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Structured treatment of depression via the Internet; protocol and results of a randomized trial [4]

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ABSTRACT

The present paper concerns an Internet-based treatment program for depression, developed by Interapy in collaboration with Mentrum Mental Health Organization Amsterdam. The program includes comprehensive screening and protocol-driven treatment for depression via the Internet. The treatment comprises cognitive-behavioral interventions, including psycho-education, writing assignments, monitoring, challenging dysfunctional automatic thinking, and relapse prevention. The procedures, the treatment, and the results of a randomized controlled trial are presented in the present paper. Participants, who underwent the full Internet treatment ($N = 32$), showed significant greater improvement than participants, whose treatment was limited to psycho-*education* only ($N = 14$). The effects of the treatment were large: 75 % of the participants, who underwent the full treatment showed reliable and clinically significant improvement. In the condition involving only psycho-education, 36 % of the participant displayed such improvement. A follow-up assessment established that the beneficial effects of the treatment were still fully present after six weeks.

Introduction

Studies in many countries have established a high worldwide incidence and prevalence of depression in adults, adolescents, and children. Lifetime prevalence of major depression has been estimated at 6.3 %. The prevalence of dysthymic disorders and sub-clinical forms of depression is still greater, and generally underestimated in current statistics (Collins, Westra, Dozoys, & Burns, 2004). According to the World Health Organization, depression is one of the most costly illnesses, both in financial terms, e.g., as a major cause of absenteeism, and in personal terms, as a source of personal suffering and diminished quality of life (Üstün & Chatterji, 2001). The high prevalence of depression is aggravated by the fact that it often takes a long time before people with mild depressive complaints, who seek help, are actually admitted to treatment. As a result of this delay, mild complaints may develop into persistent serious complaints, or may even result in major depression (Cuijpers, 2004; Wang, Demler, & Kessler, 2002). In many countries, insurance companies are increasingly unwilling to finance extensive therapeutic interventions, and there is thus a growing demand for efficient, short-term treatments.

A large body of research has shown that cognitive behavioral therapy is the most effective treatment for depression (e.g., Antonuccio, Burns, Danton, & O'Donohue, 2000; Kirsch & Sapirstein, 1998; Richter, 2002). The central aim of cognitive behavioral therapy is the detection and elimination of negative automatic thoughts that contribute to, or maintain, the depression. In addition to this, patients are encouraged to participate in activities that are expected to have a positive effect on their mood.

Recently, a number of protocols have been developed within cognitive behavioral therapy for the treatment of specific disorders. The usefulness of such protocols for treatment via the Internet has been established in a number of studies. These include the Internet-based treatment of eating disorders (Robinson & Serfaty, 2003; Zabinski, Celio, Jacobs, Manwarring, & Wilfley, 2003), panic disorders (Carlbring, Ekselius, & Andersson, 2003; Jager, Emmelkamp, & Lange, 2004; Richards, Klein, & Carlbring, 2003), posttraumatic stress disorder and complicated grief (Lange, et al., 2003), insomnia (Ström,

Petterson, & Andersson, 2004), fear of speaking in public (Botella, Banos, Villa, Perpina, & Garcia-Palacios, 2000), and burnout (Lange, Van de Ven, Schrieken, & Smit, 2004).

More recently, the department of clinical psychology of the University of Amsterdam has, in collaboration with Mentrum Mental Health Organization Amsterdam, developed an Internet protocol for the treatment of depression. An initial version of the depression protocol was tested in a pilot study, which resulted in several improvements. In this paper we describe the final protocol in detail, and present the results of a randomized controlled study of the effectiveness of this treatment.

Method

Procedure

In the present protocol, contact between the patient and therapist takes place exclusively via the Internet (www.interapy.nl). Patients and therapists can enter the web-server on any computer that is equipped with a recent version of Internet Explorer. All patients receive a personal entry-code, which gives them access to their own personal area of the server database. This area is accessible only to the patient and his or her therapist.

Those who express interest in the treatment first receive an introduction to the treatment in the form of *psycho-education*. This information is provided via the website. Psycho-education includes information about mood disorders, the existing forms of therapy, and some background information on the protocol. The applicants are also informed about the practicalities of the Internet treatment, such as the Internet procedures and applications, the screening, the online assessments, and the supervision, which participating therapists receive. If potential patients, following this introduction, choose to apply for the treatment, they receive a username and password. These give them access to the screening and pre-testing procedures. Applicants, who are admitted to the treatment, following the screening, are required to sign an *informed consent form*, and to return this form by regular mail or fax. Once the informed consent form is received, a therapist is assigned to the patient. All questionnaires that the patient is required to complete are

presented on the computer via the Internet. All incoming data from the patients are processed instantly. Subsequently, the therapist introduces him or herself, and starts with the instruction of the first phase of the treatment. Together with the therapist, the patient then follows the treatment. After the treatment, the patients complete the *post-test form* and an *evaluation form*. The latter serves to gather information concerning the patients' opinion about the treatment and their therapists. Six weeks later, a *follow-up* test is administered.

Screening

The *Interapy Biographic Questionnaire* (*Bio;* Abels- Reguera & Brunner, 2002) and various other well validated standardized online diagnostic self-assessment measures are used to determine whether potential patients satisfy the criteria for admittance to the Internet depression treatment. The following exclusion criteria were applied:

- *Younger than 18 years*.

- *Drug use or alcohol abuse*. Applicants who use hard drugs, or who consume more than 10 units of alcohol a day, are excluded from participation.

Currently receiving psychological or psychiatric treatment.

