

“INTERAPY”: THE EFFECTS OF A SHORT PROTOCOLLED TREATMENT OF POSTTRAUMATIC STRESS AND PATHOLOGICAL GRIEF THROUGH THE INTERNET

Alfred Lange, Bart Schrieken, Jean-Pierre van de Ven, Bert Bredeweg
and Paul M. G. Emmelkamp

with

Joisel van der Kolk, Linda Lydsdottir, Marina Massaro
and Anneke Reuvers

University of Amsterdam, The Netherlands

Abstract. The present study examines the effectiveness of an online standardized treatment of posttraumatic stress and pathological grief administered through the Internet. Twenty students who had experienced traumatic life events and showed the symptoms of posttraumatic stress participated in the study. They received credit course points for inclusion in the research. Treatment consisted of 10 writing sessions (45 minutes each) during a period of 5 weeks. Participants were assessed at pretreatment, posttreatment, and after six weeks (follow-up). The participants improved strongly from pre- to post-treatment on posttraumatic stress and pathological grief symptoms and in psychological functioning. These improvements were sustained during the follow-up period. Moreover, 19 of the 20 participants were clinically recovered after treatment. The changes in posttraumatic stress symptomatology were compared post hoc to changes in control and experimental groups from trials on similarly protocolled but face-to-face treatment of posttraumatic stress.

Keywords: Protocolled treatment, internet, posttraumatic stress, writing assignments.

Introduction

So far in psychological practice computers have been used mainly as a tool for assessment (Chandler, Burck, & Sampson, 1986) and complex behaviour observation programmes. However, some attention has been given to the development of programmes in which computer mediated therapies are offered. These programmes focus on psychological problems including obesity (Burnett, Magel, Harrington, & Taylor, 1989; Taylor, Agras, Losch, Plante, & Burnett, 1991), depression (Selmi, Klein, Greist, Sorrell, & Erdman, 1990), panic disorders (Carr, Ghosh, & Marks, 1988; Chandler, Burck,

Reprint requests to Professor Alfred Lange, Department of Clinical Psychology, University of Amsterdam, Roetersstraat 15, 1018 WB Amsterdam, The Netherlands. Email: kp_lange@macmail.psy.uva.nl

© 2000 British Association for Behavioural and Cognitive Psychotherapies

Sampson, & Wray, 1988; Newman, Kenardy, Herman, & Taylor, 1997) and alcohol or drug abuse (Moncher et al., 1985). In these therapies the patient works independently without having contact with a therapist. Some computer-mediated therapies are more effective than no therapy and as effective as the face-to-face treatment with which they were compared (Ghosh & Marks, 1987; Ghosh, Marks, & Carr, 1988; Selmi et al., 1990).

The Internet increases the therapeutic possibilities of computers. It enables patients who engage in computer-mediated therapy to interact with their therapists, without the necessity of face-to-face contact. Administering therapy through the Internet has other advantages. Patients may be treated while staying at home, ensuring that even people living in remote areas may be reached. Treatment through the World Wide Web also creates the possibility of reaching physically disabled patients whose mobility has decreased, or patients who are afraid to seek face-to-face therapy due to anxiety or stigmatization. Furthermore, quite a few people prefer to reveal their innermost thoughts and feelings to a computer-screen instead of to a real person (Erdman, Klein, & Greist, 1985; Postmes, 1997). These advantages might lower the barrier for people to engage in psychotherapy.

Obviously, treatment through the Internet will have disadvantages. The medium does not allow therapists and patients to establish a deep relationship. Hence, the Internet will probably be suited exclusively for administering well established treatment-protocols for clearly defined disorders. In the present paper we report on the results of such a protocolled treatment through the Internet, for patients who suffer from posttraumatic stress and pathological grief.

A considerable amount of research has shown that reprocessing traumatic events involves two mechanisms: (1) *habituation*, after exposure through self-confrontation of the traumatic memories and avoided stimuli (Foa & Riggs, 1995; Foa, Rothbaum, Riggs, & Murdoch, 1991; Frank et al., 1988; Vaughan & Tarrier, 1992) and (2) *cognitive reappraisal* (Davey, 1993; Donnelly & Murray, 1991; Foa, Steketee, & Olatov-Rothbaum, 1989; Kubany & Manke, 1995; Lange, Richard, Gest, De Vries, & Lodder, 1998; Resick & Schnicke, 1992). During self-confrontation (actualization), patients intentionally confront themselves with the sensory perceptions, emotions and thoughts that they normally avoid. Cognitive reappraisal refers to challenging dysfunctional automatic thoughts and stimulating reinterpretation of misattributions about the traumatic event, in order to accommodate a new symbolic meaning about the experience.

Several case studies have demonstrated the usefulness of structured writing assignments in the treatment of pathological grief and posttraumatic stress (L'Abate, 1991; Lange, 1994, 1996). Patients receive precise instructions concerning subject matter, manner of writing, frequency, amount of time spent, and location. In face-to-face sessions, therapist and patient discuss the effects of writing on the patient.

