

MDD, major depressive disorder; medication use, antidepressants and/or sedatives [c] including St John's Wort.

[a] McNemars test for significance of change $p < .001$; [b] McNemars test for significance of change $p > 0.05$

index: at the conclusion of the course 116 (37%) of the 318 participants achieved a reliable improvement and 15 (5%) had worsened. At 14-month FU, 32 of the 232 participants who were reached for the clinical interview fulfilled the criteria for a MDD; 24 of these participants had a MDD at pre-treatment, the other eight reported a recurrence; of the 94 participants with a MDD at pre-treatment, 70 were in remission. These changes in clinical diagnosis between pre-treatment and the 14 month FU were significant (McNemar χ^2 (1, n = 232) = 47.71, $p < .001$). The change in the use of psychotropic medication between pre- and post-treatment reached borderline significance (McNemar $\chi^2(1, n = 225) = 3.56$, $p < .059$). The change between post-treatment and the 14 month FU was not significant (McNemar $\chi^2(1, n = 219) = 0.20$, $p < .66$).

Prediction of decrease in depression symptoms; results from the RCRM

Results for the unconditional (empty) model three level model revealed a non-significant intra-class correlation (ICC = 0.02, $F(45, 267) = 0.99$, $p > .10$), that is no significant effect of the CWD group. Hence, all succeeding models were simplified considering only two levels of variation: repeated measures nested within participants.

The unconditional three level model:
$CES_{ijk} = \beta_0 + v_{00k} + u_{0jk} + e_{ijk}$
$\beta_0 = 21.30$ (*SE* = 0.53)
$\sigma^2_{v0} = 2.46$ (*SE* = 4.83), σ2u0 = 65.64 (*SE* =7.94).
$\sigma^2_e = 53.34$ (*SE* = 2.66).
Deviance (-2*loglikelihood): 8159.58 (1119 of 1272 cases in use

Immediate Effect – improvement rate

Due to dropout from the course or from the study, 831 responses (87%) of the possible 954 assessment points (318 participants on each of three occasions) were present in the data and used for analyses. The baseline model for immediate effect showed that the mean trajectory van be described by an average initial severity (β_0) of 24.48 (*SE*=0.54) and a highly significant average decrease of CES-D over time (β_1 = -0.31 [*SE*=0.03]). The individual variation in initial severity (σ^2_{0j} = 44.66 (*SE* = 8.61) is large. The individual variation in the improvement rate is small (σ^2_{1j} = 0.003 (*SE* = 0.04). This model's deviance is 6049.54.

Incorporation of predictor variables and subsequent model refinement resulted in the final model described in Table 3, which showed that the mean trend of the CES-D scores over the three time points was explained by 11 predictor variables and four two-way interactions: living alone, education, current MDD, previous episodes/chronicity, anxiety, personality disorder symptoms, physical functioning, two coping styles (palliative-responses and depressive-reaction-pattern), post-traumatic distress, self-efficacy, and the two-way interactions education with time, current MDD with time, previous episodes/chronicity with time, and anxiety with time.

This model had significantly better fit than the baseline model ($\chi^2(15) = 528.47$, $p < .001$). All predictors, except education, contributed significantly to the average initial severity. The variables education, current MDD, previous episodes/chronicity and anxiety contributed significantly to the average improvement rate. Result showed that no individual variation was left in either the initial severity or the improvement rate (σ^2_{0j} and σ^2_{1j} can be considered zero; see note in Table 3).

Using the final model, the average contribution for each predictor variable to the average CES-D scores at the three assessment times, and the mean change on the CES-D (Δ CES-D, i.e., the improvement) were estimated (see Table 4). High anxiety and current MDD had the largest effects on the initial CES-D scores, whereas the effect of previous episodes/chronicity was negligible. Comparison of the estimated Δ CES-D's with the reliable change index showed that none of the variables by themselves exceeded the limit of 8.6. The estimated effect of previous episodes was the smallest.

Table 3. *Two-level RCRM for immediate effect (pre- and post-treatment, and 2-month FU*