- *Too depressed or not depressed enough*. The intensity of the depression is assessed through the Dutch version of the *Beck Depression Inventory* (*BDI*, Beck & Steer, 1987; Bouman, 1994). The BDI is a frequently used questionnaire, which emphasizes the cognitive symptoms of depression. The reliability coefficient of the BDI is $\alpha = .85$. The convergent validity of this instrument is supported by the high correlations with other depression questionnaires. Applicants with BDI scores < 10 are excluded from the treatment. Applicants with BDI scores > 29 are also excluded from the treatment. The latter applicants are referred to a simultaneously running controlled face-to-face study on the treatment of severe depression.

- *Suicidal risks*. The risk of suicide is assessed using the Suicide Risico Taxatielijst (SRT; *Suicidal Risk Evaluation list*), which is based on Joiner et al. (2003). Applicants who have attempted suicide at least once during the past three years, or who have seriously contemplated suicide, are excluded from the treatment. These applicants are advised to apply for other treatment. The person, if any, who had referred the applicant (e.g., his or her general practitioner), is informed about this.

- *Presence of dissociative disorders*. The presence of dissociative disorders is assessed through the *Somatoform Dissociation Questionnaire* (SDQ-*5*; Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1997). This is a short questionnaire that assesses somatic expressions of dissociation. The reliability of the SDQ is good (α = .80), and its cross-validation is satisfactory. The SDQ distinguishes between patients with and patients without dissociative disorders. The questionnaire employs a cut-off score that is based on a clinical norm group. Applicants with an SDQ score ≥ 8 are excluded from the treatment.
- *Presence of psychotic symptoms*. The Gewaarwordingsvragenlijst (*GL; Perception questionnaire*; Lange, Schrieken, Blankers, Van de Ven, & Slot, 2000) is an eight-item questionnaire that is used to determine whether a patient experiences psychotic symptoms, or has an increased risk of developing psychosis. An example item is: "Sometimes I receive messages from voices inside, or just outside, my head". The GL is a valid assessment instrument for detecting psychotic disorders (Lange et al., 2000). The reliability is acceptable to good in non-clinical populations (α =.73) and in clinical populations (α =.83). Applicants with scores ≥ 5 on the scale of auditory hallucinations are excluded from the treatment. Applicants receiving anti-psychotic medication (as determined through the *Interapy Biographic Questionnaire*) are also excluded from the treatment.
- *Prevailing anxiety disorder*. The presence of anxiety disorder is determined through the Dutch version of Shear's (Shear et al., 1997) *Panic Disorder Severity Scale* (*PDSS*; Jager, Emmelkamp, & Lange, in preparation). The reliability of this questionnaire is good (α = .88), as are the convergent and divergent validity of the instrument. Applicants with a prevailing anxiety disorder (scores > 8 on the PDSS) are excluded from the Internet treatment for depression. They are invited to apply for the Internet treatment for anxiety disorders, or are referred to other treatments.
- *Posttraumatic stress disorder*. The Dutch version of the *Impact of Events Scale* (*IES*; Brom & Kleber**,** 1985; Horowitz, Wilner, & Alvarez, 1979) is used to determine the prevalence of posttraumatic stress disorder. The reliability of the IES subscales ranges from .66 to .81. The external validity of the subscales is good. Applicants with scores > 36 are asked to clarify their symptoms over the telephone, and if appropriate, they are invited to apply for the Internet treatment for posttraumatic stress.

Outcome measures

The effectiveness of the treatment is assessed using the following instruments:

- The *BDI* (described above).
- The Dutch version of the depression subscale of the Symptom Check List (*SCL-90*; Arrindell & Ettema, 2003; Derogatis, 1977). Reliability and validity of the scales of the SCL-90 are good. The depression subscale, which consists of 16 items, has good reliability of $\alpha = .90$, and good convergent and divergent validity.
- The Dutch version of the depression subscale of the *Depression, Anxiety, and Stress Scale* (*DASS*, Antony, Bieling, Cox, Enns, & Swinson, 1998). The three subscales each consist of 14 items. The reliability of the depression subscale is good ($\alpha = .95$), as are the reliabilities of the other subscales. This depression subscale correlates highly with the BDI ($r = .72$) and has good validity (De Beurs, Van Dyck, Marquenie, Lange, & Blonck, 2001).

Participants

Over a period of four months, 231 individuals applied for the treatment. The publication of an interview about the treatment in a Dutch national newspaper provided the initial impetus for many applicants. In addition, participants were recruited through advertisements in the weekly magazine of the University of Amsterdam, and advertisements in a Dutch newspaper. Finally, a number of applicants were recruited through Mentrum Mental Health Organization Amsterdam. Of the 231 applicants, 59 did not enter the intake procedure, did not complete the screening, or failed to return the informed consent form. Following the screening procedure, 115 of the 172 applicants failed the inclusion criteria. Of these 115, 64 were excluded because of other disorders; 7 applicants scored too low on the BDI; 5 scores too high on the BDI; 18 applicants were considered to have too great a risk of suicide; 15 applicants had too many dissociative symptoms; 4 applicants had an increased risk of psychosis; and 2 applicants were excluded because of drug use. The 57 remaining applicants, who were admitted to the treatment, were assigned randomly to a group that receive treatment right away, or to a control group that first received psycho-education, and was given the full treatment later on. By design, more patients were assigned to the active treatment group (40) than to the psycho-education control group (17). Oversampling in the treatment group is based both on ethical considerations (i.e., the desire to help as many as

possible, as soon as possible) and methodological considerations (the possibility that drop-out may be greater in the more demanding treatment group). Of the 57 patients in the complete group, 46 completed the entire treatment. Of the 11 patients who dropped out, 8 were in the treatment condition, and 3 were in the psycho-educational control condition. The analyses in this study were based on the results of these 46 patients.