The effects of structured writing assignments on health and personal well-being have been investigated in many experimental trials (e.g., Esterling, L'Abate, Murray, & Pennebaker, 1999; Greenberg & Stone, 1992; Pennebaker & Francis, 1996; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995; Spera, Buhrfeind, & Pennebaker, 1994). The design employed in most of these studies involved a brief writing task developed by Pennebaker (see Pennebaker & Klihr-Beall, 1986): participants were asked to write about assigned topics for three to five consecutive days, 15 to 45 minutes each day.

Writing was done in a laboratory and participants did not receive feedback. Participants in the writing condition were instructed to write about their deepest thoughts and feelings, whereas control participants were asked to write about trivial topics. Smyth (1998) calculated the effect-size produced by writing tasks across 13 studies. A mean weighed effect size of $d = .47$ was found, representing an additional improvement in subjective well-being of 23% for the participants in writing groups, compared to control groups. This effect size matches those found in other quantitative analyses of psychological interventions (Smyth, 1998). From these findings, it may be concluded that writing about upsetting experiences is as beneficial to relatively healthy persons as regular face-to-face treatment.

To evaluate the use of writing assignments in a clinical setting, the protocol had to be brought more in accordance with clinical practice than in the studies mentioned above. At the Department of Clinical Psychology of the University of Amsterdam the beneficial effects of such a writing protocol, consisting of five face-to-face sessions to instruct the patients who subsequently wrote at home, were firmly established (Schoutrop & Lange, 1997; Schoutrop, Lange, Hanewald, Duurland, & Bermond, 1997). In this paper, we present the results of a study in which this protocol served as the basis for a writing therapy that was not administered face-to-face, but through the Internet: Interapy. We briefly describe the content and technical aspects of the internet site we developed and the internet procedure, including psycho-education, screening and guiding the patient during the process of writing. Moreover, we compared control and experimental group outcomes of the studies by Schoutrop et al. (1997) and Schoutrop and Lange (1997) with the results of our experimental group.

Method

Participants

Thirty-six undergraduate psychology students applied for participation in the study in return for course credit-points. Participants had to be over 18 years old, and they had to have experienced a traumatic event at least 3 months ago. In general, applicants are excluded from Interapy if they meet one of the following diagnostical criteria (for information about the screening instruments we refer to the section about design and measures):

- alcohol or drug abuse;
- major depression or the use of anti-depressants;
- psychological dissociation;
- psychotic disorder or the use of anti-psychotic medication;
- clinical scores in general psychopathology;
- presently involved in any other psychological treatment.

Twelve applicants were excluded; 24 participants (22 women and 2 men) were admitted. Three of them did not complete treatment. One participant quit at the beginning of treatment, because she did not have affinity with computers; two others dropped out of treatment because of lack of time. Another person finished treatment, but did not complete the follow-up questionnaires. This yielded a final N of 20 participants, 18

women and 2 men. Their age ranged from 19 to 38 years, with an average of 25 years ($SD = 6.9$). The mean length of time since the traumatic experience was 6 years ($SD = 6$). Half of the participants experienced the loss of a significant other, among the others were victims of sexual and violent aggression, and people who had been robbed.

Design and measures

The study had a pre-post-follow-up quasi experimental design. Treatment lasted 5 weeks; the follow-up tests were completed 6 weeks after treatment. The measures described below were used for screening, testing the hypotheses, or exploratory sub-analyses. The data were compared post hoc to experimental groups and a control group from former studies in which similar protocols were employed in face-to-face treatment.

Screening measures

In Interapy, all questionnaires are completed on-line (on the Internet). The screening phase contains the following measures:

The Symptom Checklist-90 (SCL-90-Revised, Derogatis, 1977). Permission to use the Dutch adaptation of the SCL-90 (Arrindell & Ettema, 1986) on the Internet was kindly granted by the publisher. The Dutch SCL-90 was found to be reliable, with Cronbach's coefficient α ranging between $\alpha = .74$ and $\alpha = .96$, and highly valid (Arrindell & Ettema, 1986). The SCL-90 is a multidimensional questionnaire that determines the level of physical and mental problems over the last 7 days. The Total score, indicating overall psychopathology, and the Depression subscale are used for screening. Potential participants are excluded if they score in the range of "high" standard values, compared to the Dutch outpatient psychiatric population (Arrindell & Ettema, 1986).

The Somatoform Dissociation Questionnaire (SDQ-5; Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1997) is a 5-item questionnaire, derived from the Dissociation Questionnaire (DIS-Q; Vanderlinden, Van Dyck, Vandereycken, Verdommen, & Verkes, 1993). The reliability of the SDQ-5 is good ($\alpha = .80$). The cross-validation is satisfactory and the instrument discriminates highly between groups of patients and nonpatients (Nijenhuis et al., 1997). Potential participants are excluded if their scores are above the cut-off score of the SDQ-5.

The Screening Device for Psychotic Disorder (SDPD). To screen for present psychotic or pre-psychotic symptoms, a screening device consisting of eight items was constructed. Three items refer to visual and auditory hallucinations, three items to delusions, one item taps the manic features of psychosis, and one item checks for derealization. Applicants who score 17 or higher on the SDPD are excluded from treatment. The SDPD is highly reliable ($\alpha = .82$) and a valid predictor of psychotic episodes as is shown by Blankers and Slot (1999).

The Biographical Information Questionnaire (BIQ) was designed for Interapy as a screening device, obtaining personal information regarding age, substance abuse, the use of psychoactive medicine, occurrence of trauma and current treatment.