Fixed Effect	Estimate (β)	*SE*	T –ratio	p^a
Intercept (β_0)	18.53	3.26	5.68	<.001
Weeks (β_1)	-0.14	0.10	-0.40	ns
LivSit	1.59	0.70	2.27	.015
EDU	1.03	0.79	1.30	ns
MDD_{pre}	5.87	0.87	6.75	<.001
$Hist_{MDD}$	-1.61	0.82	-1.96	.03
$HADS_{anx}$	0.52	0.11	4.72	<.001
PD_{NOS}	0.71	0.21	3.38	<.001
MOS_{phys}	-0.03	0.01	-3.00	.002
PALL	-0.31	0.11	-3.00	.002
DRP	0.24	0.13	1.85	.05
IES	0.07	0.02	3.50	<.001
SE	-0.19	0.06	-3.17	.001
Weeks* Education	-0.21	0.07	-3.00	.002
Weeks*MDD_{pre}	-0.12	0.07	-1.71	.05
Weeks* $Hist_{MDD}$	0.23	0.07	3.29	<.001
Weeks* $HADS_{anx}$	-0.02	0.01	-2.00	.02
Variance component				
Level 1: weeks (σ^2_e)	52.85	4.72		
Level 2: intercept (σ^2_{u0})	-6.69 [b]	5.71		
Level 2: slope (σ^2_{u1})	-0.04 [b]	0.04		
Level 2: covariance (σ_{u10})	1.38	0.36		
Deviance (2*loglikelihood)	5521.07			

Weeks = time in weeks: pre =1, post = 10, 2 mo FU = 20; LivSit = living alone; 14 mo FU = 72; EDU ≥ 11 years of education; MDD_{pre} = major depressive disorder at pre-treatment; $Hist_{MDD}$ = ≥ 2 previous episodes or chronic MDD; $HADS_{anx}$ = anxiety scale; PD_{NOS} = personality disorder score; MOS_{phys} = physical functioning; PALL = palliative-responses; DRP = Depressive-reaction-pattern; IES = posttraumatic stress; SE = self-efficacy.

[a] Based on one-tailed *t* -tests

[b] These negative values are due to a computational option in MLwIN. Variances are bounded below by zero, so a negative variance estimate is usually considered equal to zero

Level 1 = repeated measures, time in weeks; level 2 = individual participant.

Base line model: $CES_{ij} = \beta_0 + \beta_1 weeks_{ij} + u_{0j} + u_{1j} weeks_{ij} + e_{ij}$

$\beta_0 = 24.47$ (*SE* = 0.54); $\beta_1 = -0.31$ (*SE* = 0.03);

$\sigma^2_{u0} = 44.66$ (*SE* = 8,61) ; $\sigma^2_{u1} = 0.003$ (*SE*=0,036); $\sigma_{u10} = 0.64$ (*SE*=0.44)

σ^2_e = 51.39 (*SE* = 4.52)
Deviance: 6049.54 (831 of 954 cases in use)

Final model: $CES_{ij} = \beta_0 + \beta_1 weeks_{ij} + \beta_2 LivSit_j + \beta_3 EDU_j + \beta_4 MDD_j + \beta_5 Hist_{MDD\ j} + \beta_6 HADS_{anx\ j} + \beta_7 PD_{NOS\ j} + \beta_8 MOS_{phys\ j} + \beta_9 IES_j + \beta_{10} PALL_j + \beta_{11} DRP_j + \beta_{12} SE_j + \beta_{13} weeks*EDU_{ij} + \beta_{14} weeks*MDD_{ij} + \beta_{15} weeks*Hist_{ij} + \beta_{16} weeks* HADS_{anx\ ij} + u_{0j} + u_{1j} weeks_{ij} + e_{ij}$
Deviance: 5521.07 (795 of 954 cases in use)

Table 4. *Immediate effect: estimated scores and estimated improvement on CES-D, seperately for each significant variable*

	Pre-treatment	Post-treatment	2-month FU	Δ CES-D
None of characteristics	18,39	17,13	15,73	1.96
HADS anx score 21	28,93	24,27	19,09	7.224
HADS anx score 8	22,41	19,85	21.13	1.92
MDD_{pre}	24,14	19,85	19.30	4.57
$Hist_{MDD}$	17,01	17,80	18.68	- 1.23
EDU	19,21	16,06	12.17	5.10

Δ CES-D is the mean change on CES-D from pre- to 2 –month FU. Three assessment points were needed to calculate the mean improvement rate. On the line representing the mean trajectory through these three points, the estimated mean score at post-treatment will be higher and the estimated mean at 2-month FU will be lower than the observed mean score. Hence Δ CES-D will lie in between those two estimations. MDD_{pre} major depressive disorder at pre-treatment; HADS anx , Hospital Anxiety and Depression scale, highest score of 21 on anxiety scale; HADS anx score 8, Hospital Anxiety and Depression scale, cut-off score 8 on anxiety scale; $Hist_{MDD}$, ≥ 2 previous episodes or chronic MDD; EDU, ≥ 11 years of education.