The total group consisted of 13 males and 33 females. The age of the patients ranged from 23 to 64 years old, with a mean of 42 (*SD* = 9.3). Seventy percent of the applicants had completed higher professional education, or some other form of higher education. One third of the participants lived alone. The other two third cohabited with partners and/or children, or with friends or housemates. Analyses showed that there were no notable differences between the two conditions in educational level, gender, age, or initial scores on the effect measures. In comparison to a non-clinical population, the initial mean score on the depression SCL-90 subscale were in the highest regions of the normal range. The initial scores on the BDI ranged between moderate and severe depression. On average, the depressive complaints had been present for about 6 year (*SD* = 14 months).

Design

The effectiveness of the active treatment was compared to that of only psycho-education in a pre-test post-test two-group design. The group that received active treatment also completed follow-up tests six weeks after the treatment. The participants of the psycho-educational control condition received active treatment with post- and follow-up assessments as soon as their presence as controls was no longer required.

The depression protocol

All participants first receive psycho-education. During active treatment, they receive instructions for assignments, feedback, and specific psycho-education. Completing the assignments usually takes a patient about two hours a week. The treatment comprises the sum total of psycho-education, active intervention, and the empathic, respectful, and motivating feedback provided by the personal therapist. The treatment is divided in eight phases and takes a minimum of 11 weeks. Generally, participants take somewhat longer to finish the entire treatment (*median* = 16). Below the 8 phases are discussed in detail.

Phase 1. Creating awareness

The theme of the first and second phase of the treatment is to create, or to increase, awareness: what symptoms does the patient experience, and since when and under what circumstances, has he or she experienced these? During the first part of this phase, which consists of a *writing assignment*, patients make an inventory how and when they experience depressive symptoms, and try to determine the immediate causes of their depressive moods. Patients are required to devote two sessions of 45 minutes to writing freely about possible past and present events that may relate to their negative feelings and thoughts. The patients are asked to write chronologically: first focusing on the past, and then gradually working towards the present. Following the first session, patients receive advise, support, and specific commentary. The writing provides the patients with structure, and provides both the patient and the therapist insight into the possible causes of the depression, and the ways in which the depression is manifested.

Phase 2. Creating awareness: the mood-evaluator

The process of creating awareness is intensified through the use of the so-called *mood-evaluator* (Lange, 2000). On five consecutive days, the patient is required to record his or her mood at three fixed time points. Based on these records, the patient and the therapist gain insight into the mood fluctuations during the day, and into the events, thoughts, or feelings that influence their mood. Together with the therapist, the patient explores the possible relations between his or her mood and the events or their thoughts.

Phase 3. Increasing activities, relaxation, and sleeping instructions

A depressive mood is often associated with a low level of activity. Generally, an increase in activities has a positive effect on one's mood (Jacobson et al., 2000; Lange, 2000). Patients are therefore encouraged to increase their activities. During one week, they are required to make a schedule for their daily activities. The therapist makes sure that the intensity of planned activities is appropriate for the patient (e.g., ensures the patient does not overdo it by planning too many activities). Afterwards, the patients evaluate their success in following their schedule. If they failed to adhere to their schedule, they evaluate the causes

of their failures. During this phase, patients also receive detailed psycho-education concerning:
- *Relaxation* and *breathing* exercises (Öst, 1987), and possible *physical* activities (Bosscher, 1991) that may be included the patients' daily schedule.
- *Sleep hygiene* (Bastien, Morin, Quellet, Blais, & Bouchard, 2004). The patients are informed about the potential negative effects of afternoon naps, caffeine, alcohol, and sleeping medication on the quality of their night sleep. The patients receive practical tips about how to get to sleep, and how to get back to sleep, when they wake up during the night. As a rule of thumb, patients are advised to keep the lights dim when they awaken during the night, and to avoid frenetically trying to get back to sleep.

Phase 4. Cognitive restructuring: challenging negative thoughts
The aim of the fourth phase of the treatment is to identify and challenge the patient's dysfunctional thoughts. The principle of challenging one's own thoughts is explained to the patients, and the patients are taught how they themselves can bring this into practice. Subsequently, patients are required to keep track of their depressogenic and worrying thoughts during a week. An important element in this phase is the so-called *30-minutes worry-time*. Rather than continually giving in to negative and worrying thoughts, the patients are encouraged to briefly write down the thoughts as they occur to them during the day. They are then required to take 30 minutes at a predetermined time during the day to think these thoughts over. The therapists instruct their patients to play devil's advocate during these 30 minutes by actively challenging their negative thoughts (McKay, Davis, & Fanning, 1997). The patients challenge their own thoughts by posing specific questions. Some examples of challenging questions that patients are taught to ask themselves are: "How big is the chance that this is actually going to happen?"; "Is there any convincing support that my assumptions are actually correct?"; "Are there other ways to look at this?"; and "What would I say to a friend, if this actually happened to him/her?".

Phase 5. Cognitive restructuring: putting negative thoughts to the test in behavioral experiments

Although it is difficult in face-to-face treatment to get patients to engage in fruitful behavioral experiments, it was decided to incorporate the technique of behavioral experiments in the Internet protocol. In practice this means that patients are instructed to transform specific negative thoughts into so-called "if... then..." hypotheses. Next, the therapist helps the patient to create an experiment in which the hypothesis is put to the test. Together, the therapist and the patient set up three experiments. The therapist assists by designing experiments that are simple, practicable and realistic, and designed such that the chance of reinforcement of the negative thoughts by others is minimized.