Measures of the effects

The Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979). The Dutch adaptation by Kleber and Brom (1986) consists of 15 items, assessing symptoms related to Avoidance and Intrusion, the two main characteristics of psychological dysfunctioning after a traumatic life event. Participants indicate on a 5-point Likert scale whether a given symptom has been experienced during the last week. The reliability varies between $\alpha = .66$ and $\alpha = .78$ for the Avoidance scale and between $\alpha = .72$ and $\alpha = .81$ for the Intrusion scale; the external validity of both scales was found to be good (Kleber & Brom, 1986).

The Symptom Checklist (SCL-90, as described above). The subscales Anxiety, Depression, Somatization and Sleeping Problems are used to measure the effect of treatment on psychopathology.

Explorative measurements

Three questions of the Biographical Information Questionnaire (BIQ) are used for explorative use, i.e., degree of computer and Internet experience, and level of typing skills.

The Evaluation Questionnaire (EQ) was designed for this study to gather subjective information from the participants about Internet-mediated treatment. The EQ contains precoded items about on-screen psycho-education, about the amount of time to complete questionnaires on screen, about the meaningfulness of writing during each phase, and about the way they experienced the on-screen contact with the therapists. Participants indicate on 5-point Likert scales how they experienced each element of the Interapy procedure. A hardcopy of the questionnaire was mailed to the participants, 2 weeks after they had completed the posttest instruments.

The therapists

Four female graduate students in clinical psychology conducted the treatment. Their average age was 36 years ($SD = 11.6$). The therapists had followed advanced courses in behavioural and cognitive psychotherapy; they received special training in applying writing assignments in the treatment of posttraumatic stress and pathological grief. During the Interapy treatment, therapists used standard examples of the feedback and instructions that they could forward to clients at each particular phase. These examples of feedback are the result of clinical experience and psychological research. They could be altered, extended or limited, depending on the client's needs. All therapies were supervised by experienced therapists, who were available to see the clients face-to-face, if necessary.

The Internet site (<http://www.psy.uva.nl/Interapy>)

To establish a computer-mediated communication between participants and therapists, an interactive site (Interapy) has been developed based on Internet technology. Participants and therapists may use a normal webbrowser to follow the complete therapeutic

procedure, which includes completing questionnaires, writing essays and reading instructions for the next stage. Any recent version of Netscape Navigator (3.0, 4.0) or Internet Explorer (up from version 4.0) will be sufficient. These browsers are distributed freely via the Internet. The Interapy programme was built to be “platform-independent”. Hence, it can be read by all systems including Unix, Windows or Macintosh.

Interapy is set up as a Client-Server System. The Client side (the interfaces of participants and therapists) is provided by a set of dynamically generated web pages, wherein the information and functionality presented depend on the data that are available on the Server side. The Server side is the part of the system where all information is gathered, calculated and stored. A special computer, the *Web Server* (Webstar), examines every action performed by participants and therapists, stores the necessary information in another special computer, the relational *Database Server* (Butler), and finally returns adequate feedback. The *Weblink* (Tango) that connects the Web Server with the Database Server, also translates all information in the right format (HTML, the layout language for the WWW). This HTML-format, or interface can be read with the Webbrowser. Besides transmission of information, the *Web Server* provides the security of all information that is sent over the network connection. To guarantee security, all coding remains proprietary in nature. The system was tested intensively before treatment began. More information about the development of the Interapy system can be found in Bredeweg et al. (1998).

Procedure

All interaction between participants and therapists takes place through the Interapy Website. Before treatment begins, participants receive the following items by traditional mail:

- An *Informed Consent* document. Participants are required to sign and return this document by traditional mail with a written signature, indicating that they have been informed about the aim and procedures of the research project and are willing to take part in it.
- A *manual* with practical instructions for the use of the Interapy system.
- A *letter with information* about where and when participants may log in to Interapy.

After the participants have contacted the Interapy home page, their first step in the treatment process includes browsing 30 *Interapy Information pages*. These pages provide information on: (a) psycho-education about structured writing assignments in overcoming posttraumatic stress and pathological grief; (b) supervisors and therapists; (c) the procedure and how to apply for treatment; (d) institutions where participants may apply for therapy if they decide not to continue with Interapy or if they are excluded; and (e) references for further reading.

After applying for treatment, participants enter the screening procedure, during which they complete questionnaires (described in the section about screening measures) and indicate which psychotropic medication they are currently using and in what quantity. The Interapy system automatically analyses the answers of the participants, computes scale scores and compares these to the inclusion cut-off scores. The system