Maintenance Effect

Of the possible 954 assessment points 705 (74%) responses were present in the data and used for analyses. The baseline model for the maintenance effect showed that the average depression severity at post-treatment (β_0) was 18.72 (*SE*=0.62) and that the average change on the CES-D could be considered zero (β_1 = -0.001 [*SE*=0.009]), the model's deviance was 5415.05. Results showed that, on average, there was no change between post-treatment and the 14-month FU. The individual variation of the intercept was large; the variation in the slope (β_1) was small, indicating large variation in the CES-D scores reached at post-treatment, while on average this score remained unchanged over the next 14 months.

The final model contained the predictors living alone, current MDD, previous episodes/chronicity, comorbid anxiety disorder, the confounder variable health improvement, and the two-way interaction variable health improvement with time.

Table 5. *Two-level RCRM for Maintenance Effect (post-treatment, 2- and 14-month FU)*

Fixed Effect	Estimate (β)	*SE*	*T*–ratio	p^a
Intercept (β_0)	10.74	1.10	9.76	<.001
Weeks (β_1)	0.01	0.01	1.30	ns
LivSit	3.06	1.00	3.05	.002
MDD_{pre}	6.44	1.04	6.19	<.001
$Hist_{MDD}$	3.41	1.03	3.32	<.001
CoAnx	3.16	1.02	3.11	.002
PosPhys	2.21	1.62	1.36	ns
Weeks*PosPhys	-0.08	0.03	-2.92	.002
Variance component				
Level 1: weeks (σ^2_e)	35.39	3.32		
Level 2: intercept (σ^2_{u0})	45.76	7.59		
Level 2: slope (σ^2_{u1})	0.005	0.002		
Level 2: covariance (σ_{u10})	-0.08	0.11		
Deviance (2*loglikelihood)	4952.67			

Weeks = time in weeks: post = 10, 2 mo FU = 20, 14 mo FU = 72; LivSit = living alone; MDD_{pre} = major depressive disorder at pre-treatment; $Hist_{MDD}$ = ≥ 2 previous episodes or chronic MDD; CoAnx = comorbid anxiety disorder present; PosPhys = improved health. [a] Based on one-tailed t-tests.

Level 1 = repeated measures, time in weeks; level 2: individual participant.
Base line model: $CES_{ij} = \beta_0 + \beta_1 Weeks_{ij} + u_{0j} + u_{1j} Weeks_{ij} + e_{ij}$
$\beta_0 = 18.72$ (*SE* = 0.62); $\beta_1 = -0.001$ (*SE* = 0.009)
$\sigma^2_{u0} = 69.08$ (*SE* = 9,40); $\sigma^2_{u1} = 0.005$ (*SE* = 0.003); $\sigma_{u10} = -0.04$ (*SE* = 0.12)
$\sigma^2_e = 37.71$ (*SE* = 3.40)
Deviance: 5415.05 (753 of 954 cases in use)

Final model: $CES_{ij} = \beta_0 + \beta_1 Weeks_{ij} + \beta_2 LivSit_j + \beta_3 MDDpre_j + \beta_4 Hist_{MDD\ j} + \beta_5 CoAnx_j + \beta_6 PosPhys_j + \beta_7 Weeks* PosPhys_{ij} + u_{0j} + u_{1j} Weeks_{ij} + e_{ij}$
Deviance: 4952.67 (705 of 954 cases in use)

This model had a significantly better fit than the baseline model ($\chi^2[6] = 462.38$, $p <$ .001). Results (see Table 5), showed that the mean trend of the CES-D scores over the

period from post-treatment to the14-month FU was explained by five variables. All of which, except health improvement contributed significantly to the average CES-D score at post treatment. The variable health improvement showed a significant interaction with the average change rate, indicating that improved health resulted in a decrease on the CES-D at the 14-month FU.

The final model showed a reduction in individual variation (σ^2_{0j}) of the post-treatment level from 69.08 to 45.76, but not of the post-treatment change rate (σ^2_{1j} remained 0.005). The estimated contribution of health improvement, based on the final model is a decrease of 3.9 points at the 14-month FU. The baseline model for the maintenance effect predicted an average score of 18 at post-treatment and no change between the assessments at post-treatment and the 14-month FU.

Prediction of remission of MDD; results from the hierarchical logistic regression

At the 14-month FU the data of 129 participants in the subgroup at risk for a recurrence of MDD were available for analyses. Only eight of these individuals had a MDD, not enough for further prediction analyses.

In the subgroup of participants with a MDD at pre-treatment 94 (73%) of the 128 participants were interviewed at the 14-month FU, of these 70 (74%) were in remission at that time. Based on the bivariate analyses 12 predictors for remission were retained for the logistic regression model: living alone, antidepressants and/or sedatives at pre-treatment, previous episodes/chronicity, comorbid anxiety disorder, anxiety, personality disorder symptoms, sum negative life events, three coping styles (depressive-reaction-pattern, palliative-responses and seeking-social-support), self-efficacy, and perceived social support.