Phase 6. Positive self-verbalizations

Once the patients have been made aware of the nature and the possible causes of their negative thoughts, the treatment turns to the positive aspects of the patients. This phase starts with psycho-education about the beneficial effects of positive self-verbalizations on self-image and mood. Patients are asked to think about their positive characteristics and qualities, and to write these down during two writing sessions. This positive information is collected in their so-called white book. The patients summarize this information in a few sentences, which they write down on a small card. Patients are encouraged to read these sentences frequently, and say them aloud. The effectiveness of positive self-verbalization has been established in case studies and randomized trials (Lange, Richard, Gest, De Vries, & Lodder, 1998; Lange, Richard, Kiestra, & Van Oostendorp, 1997).

Phase 7. Interacting with others

A depressive mood and negative self-image often result in diminished contact with others. As a consequence of their mood, patients may feel a lack of interest in others, and thus experience few satisfying and positive interactions. It is therefore important to help patients, their negative mood notwithstanding, to assume a more positive attitude towards other people, like family, friends, and colleagues. In this phase, patients are made aware of their own contributions to the interactions with people in their surroundings. They are taught to communicate their wishes in a sympathetic and constructive manner, and to express their interest in and approval of others.

Phase 8. Relapse prevention: the toolkit

The last phase of the protocol is dedicated to preparing patients for the future. Patients are required to assemble a so-called toolkit. This toolkit consists of a letter addressed to themselves in which they make a compilation of the various elements of their therapy that they have found to be helpful in specific circumstances. They also commit to paper the intention to use the toolkit as soon as they feel any signs of an upcoming or imminent relapse. Figure 1 provides a schematic overview of the phases and the elements in the phases.

Figure 1 about here

The therapists

A total of 25 therapists (6 males, 19 females) treated the patients in this study. Each patient was assigned a personal therapist. While some therapists treated more than one patient (but no more than three), most therapists treated just one patient. The majority of the therapists were young clinical psychologists, who had recently graduated. The remaining therapists were employees of Mentrum Mental Health Organization Amsterdam. The therapists were 33 years old on average (range 21-58, *SD* = 10.6). All therapists underwent prior training in working with the Internet depression protocol. During the actual treatment, the therapists attended weekly group meetings, during which they discussed their individual cases and received supervision.

Data analyses

The effectiveness of the treatment was studied in both conditions, i.e., the actual (active) treatment condition and the psycho-educational control condition. Paired t-tests were used to test the significance of the change in depressive symptoms between pre-test and post-test in the two conditions. In addition, exploratory analyses were conducted to investigate the reduction in anxiety and stress related symptoms. Univariate analyses of variance (ANOVA's) were used to test the difference in reduction of the depressogenic symptoms between the conditions for each measure separately, and a multivariate analysis of variance (MANOVA) was used to test the overall effect on the various measures. Cohen's *d* was

calculated in each condition as a measure of effect size (Cohen, 1988). Effect sizes in terms of *d* ranging between .2 and .5 are considered moderate, and values of *d* greater than .8 are considered large. The difference in effect sizes between the conditions serves as a measure of the net effect of the treatment.

The method of Jacobson and Truax (1991) was used to establish whether patients had changed significantly in a clinical sense. To this end, it was first established for each patient individually whether he or she had shown *reliable* change. For each patient, who showed reliable change, we then determined whether this change was also *clinically relevant*, i.e., whether these patients now scored in a different (more favorable) norm group. We then compared the percentage of patients in both conditions who had shown clinically relevant change. A chi-square test was used to test the difference in percentages between the two conditions. Finally, we discuss the patients' perception of the different aspects of their treatment and their therapists, as expressed in their responses to the evaluation questionnaire.

Results

Table 1 contains the means and standard deviations of the outcome measures at the pre-test and post-test. The table also includes the results of the six-week follow-up in the treatment condition. In the treatment group, depression, anxiety, and stress all decreased significantly, and there was no relapse at the six-weeks follow-up. The effect sizes (pretest vs. posttest) are all large, ranging from 1.9 (BDI, DASS depression) to 1.2 (DASS anxiety). The psycho-educational control group also showed decreases in mean depression, anxiety, and stress. However, these decreases were less substantial in comparison to the treatment group.

Table 1 about here

Testing the differences between the conditions

A MANOVA was conducted on the differences in pre-test post-test decrease in the treatment group and the psycho-educational group. For the BDI, SCL-90-depression, and

DASS-depression, the MANOVA showed that the reduction of depressive symptoms differed significantly between the two conditions ($F(3, 44) = 3.6$, $p = .021$). Similarly, univariate analyses revealed that decreases in the scores on the DASS-anxiety scale and the DASS-stress scales were greater in the treatment group than in the psycho-educational control group (for DASS-anxiety: $F(1,44) = 9.5$; $p = 0.004$; for DASS-stress: $F(1,44) = 4.6$; $p = 0.037$).

Effect sizes

The effect of the treatment was estimated by calculating the difference between the effect sizes of the treatment condition and the psycho-educational control condition. The effects sizes in Table 1 show that for the depression measures, the net effects of the treatment are between $d = 0.9$ and $d = 1.4$, with a mean net effect of $d = 1.1$, always clearly favoring the treatment condition.

Percentage of patients who showed clinically relevant change

Table 2 shows that in both conditions a large percentage of the patients had experienced clinically relevant reduction of depressive symptoms (Jacobson & Truax, 1991), with the treatment condition showing an advantage over the psycho-educational control condition. The difference between the two conditions based on the BDI was not significant, but the difference based on the SCL-90 was significant. We return to this discrepancy in the discussion.

Table 2 about here

Exploratory analyses

The evaluation questionnaire was administered to all patients who had completed the active treatment. The patients in the psycho-educational control condition completed the evaluation questionnaire after they in turn had completed the active treatment. The evaluation data of the two groups could therefore be pooled.