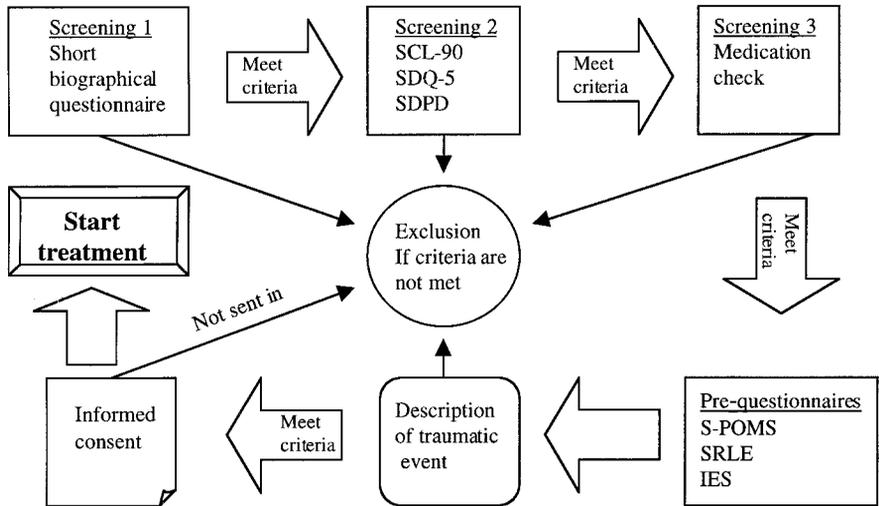


Figure 1. Overview of screening and pretest for Interypy

informs the participants immediately whether or not they fit the inclusion criteria. Therapists only check the questions about quantity and type of medication, to decide whether or not the pharmacological situation of the participant allows inclusion. Participants who do not meet the inclusion criteria receive information about other institutions where they may seek help.

Participants who are admitted complete the pre-test. Subsequently, they describe briefly the traumatic event from which they suffer and which they hope to overcome. The system then randomly assigns each participant to one of the therapists, ensuring that each therapist receives the same number of clients. Treatment can begin only after confirmation from the therapists that they have received the Informed Consent form with a written signature from their client. Figure 1 presents an overview of the procedures for screening and pre-testing in Interypy.

After treatment is finished, participants complete the posttest, which consists of the IES (Horowitz et al., 1979) and the SCL-90 (Derogatis, 1977). Two weeks later participants receive the Evaluation Questionnaire; six weeks after treatment, participants log in again and complete the follow-up test, which consists of the same questionnaires as the posttest.

Treatment

During a period of 5 weeks participants have 10 writing sessions, 45 minutes each. Participants write two essays a week. They are required to make a time-schedule, which is registered in the system at the beginning of each of three treatment phases. In the middle of each phase, the therapists provide the participants with feedback about their writings and instructions on how to proceed. The participants receive the feedback within two working days of sending in their essays. The treatment protocol consists of the following three phases:

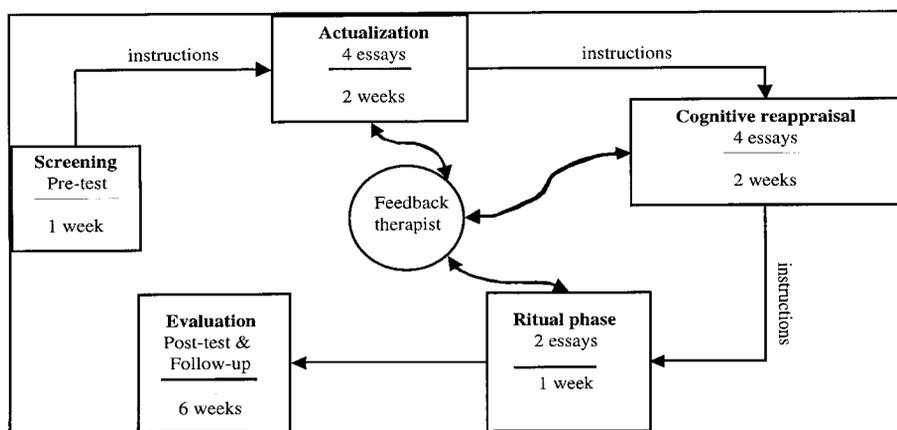


Figure 2. Overview of the study

First phase: Actualization/self-confrontation. At the start of treatment the participants receive on-screen psycho-education about the rationale of self-confrontation (exposure). Accordingly, the therapists instruct the participants not only to describe their traumatic event in detail but also to write about their intimate fears and thoughts concerning the traumatic events. This is the theme of the first four writing sessions (Lange, 1994; Schoutrop & Lange, 1997). To stimulate self-confrontation, participants are asked to write in the first person and in the present tense, describing in as much detail as possible the sensory perceptions they experienced at the time of the traumatic event, including olfactory, visual and auditory stimuli. Participants are instructed to write freely without concern about style, spelling, grammar or chronology.

Second phase: Cognitive reappraisal. Participants receive psycho-education about the principles of cognitive reappraisal. The main goal in this phase is to develop new views on the traumatic event, and to regain a sense of control (Resick & Schnicke, 1992; Schoutrop et al., 1997). This is achieved by instructing participants to write encouraging advice for a hypothetical friend who has experienced the same traumatic event. The advice should deal with issues such as the positive effect of the event on this person's life and the lessons to be learned from it.

Third phase: Sharing and farewell ritual. Participants receive psycho-education about the positive effects of sharing. Subsequently, participants take symbolic leave of the traumatic experience by writing a letter to a significant other person, to a person who has been involved in the traumatic event, or to themselves (Lange, 1994). The letter is not necessarily sent to the addressed person. Figure 2 presents an overview of the study.