Direct logistic regression of the variable remission MDD on living alone, medication, previous episodes/chronicity, comorbid anxiety disorder in the first and the remaining variables in the second (explorative) step was statistically reliable, $\chi^2(5, n = 92) = 38.18$, $p \leq .001$. The contributions of living alone (OR 0.11), medication (OR 0.14), comorbid anxiety disorder (OR 0.23), seeking social support (OR 1.39) and self-efficacy (OR 1.10) were significant. Previous episodes/chronicity was borderline significant (OR 0.21, $p = .78$). Table 6 shows the hierarchal logistic model built up by entering sets of predictors one by one. These results indicate that living with somebody, taking no psychotropic medication, the absence of a comorbid anxiety disorder, the ability to seek social support, and having a good sense of self-efficacy all increased the chances of remission. A further look at medication use showed that 61% of all the participants using antidepressants had a comorbid anxiety disorder and 90% reported previous episodes; the associations between medication and comorbid anxiety disorder as well as between medication and previous episodes were borderline significant ($\chi^2(1,n = 94)= 3.39$, $p = .07$ and $\chi^2(1,n = 94) = 3.36$, $p = .007$).

Table 6. *Logistic Regression Subgroup MDD at pre-treatment (N = 128)*

Variable	χ^2 (*df*)	*B*	*SEB*	*p*	OR
Step 1	21.50 (5)			<.001	
Living alone		-1.25	0.60	.04	
Prior Episodes		-1.24	0.74	.09	
Medication		-1.20	0.60	.05	
CoAnx		-1.25	0.63	.05	
Anxiety		-0.08	0.08	.31	
Constant		4.07	1.28	.002	
Step 2	38.17(7)			<.001	
Living alone		-2.23	0.80	**.01**	0.11
Prior episodes		-1.56	0.86	.08	
Medication		-1.20	0.83	**.02**	0.14
CoAnx		-1.47	0.74	**.05**	0.23
Anxiety		-0.05	0.10	.61	
SSS		0.32	0.12	**.01**	1.38
S-E		0.10	0.05	**.05**	1.10
Constant		-1.64	2.21	.46	

Included in the analyses are 92 cases. Prior episodes ≥ 2 previous episodes/chronicity; Medication = antidepressants and/or sedatives; CoAnx = comorbid anxiety disorder; anxiety = score on Hospital anxiety and Depression Scal – anxiety scale; SSS = seeking-social-support; SE = self-efficacy.

Discussion

The CES-D scores over the 16 months showed two distinct courses: a sharp and highly significant decrease in symptomatology from pre to post-treatment and an almost horizontal levelling out during the 14-month follow-up period, indicating that the effect was maintained. These findings corroborate the results of the RCT study (Haringsma, et al., 2006) and are in agreement with the literature on efficacy studies of psychotherapy for late life depression (Cuijpers, 1998a; Engels & Vermey, 1997; Karel & Hinrichsen, 2000).

The large variation of initial depression severity was fully predicted by 10 prognostic factors. In general the influence of these factors was in the expected direction. The individual variation in the immediate effect was predicted by only three of these factors plus level of education. Higher initial depression levels and greater improvement was predicted by current MDD, less than two previous episodes and a high level of anxiety. However, when evaluating the separate predictors one should bear in mind that in general those with the highest level of symptom distress will show

the greatest reduction (Garfield, 1994). The differential effect of current MDD probably reflects this tendency. Hamilton and Dobson (2002) concluded that in patients suffering from acute MDD, treatment response is negatively affected by prior depressive episodes or chronicity. In our sample this influence was clinically meaningless. This difference may be due to heterogeneity of our sample.

The effect of anxiety on treatment response reflects the entwinement of depression and anxiety, which in our sample was apparent by the high comorbidity of MDD with anxiety disorder and the high correlations between the CES-D and the HADS anxiety (0.56 and 0.63, respectively, both with a $p< 0.001$). Consequently, reduction of the depression symptoms will also result in a reduction of anxiety symptoms and vice versa. Our RCT study of the sample showed that the course had a significant effect on the anxiety score (Haringsma et al., 2006). The literature of the effects of education on treatment outcome are inconclusive (Garfield, 1994), although Steinmetz et al. (1983) found that reading ability predicted a better treatment outcome of the CWD course for adults. They hypothesized that reading ability is important because the course uses a lot of written material. In the same vein of thinking we postulate that for those with more years of formal schooling the course's educational format is a familiar way of learning.