Patients' assessment of the specific aspects of the treatment

Table 3 shows that, in general, the patients judged the modules of the treatment as very useful: on a scale from 1 to 10, mean values ranged from 6.8 to 8.4 (overall mean 7.7). Writing about the events that had contributed to their depression, and keeping track of depressing events and thoughts were considered most valuable. Challenging of dysfunctional automatic thoughts was also regarded as very useful. The lowest mean rating concerned the module planning daily activities, although the relatively large standard deviation (*SD* = 2.8) suggests that the appreciation of this aspect varied greatly from patient to patient.

Patients' assessment of their therapists, the procedures, and their improvements

In general, patients indicated that they were very satisfied with the support that the therapist provided. On a scale of 1 to 10, the average scores were 8.4 (*SD* = 1.6). The patients' satisfaction with the procedure was evident in the amount of time that the patients devoted to their assignments between Internet contacts. Only a few patients spend less than an hour on their assignments, while 41 % of the patients spend between one and two hours, 46 % spend between two and four hours, and 11 % of the patients spend more than four hours on their assignments.

The results in Table 4 suggest that the majority of the patients were satisfied with the treatments. Almost all patients judged the instructions to be clear (95 %), the program as a whole to be well organized (93 %), and the Internet treatment to be an effective way to reduce depression-related complaints (93 %). Almost all patients (96 %) indicated that they would recommend the Internet treatment to others. The majority of patients (87 %) were positive about this type of Internet-based treatment, in comparison to face-to-face treatment. Although the treatment was conducted over the Internet, 78 % of patients indicated that they had experienced the contact with their therapist as personal, while only 4 % of the patients judged the contact as impersonal (18 % responded “no opinion”). Finally, the majority of patients felt that they had improved, while only a few indicated no reduction in symptoms.

Discussion

The results of the Internet-based depression treatment, as described in the present paper, are clearly promising. The overall effect sizes were large. At the individual level we found that many patients experienced reliable and clinically significant reduction in their symptoms. In evaluating these results, it is important to note that many of the patients had experienced depressive symptoms for extensive periods of time (six years on average). This implies that it is highly unlikely that spontaneous recovery played a role of any significance in these results.

In both conditions, psycho-education was provided prior to treatment. This included information about the nature of the signs and symptoms of depression, about the various kinds of treatment available, and about the type of available treatment. The potential participants needed this information to be able to make an informed decision about the presented treatment. Only then were the participants randomly assigned to either the experimental (active treatment) condition or the control (i.e., psycho-education only) condition. Patients, who were assigned to the control condition, received a lot of information about depression, how it can be treated, and what they could expect from their treatment, which would start about two months after application. Thus, the control condition was more than a regular waiting list control group, and the patients in this conditions consequently showed improvements on a number of measures This was most evident in the clinically significant individual improvement that these patients showed with respect to their scores on the BDI. However, when we turn to the scores on the SCL-90, the patients in the treatment condition showed markedly greater improvement than the participants in the control condition. The difference in results relating to the BDI and the SCL-90 may be due to the greater sensitivity of the SCL-90 (see Arrindell & Ettema, 2003). However, despite the improvements observed in the psycho-educational control group, the differences between this group and the full treatment group were large, with net effect sizes (i.e., differences in *d*-values between the two groups) ranging from $d = .9$ (DASS depression) to $d = 1.4$ (SCL-90).

The patients, who had completed the active treatment, indicated great satisfaction with the various aspects of the treatment. In the evaluations, the writing and monitoring

assignments were viewed as most useful. These assignments are meant to induce a greater awareness of the situational factors contributing to the depression. The usefulness of writing assignments in the treatment of posttraumatic stress disorder is well established. However, the utility of such assignments in the present treatment of depression and, as former studies have shown, in the treatment of chronic stress, is striking. Actively gaining insight into, or increasing awareness of, the factors and events that contribute to one's mental condition, could well prove to be a universal aspect of cognitive behavioral therapy. This awareness creates in patients a feeling of control and competence in dealing with their problems.

In designing the Internet protocol, the technique of challenging dysfunctional automatic thoughts was considered a necessary ingredient in the treatment. It was however uncertain whether this technique could be conveyed successfully via the Internet. In the pilot study, special attention was devoted to improving this module in the light of the patients' evaluations, and the experiences of the therapists. The highly positive evaluation of this technique in the present study (mean of 8.2 on a scale ranging from 1 to 10) suggests that the improvements were effective. The large percentage of patients, who indicated that they found the instructions clear (95 %), and the treatment as a whole as well organized (93 %), suggests that *all* aspects of the treatment contributed to the success of the treatment, including the aspects that were considered potentially difficult or problematic in an Internet-based therapy. Unfortunately, the evaluation questionnaire did not include separate questions concerning cognitive challenging of dysfunctional thoughts and behavioral experiments, two distinct techniques. As a result, we cannot rule out the possibility that one of these techniques was indeed difficult to convey via the Internet, and had therefore perhaps contributed less to the treatment. The evaluation questionnaire has now been revised and includes separate questions concerning these two techniques.

The following factors have probably contributed to the positive outcome and positive evaluation of the treatment:

- The protocol includes a balanced combination of different elements that have proven their usefulness over the years in face-to-face treatment. The protocol contains many practical components that patients can use themselves to address their problems. The emphasis on

fostering the patients' ability to manage and cope with their own problems also induces a feeling of competence in the patients.
- The protocol was developed in close collaboration between the department of clinical psychology of the University of Amsterdam, and a team of experienced therapists of the Mentrum Mental Health Organization Amsterdam.
- Various small-scale pilot studies were conducted during which patients were encouraged to share their views and opinions concerning the treatment. These pilot studies resulted in significant improvements in the protocol, the instructions, the feedback, and the ways in which patients could be motivated.
- The entire treatment was conducted via the website, i.e., not via email, attachments, etc. This procedure is helpful for both therapists and patients, as it provided the protocol with clarity and structure. Email was only used in the exceptional cases, e.g., when patients wanted to pose additional questions, or requested additional information.
- The protocol includes not only instructions for the patients, but also directions for the therapists about how to motivate their patients. This also seems to have had a beneficial effect on the treatment: patients were very satisfied with the support that they received (8.4 on a scale ranging from 1 to 10), only 11 % of the patients indicated that they had missed the face-to-face contact (in comparison, this was 31 % in the chronic stress Internet treatment, see Lange et al, 2004), while 96 % of the patients indicated that they would recommend the treatment to others.
- The patients in this study devoted a considerable amount of their time to the treatment and to the accompanying assignments. This was probably due in part to the therapists' continual effort to motivate their patients.