Results

Decrease of posttraumatic stress symptoms

Table 1 shows the means and standard deviations for the IES subscales (Avoidance and Intrusion) gathered at pretest, posttest and follow-up. Inspection of the means reveals decreases in mean scores of the Avoidance, Intrusion and the total scores at

Table 1. Means and standard deviations on the total IES scores, and the subscales, at pretest, posttest and follow-up, and the *F*-values of the analyses of variance (*N*= 20)

Scale	Pretest		Posttest		Follow-up		<i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
IES total	23.60	15.26	8.10	5.66	9.10	6.49	18.65*
Avoidance	9.35	7.55	3.30	3.84	3.25	4.69	11.35*
Intrusion	12.10	8.17	4.05	3.52	5.20	4.41	14.41*

**p* < .0005.

posttest, which were maintained during follow-up. Multivariate Analysis of Variance (MANOVA) for repeated measure of the Avoidance and Intrusion scores with time as the within factor shows that the differences between the scores at the three measurement points are highly significant ($F(4, 74) = 7.12, p < .0005$).

To identify which variables contribute to the multivariate effects, we subsequently performed Univariate Analysis for each variable. As Table 1 shows, significant decreases in traumatic symptomatology are found for all scales. Since these reductions of symptoms apparently took place during treatment and are sustained at follow-up, the differences between pre- and posttest are tested separately. Table 2 reveals that the reduction at posttest is highly significant. The effect sizes are computed according to Rosnow and Rosenthal (1988). Their suggested effect size *r* ($r = \sqrt{F/F(df\ error)}$) is an equivalent of Cohen’s *d* or *eta*. As the Table shows the effect sizes are large for each scale.

Clinical significance

To estimate the clinical significance of our results, we first compared the pre-, post- and follow-up scores from our sample with the average scores on the Avoidance and the Intrusion scales from the general population (Kleber & Brom, 1986). Before treatment 75% of the participants scored higher than the average of the general population on Avoidance. At posttest 45% scored above average. Six weeks after treatment, only 30% scored higher than the average population. Eighty per cent of our participants scored higher than the average on Intrusion before treatment, at posttest only 35% scored higher. Six weeks after treatment this percentage had risen slightly to 40%.

To get more information about the clinical relevance of the treatment, individual improvement of each participant on the IES subscales has been calculated according

Table 2. Paired *t*-test for the IES scales, pre- versus posttest, *F*-values and effect sizes *r* (*N*= 20)

Scale	Paired <i>t</i> -test		Effect size <i>r</i>
	<i>T</i> (19)	<i>p</i> -value	
IES total	5.12	< .0005	.76
Avoidance	4.09	< .001	.68
Intrusion	4.94	< .0005	.75

Table 3. Means and standard deviations at pre-, post- and follow-up test, on Anxiety, Depression, Somatization and Sleeping disorder, together with the *F*-value (*N* = 20)

Measure	Pretest		Posttest		Follow-up		<i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Anxiety	16.80	5.13	12.80	3.43	12.15	2.60	13.70**
Depression	30.80	8.45	20.75	3.86	21.20	6.07	17.87**
Somatization	20.65	8.14	15.30	3.57	15.05	2.98	11.28**
Sleeping problems	5.65	1.93	4.25	1.52	4.55	2.42	7.61*

* $p < .005$; ** $p < .0005$.

to Jacobson and Truax' (1991) recommendations. Nineteen of the 20 participants demonstrated clinically relevant improvement between pre- and posttest. Improvement was strongest on Intrusion. Three participants showed slight relapses during the follow-up period.

Decrease in psychopathology

Table 3 shows the means and standard deviations for the four subscales of the SCL-90 that are generally associated with posttraumatic stress: Anxiety, Depression, Somatization and Sleeping problems. The scores are gathered at pretest, posttest and follow-up. Inspection of the means reveals a clear decrease of the degree of psychopathology at posttest, which is maintained during follow-up. The changes on these four scales were tested for significance by means of Multivariate Analysis of Variance (MANOVA) for repeated measure with time as the within factor. The MANOVA yielded a highly significant main effect ($F(8, 70) = 4.33, p < .0005$).

To identify which variables contribute to the multivariate effects, we subsequently performed Univariate Analysis for each variable. Table 4 shows significant effects for all scales. Inspection of the means indicated that the effects of treatment took place between pre- and posttest. Therefore, paired *t*-tests were conducted between pretest and posttest scores. Table 4 demonstrates that the changes were highly significant for all variables with large effects sizes (*r*) as calculated by method of Rosnow and Rosenthal (1988). The improvements were sustained during follow-up.

The changes in Anxiety, Depression, Somatization and Sleeping problems were then compared with the norm scores of the Dutch normal population (Arrindell & Ettema, 1986). Before treatment, 70% of the participants scored higher than average on Anxiety,

Table 4. Paired *t*-tests of pre- versus posttest and effect sizes (*N* = 20) for the SCL-90 subscales

Measure	<i>t</i> -value	<i>p</i> -value	Effect sizes <i>r</i>
Anxiety	3.63	< .005	.64
Depression	5.41	< .0005	.78
Somatization	3.54	< .005	.63
Sleeping problems	4.17	< .001	.69

90% higher than average on Depression, 40% higher than average on Somatization, and 70% higher than average on Sleeping problems. After treatment, only 20% of the participants scored higher than average on Anxiety and 25% scored higher than average on Depression, Somatization and Sleeping problems. These data suggest that the changes have high clinical relevance, which is confirmed by the above mentioned calculation according to Jacobson and Truax (1991). All but one of the participants improved clinically significant from pre- to posttest. The changes were largest with regard to depression.