Medication use was not a predictor of response, this corroborates with our conclusion in the RCT study that since the experimental and the control group did not differ in the use of psychotropic medication, the differences in outcome between the conditions could not be attributed to medication (Haringsma et al., 2006). This result may be explained by the fact that the use of antidepressants at pre-treatment was not related to diagnostic status. Furthermore, the improvement may have led to the decrease at post-treatment. Non-differential effects of medication were also reported by Bockting et al. (2005) in their study of preventive cognitive therapy in remitted patients.

Participants retained the level of depression symptoms they had achieved at post-treatment for at least the next 14 months, and there was hardly any variation in this course over time. However, the variable improvement of health showed a small effect on the score on the CES-D on the last assessment. Improvement of physical health was measured with a single question, so no firm conclusions can be drawn. Nonetheless, this finding is in agreement with research showing that the functional impairment and not the medical condition *per se* is associated with the development of depression (Beekman et al., 1996; Zeiss, Lewinsohn, Rohde & Seeley, 1996).

The incidence of MDD 14 months after the conclusion of the course was an indication of successful indicated or secondary prevention. We had no data on the incidence of MDD during that period, which limits our conclusions. However, the small number of cases in the subgroup of participants who were at risk for developing a MDD can be considered as an indication of successfully preventing recurrence. With regard to secondary prevention, we found that 74.5% were in remission 14 months later. From the factors that predicted this state a less vulnerable and mentally healthier

participant emerged: a participant, who was cohabiting, did not use psychotropic medication, did not have a comorbid anxiety disorder, sought social support when there were problems, and had a high sense of self-efficacy. Apart from the use of medication, all these factors are known from other studies to be related to recovery. The associations of antidepressants with either comorbid anxiety disorder or previous episodes were nearly significant. Because all variables were predictive of a worse outcome at the 14-month FU, this might be seen as an indication that medication non-use is a characteristic of the subgroup of healthier individuals for whom secondary prevention is especially successful. The group format of the intervention warranted examination of group membership as a prognostic factor. The analyses showed that group membership was irrelevant for the variation in treatment outcome, that is, there were no CWD groups that produced significantly higher or lower outcomes than other groups. The standardized format of the course seems to ensure that the benefits of attending do not depend on individual differences between group leaders or differences in group interactions. To our knowledge this is the first study that analyzed the effect of group membership.

This study counted several limitations. It was not a controlled treatment outcome study; therefore we can not be certain that the improvements were the result of the course and not due to spontaneous improvement or remission. However, we found a similar rate of improvement in our controlled evaluation of the course, where course participants had a significantly better outcome than non-treated controls (Haringsma et al., 2006). The most important limitation is our lack of data on the incidence of MDD at post-treatment and 2 month FU. Therefore, we could not predict the effect of the program in preventing a MDD for those at risk both immediately after the course as well as during the follow up period.

The merit of this study is in the first place the fact that it is a large field study. The CWD course has been widely accepted, not only in the USA, but also in Western Europe for instance in Germany, and in the Netherlands. To our knowledge this is the first study that examines prognostic factors of outcome of this type of group intervention in the way it is utilised by the mental health care system. The sample studied was heterogeneous; participants differed in level of depression symptomatology, unipolar depression diagnoses, history of depression, and in comorbid anxiety disorders. The size of the population studied was large and a wide range of variables was examined for their prognostic value. The long follow up period allowed us examination of the clinical status (presence of MDD) a good year after enrolment into the course. Also our sample of 46 intervention groups was large enough for the use of random coefficient regression modelling (Kreft & de Leeuw; 1998), and justified our conclusion that the variance due to group differences can be ignored. Furthermore, the use of RCRM as analyses method has the advantage that in one model the initial depression severity as well as the change over time can be analyzed. This allows for a more comprehensive understanding of the effects that the

different predicting factors have on the initial level of depression symptoms, response to the CWD course and the maintenance of the achieved improvement.

To summarize our results: the course was well accepted by the target group. It is an attractive low threshold intervention of light intensity, which in general was beneficial for all. Close inspection of a range of participant variables explained some of the individual variation in change. However, the magnitude of the contribution of each prediction variable tot treatment outcome was smaller that the reliable change, which leads tot the conclusion that the clinical significance of the four predictor variables on treatment outcome does not justify triage beyond the criteria that are presently used to select the participants for the CWD course. The level of depression symptomatology reached at post-treatment was maintained over the next 14 months, indicating that the course was enough for those with an end score below 16. However, for the participants with a post-treatment score $\geq$ 16, further treatment should be considered. Finally, an adaptation of the course to the less educated should be considered.

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