It is important to note that many different therapists were involved in the present study. This rules out the possibility that the overall positive results are attributable to just a few brilliant therapists. It also suggests that the proficiency in executing the protocol is attainable for any competent therapist, who undergoes the required training.

Although the results of the present Internet-based treatment for depression are clearly positive, the treatment has certain limitations. At present, not everyone has access to the Internet, which limits the coverage of Internet-based treatment. However, as access to the

Internet is quickly expanding, coverage can only increase in the future. Regardless of the access to the Internet, some patients are not prepared to abandon face-to-face contact altogether, i.e., not all potential patients are willing to embark on an Internet-based treatment. Furthermore, in the present study, a considerable number of applicants were excluded from the treatment. 56 % of the applicants were excluded because their symptoms were indicative of other disorders, such as posttraumatic stress, chronic stress, or anxiety disorder. Applicants who were more likely to experience dissociative disorders or psychosis, and applicants who used hard drugs or abused alcohol, were also excluded. Similar stringent exclusion criteria have been employed in randomized face-to-face treatment studies (Garfield, 1998; Persons & Silberschatz, 1998). Several applicants were excluded from the treatment, because they were considered not sufficiently depressed (6 %), too depressed (4 %), or because the risk of suicide was considered too high (15 %). For such applicants (i.e., severely depressed, suicidal), face-to-face treatment is indicated, as it includes the possibility of prescribing medication, if necessary. Nevertheless, the Internet treatment has been shown to be effective in a group of patients who experienced serious and persistent depressive symptoms.

Former studies have shown that effective cognitive behavioral therapy greatly reduces the risk that mild or moderate depression develops into severe depression (Cuijpers, 2004). When viewed in this light, the Internet depression treatment has considerable preventive potential. This potential is increased by the fact that it is in principle readily available, and is not subject to long waiting lists, or long intervals between sessions.

In all, 19 % of the patients did not complete the treatment. This is a relatively small number. For instance, in a recent study, in which Internet-based treatment for mild depression was combined with face-to-face contact, Andersson, Bergstrom, Holländare, Ekselius en Carlbring (2004) reported higher percentages of exclusion and dropout. Kakes (2004) also reported higher percentages of dropout for Internet-based treatments. The current percentage is also relatively low when compared to the percentages of dropout reported for regular face-to-face treatment. For instance, De Jonghe et al. (2004) report dropout percentages of approximately 40 % in pharmaceutical treatment of depression, and about 25 % in short-term psychotherapy. The thorough screening, the continual motivation of the patients, and the good therapeutic relations probably resulted in the present low

dropout percentage. Nonetheless, collaboration with institutions that can provide follow-up care, if necessary, remains important.

Finally, the follow-up period for this study was six weeks. An 18-month follow-up study of the long terms effects of the present depression treatment is currently underway. The results of this follow up study will be reported in due course.

References

Abels-Reguera, L., & Brunner, K. (2002). *Interapy-burnout: Een ongecontroleerde pilotstudie naar het effect van een geprotocolleerde behandeling van burnout via het Internet (Uncontrolled pilot study into manualized treatment of burnout via Internet).* Amsterdam: Programmagroep Klinische psychologie, Universiteit van Amsterdam.

Andersson, G., Bergström, J., Holländare,F., Ekselius, L., & Carlbring, P. (2004). Delivering CBT for mild to moderate depression via the Internet: Predicting outcome at 6-months follow-up. *Verhaltenstherapie, 14*(3), 185-189.

Antonuccio, D.O, Burns, D., Danton, W.G., & O'Donohue, W. (2000). Rumble in Reno: The psychosocial perspective on depression. *Psychiatric Times*, *17*(8).

Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.W., & Swinson, R.P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales (DASS) in clinical groups and a community sample. *Psychological Assessment, 10,* 176-181.

Arrindell, W. A., & Ettema, J. H. M. (2003). *SCL-90: Handleiding bij een multidimensionele psychopathologie-indicato (Manual Dutch Scl-90).* Lisse: Swets, & Zeitlinger.

Bastien, C.H., Morin, Ch.M., Quellet, M.C., Blais, F.C., & Bouchard, S. (2004). Cognitive-behavioral therapy for insomnia: comparison of individual therapy, group therapy, and telephone consultations. *Journal of Consulting and Clinical Psychology, 72*(4), 653-659.

Beck, A.T., & Steer, R.A. (1987). *Manual for the revised Beck Depression Inventory.* San Antonio, TX: Psychological Corporation.

Beurs, E. de, Dyck, R. van, Marquenie, L.A., Lange, A., & Blonk, R.W.B. (2001). De DASS; een vragenlijst voor het meten van depressie, angst en stress (Dutch adaption of the DASS, measurement of depression, anxiety and stress). *Gedragstherapie, 34*(1), 35-53.

Bosscher, R.J. (1991). *Running Therapie bij depressie*. Amsterdam: Thesis publishers.