Comparison with previous studies

Since we had not included control groups, we compared our data with those of two recent studies at our department that used a similar but face-to-face protocol for treatment of posttraumatic stress. The treatment in study 1 (Schoutrop et al., 1997) comprised five writing sessions focused on Actualization (self-confrontation) in 2 weeks. Participants were undergraduate students with posttraumatic stress symptomatology. Half of the students underwent the treatment and the others were used as a waiting-list control group. The treatment in study 2 (Schoutrop & Lange, 1997) also comprised five writing sessions in 2 weeks, but the focus was on a combination of Actualization and Cognitive Reappraisal. Twenty-two participants with posttraumatic stress symptomatology, who responded to an article in a leading Dutch newspaper, received this treatment. Since study 1 involved similar participants (undergraduate students), who were recruited in a similar manner as in Interapy, we compared the results of Interapy with the waiting-list control condition of that study. Subsequently, we compared the results of Interapy with the experimental conditions of study 1 and 2.

Analysis of variance revealed that Avoidance decreased significantly more in time during Interapy treatment than during time in the waiting list control condition: $F(2, 80) = 4.45$, ($p < .05$). The differences in reduction of Intrusions were even larger: ($F(2, 80) = 6.84$, $p < .005$). Reduction of Avoidance was larger in Interapy than in the face-to-face Actualization condition, but the difference was not significant ($F(2, 88) = 2.86$). However, Interapy induced significant more reduction in Avoidance than the face-to-face Combination condition ($F(2, 80) = 3.37$, $p < .05$), and also significant more reduction in Intrusion than the face-to-face Actualization condition ($F(2, 88) = 8.14$, $p < .001$) and the face-to-face Combination condition ($F(2, 80) = 5.46$, $p < .01$).

Explorations

High versus low initial traumatic stress

Based on the cut-off score of the IES total (Kleber & Brom, 1986), the participants were divided into two groups: participants with high ($n = 7$) and low ($n = 13$) pretreatment posttraumatic stress. Table 5 suggests that the highly traumatized group benefits most from treatment. Their decrease in psychopathology as measured by the SCL-90 subscales is larger than the decrease in the less traumatized group. Multivariate Analysis of Variance (MANOVA) for repeated measures of the two groups with time as within factor confirms this with significant interaction effects at follow-up for Depression

Table 5. Means and standard deviations for the high ($n = 7$) and low trauma ($n = 13$) groups on Anxiety, Depression, Somatization and Sleeping problems at pre-, posttreatment and follow-up

Measure	Pre-test		Posttest		Follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Anxiety						
High trauma	20.71	5.12	12.71	1.38	16.57	2.69
Low trauma	14.69	3.84	12.85	4.20	11.92	2.62
Depression						
High trauma	38.43	8.40	21.00	3.42	20.71	1.70
Low trauma	26.69	5.06	20.62	4.21	21.46	7.53
Somatization						
High trauma	26.39	9.52	16.57	4.03	15.85	2.79
Low trauma	17.62	5.58	14.62	3.25	14.62	3.09
Sleeping problems						
High trauma	7.14	1.86	5.00	1.63	5.29	3.20
Low trauma	4.85	1.46	3.85	1.34	4.15	1.91

($F(2, 36) = 8.34$; $p < .005$), Anxiety ($F(2, 36) = 7.37$; $p < .005$ and Somatization ($F(2, 36) = 5.28$; $p < .05$). No significant effect has been found for Sleeping problems.

Computer or Internet experiences and typing skills

The Biographical Information Questionnaire provided data on the degree of computer and Internet experience, and typing skills. Most participants had considerable computer experience (70%) while only 40% had Internet experience. Nearly half of the participants had few typing skills. When comparing the improvements on the SCL-90 scales and the IES scales for these subgroups, MANOVA indicated no significant multivariate effects with these categories as between factors. Participants without much computer, Internet and typing experience also benefited from the treatment.

Evaluation by the participants

Two weeks after terminating therapy, all participants completed the Evaluation Questionnaire. The following data were obtained:

Information pages and screening procedure. None of the participants found the information pages too long. Nine (45%) participants found it pleasant to read the "Information pages" on the computer screen, while eight (40%) had no opinion and three (15%) participants reported that it was unpleasant for them to read the pages on screen. No differences in treatment effect were found between these groups. Eight (40%) participants were motivated by completing the screening questionnaires, five (25%) were demotivated by it. The others had no opinion.

Meaningfulness of writing in each phase. Nearly all participants found the instructions clear in all phases of treatment. Only two (10%) found the content of the instructions

insufficient. All but one of the participants found writing meaningful. Writing about cognitive reappraisal was valued least. Writing in the ritual phase was valued most.

Feedback. Nine participants (45%) found the frequency of feedback sufficient; 11 (55%) found it insufficient. Participants who found it insufficient would have preferred to receive feedback after every writing assignment instead of after two. It would have given them more assurance that they were on the right track. However, multivariate analysis of variance (MANOVA) revealed that the appreciation of frequency of feedback was not associated with improvement in psychopathology or traumatic experiences.

Difficulty of writing about the traumatic experience. Six (30%) participants reported that to write about the traumatic events had been a very difficult emotional task. Especially during the Actualization phase they had experienced fatigue, nausea, embarrassment, anger, sadness and irritation. These participants scored higher on Intrusion, Avoidance and Anxiety at pretest than participants who found it less difficult to write. At posttest these differences had been diminished, indicating that those who found it difficult to write, showed dramatically more improvement than those who found it less difficult. MANOVAs for repeated measures with level of difficulty as between factor and time as within factor confirmed the significance of these data: for IES total, $F(2, 34) = 6.25, p < .005$; for Intrusion, $F(2, 34) = 4.29, p < .05$; for Avoidance, $F(2, 34) = 5.81, p < .01$; for SCL-90 total, $F(2, 34) = 4.71, p < .05$; and for Anxiety, $F(2, 34) = 5.54, p < .01$.

Contact with the therapists. Nine (45%) participants found it pleasant that contact with their therapist took place through the computer only. It gave them “a sense of anonymity”. Eight (40%) participants found it unpleasant and three (15%) had no opinion. The participants who had appreciated anonymity had higher Avoidance scores at pretest than those who found anonymity unpleasant. At posttest and follow-up these differences had disappeared, indicating that those who appreciated anonymity benefited most from Interapy. MANOVA for repeated measures with the two groups as between factor and time as within factor confirmed the significance of this interaction between evaluation of anonymity and effect of Interapy on Avoidance: $F(2, 30) = 4.42, p < .05$.

Overall evaluation by the participants. Two participants experienced treatment through Internet as overall unpleasant; four participants found using the computer instead of writing on paper an unpleasant experience. Only one participant found Interapy an ineffective method to deal with her traumatic experiences. Three found it slightly effective, while 15 participants found Interapy an effective method (one participant had not answered this question).

Discussion

Interapy is the first systematic attempt to administer through the Internet a well established treatment procedure, consisting of psycho-education, screening, standardized and validated pretests, clearly defined protocolled interventions and posttests. The results of this first study are promising, showing strong and clinically relevant effects on posttraumatic stress symptomatology and on general psychological functioning.

Post hoc comparison of the Interapy data with the data of recent studies, with a similar protocol and the same outcome measure (the IES), suggests that the effects we found are not due to regression to means, change over time, or placebo effects. Participants in Interapy improved significantly more than the control and experimental participants in those face-to-face studies. These are, however, post hoc comparisons. Randomized trials comparing treatment through the Internet and protocolled face-to-face treatments are called for.

Although similar, there are some differences between the Interapy protocol and the face-to-face studies, as described by Schoutrop and Lange (1997). In those studies, participants wrote five times during 2 weeks, without receiving feedback. In Interapy, the participants wrote 10 essays during 5 weeks and the protocol included feedback about the writing, which helped the participants to focus on the relevant themes. As is shown in the answers of the Evaluation Questionnaire, most participants valued this feedback very much. Some even suggested they should receive feedback after each writing session, instead of two.

The Evaluation Questionnaire revealed that the information, the screening procedure and the tests had been clear and appropriate to most participants. It also revealed other information. Less than half of the participants found it unpleasant that there was no face-to-face contact with the therapist. The participants who appreciated this anonymity also had significantly higher Avoidance scores at pretest. This suggests that patients who suffer from posttraumatic stress or pathological grief, and especially from avoidance symptomatology, might apply for treatment on the Internet while they would refrain from traditional treatment. This is especially interesting if we consider that these participants (high avoidance and preference for anonymity) benefited most from treatment.

Schoutrop et al. (1997) found some evidence for the hypothesis that cognitive reappraisal might be the more important mechanism in overcoming posttraumatic stress, in comparison with habituation. In Interapy we found indications that the role of habituation should not be overlooked. Most participants valued writing in all three phases of treatment (Actualization, Cognitive reappraisal, and Ritual). They perceived the Actualization (habituation) phase as most difficult. In some participants, self-confrontation led to intense symptoms such as nausea, fatigue, anger and crying. These participants benefited most from treatment, reporting that the intensity had decreased gradually during the treatment process. This may be viewed as support for the role of habituation in overcoming posttraumatic stress. In studies with larger samples more attention should be devoted to these theoretical concepts.

Exploratory analyses showed that participants with most symptomatology benefited most from treatment. This contradicts the view that Interapy would only be suited to overcome mild traumas. Here we have to take into account that our participants were students and that participants in the face-to-face studies (also students) on average had higher IES-scores at pretest than our participants. Future studies should involve non-student clinical samples. A first study with Interapy for non-student traumatized participants has recently been started.

Interapy will, of course, be more attractive to participants who already have experiences with the Internet. Yet, our data suggest that computer or Internet experience does not seem to be a prerequisite. Participants who were inexperienced in the use of

Internet showed improvements that were similar to those of experienced participants. Again, we should bear in mind that our participants were students.

Interapy allows the participation of graduate students in clinical psychology or psychiatry as therapists. The interventions by the therapists consist of written support and feedback. For this, they may use standardized statements and add client-tailored suggestions of their own. Eventually, this procedure will make Interapy cost-effective. However, the therapists should receive specific training in the use of the protocol and the Internet format. Their contributions should be supervised by an experienced clinical psychologist or psychiatrist. Since all communications between therapist and client are recorded, Interapy allows for closer supervision than face-to-face therapies. Supervision and intervision sessions should be organized on a regular basis, to prevent drop-out as much as possible and to offer additional therapeutic contact if necessary.