Botella, C., Banos, R. M., Villa, H., Perpina, C., & Garcia-Palacios, A. (2000). Telepsychology: Public speaking fear treatment on the Internet. *CyberPsychology and Behavior, 3*, 959–968.

Bouman, T. (1994). Kort Instrumenteel; De 'Beck Depression Inventory' (BDI). *Gedragstherapie, 27*(1), 69-71.

Brom, D., & Kleber, R.J. (1985) De Schokverwerkingslijst (Dutch adaptation of the IES). *Nederlands Tijdschrift voor Psychologie, 40*, 164-168.

Carlbring, P., Ekselius, L., & Andersson, G. (2003) Treatment of panic disorder via the Internet: a randomized trial of CBT vs. applied relaxation. *Journal of Behavior Therapy and Experimental Psychiatry, 34*(2), 129-140.

Cohen, J. (1988*). Statistical power analysis for the behavioral sciences (2nd ed.)* Hillsdale, NJ: Lawrence Erlbaum Associates.

Collins, K.A., Westra, H.A., Dozois, D.J.A., & Burns, D.D. (2004). Gaps in accessing treatment for anxiety and depression: challenges for the delivery of care. *Clinical Psychology Review, 24*(5), 583-616.

Cuijpers, P. (2004). *Psychische ziekten van alledag (Daily psychic problems)*. Amsterdam: Dissertation, VU publishers.

Derogatis, L.R. (1977). *SCL-90 (R): Administration, Scoring and Procedures Manual-I for the Revised Version of Other Instruments of the Psychopathology Rating Scale Series.* Baltimore: Clinical Psychometrics Research Unit, John Hopkins University of Medicine.

Garfield, S.L. (1998). Some comments on empirically supported treatments. *Journal of Consulting and Clinical Psychology, 66*(1), 121-125.

Horowitz, M.J., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine, 41*, 209-218.

Jacobson, N.S., & Truax, P.A. (1991). Clinical significance: A statistical approach to meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*(1), 12-19.

Jacobson, N.S., Dobson, K.S., Truax, P.A., Addis, M.E., Koerner, K., Gollan, J.K, Gortner, E., & Prince, S.E. (2000). A component analysis of cognitive–behavioral treatment

for depression. *Prevention, & Treatment, 3* (23). [online]. journals. apa.org/prevention /volume3/pre0030023a.html.

Jager, J., Emmelkamp, P. M. G., & Lange, A (in preparation). De Nederlandse versie van de Panic Disorder Severity Scale (Dutch version of the PDSS). Amsterdam: Universiteit van Amsterdam.

Jager, J., Emmelkamp, P.M.G., & Lange, A. (2004). Die Behandlung von Panikstörungen über das Internet: Eine Fallbeschreibung. *Verhaltenstherapie, 14*(3), 200-205.

Joiner, T.E., Steer,R.A., Brown, G., Beck, A.T., Pettit, J.W., & Rudd, M.D. (2003). Worst-point suicidal plans: a dimension of suicidality predictive of past suicide attempts and eventual death by suicide. *Behavior Research and Therapy, 41*(2), 1469-1480.

Jonghe, F. de, Hendriksen, M., Aalst, G. van, Kool, S. , Peen, J., Van, R., Eijnden, E van den, & Dekker, J. (2004). Psychotherapy and Combined Therapy (Pharmacotherapy plus Psychotherapy) in the Treatment of Depression, *British Journal of Psychiatry, 185,* 37-45.

Kakes, N. (2004). *Een vergelijking van Internetbehandelingen voor drie verschillende klachtengebieden: het effect van begeleiding, structuur en screening op het resultaat (Comparison of Internet treatments of three disorders).* Amsterdam: Programmagroep Klinische Psychologie.

Kirsch, I., & Sapirstein, G. (1998). Listening to Prozac but hearing placebo: a meta analysis of antidepressant medication. *Prevention, & Treatment, 1* (4c) [online]. journals.apa.org/prevention/volume1/pre0010004c.html.

Lange, A (2000). *Gedragsverandering in gezinnen (Behavior change within the family), seventh revised edition.* Groningen:Wolters Noordhof.

Lange, A., Richard, R., Gest, A., Vries, M. de, & Lodder, L. (1998). The effects of positieve self-instruction; A controlled trial. *Cognitive Therapy and Research, 22*(3), 225-236.

Lange, A., Richard, R., Kiestra, J., & Oostendorp, E. van (1997). Cognitive treatment through positive self-verbalization; A multiple case study. *Behavioural and Cognitive Psychotherapy, 25,* 161-171.

Lange, A., Rietdijk, D., Hudcovicova, M., Ven, J-P., van de, Schrieken, B., & Emmelkamp, P. M.G. (2003*).* Interapy; a controlled randomized trial of the

standardized treatment of posttraumatic stress through the Internet. *Journal of Consulting and Clinical Psychology, 71*(5), 901-909.

Lange, A., Schrieken, B., Blankers, M., Ven, J-P. van de., & Slot, M. (2000). Constructie en validatie van de Gewaarwordingenlijst: een hulpmiddel bij het signaleren van een verhoogde kans op psychosen (Construction and validation of the Psychosis List). *Directieve Therapie 20*(2), 162- 173.

Lange A, Ven J.P. van de, Schrieken B, & Smit M (2004). 'Interapy' Burn-out: Prävention und Behandlung von Burn-out über das Internet. *Verhaltenstherapie, 14*, 190-199

McKay, M., Davis, M., Fanning, P. (1997). *Thoughts, & Feelings - Taking control of your moods and life*. Oakland, Ca: New Harbinger Publications.

Nijenhuis, E.R.S., Spinhoven, Ph., Dyck, R. van, Hart, O. Van der, & Vanderlinden, J. (1997). The development of the Somatoform Dissociation Questionnaire (SDQ 5) as a screening instrument for dissociative disorders. *Acta Psychiatrica Scandinavica, 96*, 311-318.

Öst, L. (1987). Applied relaxation: Description of a coping technique and a review of controlled studies. *Behavior Research and Therapy, 25*,(5), 397-409.

Persons, J.B., & Silberschatz, G. (1998). Are results of randomized controlled trials useful to psychotherapy? *Journal of Consulting and Clinical Psychology, 66*(1), 126-135. In Nederlands: Zijn de resultaten van gerandomiseerd gecontroleerd onderzoek bruikbaar voor psychotherapeuten. *Gezinstherapie Wereldwijd, 1999, 10*(2), 179-204.

Renckens, C. (2004). *Interapy: een geprotocolleerde behandeling van depressie via het Internet (Protolled treatment of depression via Internet).* Amsterdam: Programmagroep Klinische Psychologie, UvA.

Richards, J., Klein, B., & Carlbring, P. (2003) Internet-based treatment for panic disorder. *Cognitive Behaviour Therapy*, *32*(3), 125-135.

Robinson, P., & Serfaty, M. (2003) Computers, e-mail and therapy in eating disorders: *European Eating Disorders Review, 11,* 210-221.

Shear, M.K., Brown, T.A., Barlow, D.H., Money, R., Sholomskas, D.E., Woods, S.W., Gorman, J.M., & Papp, L.A. (1997). Multicenter Collaborative Panic Disorder Severity Scale. *American Journal of Psychiatry, 154*, 1571-1575.

Ström, L., Petterson, R., & Andersson, G. (2004). Internet-based treatment for insomnia: A controlled evaluation. *Journal of Consulting and Clinical Psychology, 72*, 113-120.

Üstün, T.B., , & Chatterji, S. (2001. Global burden of depressive disorders and future projections. In : A. Dawson, & A. Tylee: *Depression; social and economic timebomb; Proceedings of an international meeting*. WHO, BMJ books (page 31-44).

Wang, P.S., Demler, O., & Kessler, R.C. (2002). Adequacy of treatment for serious mental illness in the United States. *American Journal of Public Health, 92*, 92-98.

Zabinski, M.F., Celio, A.A., Jacobs, M.J., Manwaring, J., & Wilfley, D.E. (2003) Internet-based prevention of eating disorders. *European Eating Disorders Review, 11*(3), 183-197.

Table 1. Means and standard deviations at the three measurement moments for the *BDI*, the *SCL-90* depression scale, and the *DASS* subscales for the Treatment condition ($N = 32$) and the Psycho-educational control condition ($N = 14$). In addition: t-values and pre- and post-test effect sizes for both conditions.

Instruments		Pre-test		Post-test		Follow-up		Pre-post	Effect size
	Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*	*T-value*	*Cohen's d*
BDI	Treatment	19.3	5.7	8.3	6.1	9.5	8.3	7.9***	1.9
	Psycho-education only	20.5	6.5	14.9	7.2	-		3.0*	0.8
SCL-depression	Treatment	40.0	8.8	25.4	7.0	26.6	8.7	8.4***	1.8
	Psycho-education only	38.6	8.2	34.4	10.5	-		1.6	0.4
DASS depression	Treatment	20.8	8.8	6.3	5.9	7.4	7.5	8.8***	1.9
	Psycho-education only	20.9	8.2	12.4	8.9	-		4.5**	1.0
DASS anxiety	Treatment	7.1	4.9	2.4	2.6	2.0	2.2	5.3***	1.2
	Psycho-education only	6.4	4.4	6.4	6.9	-		0.0	0.0
DASS stress	Treatment	18.4	8.5	8.4	6.5	8.2	7.0	5.3***	1.3
	Psycho-education only	15.9	8.4	13.1	9.0	-		1.1	0.3

* Difference between pre- and post-test is significant $p < .05$, ** = $p < .01$, *** = $p < .000$

Table 2. Percentage of patients who showed reliable and clinically relevant change in the treatment condition ($N = 32$) and the psycho-educational control condition ($N = 14$).

		Improvement of one norm group		
Scale	Condition	%	χ^2 (df=1)	$p<$
BDI	Treatment	81	0.6	.23
	Psycho-education only	71		
SCL-depression	Treatment	75	6.5	.005*
	Psycho-education only	36		

* = one-sided significant at ≤ .05

Table 3. Perceived usefulness of the different modules of treatment, scale ranges from 1 (not at all useful) to 10 (very useful) (*N*=46)

Intervention	**Mean**	***SD***
Writing / monitoring	8.4	1.6
Challenging dysfunctional automatic thoughts	8.2	1.7
Positive self-instruction	7.8	1.7
Dealing with others	7.5	2.0
Toolkit	7.4	1.7
Planning daily activities	6.8	2.8
Overall	7.7	

Table 4. Evaluation of various aspects of the treatment in percentages ($N = 46$)

Question	Answer	%
Were the instructions clear?	yes	95
	no	4
Would you recommend the treatment to others?	yes	96
	no	2
How did you experience the contact with your therapist?	personal	78
	impersonal	4
Did you regret the absence of face-to-face contact with your therapist?	yes	11
	no	80
How did you like being treated via the Internet in comparison to face-to-face treatment?	pleasant	87
	unpleasant	2
Considering the entire treatment, do you judge the program to be well-organized?	yes	93
	no	4
Do you consider the Interapy approach to be an effective method for reducing depressive symptoms?	yes	93
	no	2
To what extent have you experienced reduction of your depressive symptoms during the treatment?	Not at all	2
	A little	37
	Quite a bit	52

* Percentages have been rounded to the nearest number. Percentages for 'No opinion' are not given in the table.

Figure 1 caption: Flow chart describing the phases of the treatment