Interapy not only provides the opportunity to reach patients who would otherwise not seek help, it may also enhance research. Larger samples will be available for outcome research, allowing sophisticated techniques including stepwise regression analyses. Topics such as who benefits most from which elements in the treatment protocol may then be studied. Also, content-analyses may be conducted with the essays from Interapy participants. This may increase our insight into the mechanisms that facilitate change in patients. Furthermore, Interapy proceedings facilitate long-time follow-ups. The usual period of 6 to 12 weeks is rather short, as is demonstrated in a study on the experimental treatment of panic disorder by De Beurs, Van Balkom, Van Dyck and Lange (1999).

Here we used the Internet for “writing therapy”, which seems to be especially elegant. However, once the system is flexible enough it will be possible to adapt it to other treatments that rely on clear instructions to patients. Agoraphobic patients especially might benefit from structured cognitive-behavioural therapy through the Internet. Also, a structured step-by-step self-control programme for bulimia nervosa, as described by Lange, De Vries, Gest and Van Oostendorp (1994), might be administered and tested through the Internet.

The issue of privacy should not be forgotten. In the current state of affairs, it is not easy but still possible to break into our database. To discourage “hackers”, we will apply several changes. During this first study, participants received their log-in password automatically from the system. This has already been altered so that future clients can choose their own password, making Interapy as safe as a “members only” netsite. We are currently undertaking steps to further enhance security; all Interapy information will be encrypted by use of a Secure Socket Layer (SSL), so that Interapy will be as safe as current money-transfers via the Internet. Furthermore, biographical information about former clients is removed from the database as soon as it is no longer needed. Another ethical issue refers to the relatively low availability of the therapist should problems occur in the personal situation of the client. Even though we did not encounter such difficulties, future studies may do so. We are therefore developing a type of e-mail format to be combined with the Interapy system, so clients may reach their therapist in an emergency. However, if Interapy is available in different countries, it will be more advantageous to inform patients about additional help in their own country and to establish cooperation from local mental health workers before treatment begins.

Acknowledgements

We thank the NFGV (Dutch Federation of Mental Health) in Utrecht for the grant they awarded us to initiate this project. We thank Jeroen Ruwaard, Pepijn Koopman and Herry Hubert for the development and maintenance of Interapy-software and Mirjam Schoutrop for providing data for post hoc comparisons.

References

- ARRINDELL, W. A., & ETTEMA, J. H. M. (1986). *SCL-90: Handleiding bij een multidimensionele psychopathologie-indicator*. Lisse: Swets & Zeitlinger.
- BEURS, E. DE, VAN BALKOM, A. J. L. M., VAN DYCK, R., & LANGE, A. (1999). Long-term outcome of pharmacological and psychological treatment for panic disorder with agoraphobia: A two year naturalistic follow-up. *Acta Psychiatrica Scandinavica*, *99*, 59–67.
- BLANKERS, M., & SLOT, M. (1999). *Validatie van twee korte screeningsinstrumenten, de Psychose-vragenlijst (PVL) en de Osev Klachten Lijst (OKL)*. (Validation of two short screening devices: The Screening Device Psychotic Disorder and the Qusep Symptom List.) Amsterdam: Department of Clinical Psychology, University of Amsterdam.
- BREDEWEG, B., KOOPMAN, P., RUWAARD, J., LANGE, A., SCHRIEKEN, B., VAN DE VEN, J.-P., & ROOSEN, B. (1998). *Designing counselling systems for the WWW*. Webnet 98, World Conference of the WWW Internet, & Intranet.
- BURNETT, K. F., MAGEL, P. M., HARRINGTON, S., & TAYLOR, C. B. (1989). Computer assisted behavioural health counselling for high school students. *Journal of Counselling Psychology*, *36*, 63–67.
- CARR, A. C., GHOSH, A., & MARKS, I. M. (1988). Computer-supervised exposure treatment for phobias. *Canadian Journal of Psychiatry*, *33*, 112–117.
- CHANDLER, G. M., BURCK, H. D., & SAMPSON, J. P. (1986). A generic computer programme for systematic desensitization: Description, construction and case study. *Journal of Behaviour Therapy and Experimental Psychiatry*, *17*, 171–174.
- CHANDLER, G. M., BURCK, H. D., SAMPSON, J. P., & WRAY, R. (1988). The effectiveness of a generic computer programme for systematic desensitization. *Computers in Human Behaviour*, *4*, 339–346.
- DAVEY, G. C. L. (1993). Trauma reevaluation, conditioning, and anxiety disorders. *Behaviour Change*, *10*, 131–140.
- 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, Johns Hopkins University of Medicine.
- DONNELLY, D. A., & MURRAY, E. J. (1991). Cognitive and emotional changes in written essays and therapy interviews. *Journal of Social and Clinical Psychology*, *10*, 334–350.
- ERDMAN, H. P., KLEIN, M. H., & GREIST, J. H. (1985). Direct patient computer interviewing. *Journal of Consulting and Clinical Psychology*, *53*, 760–773.
- ESTERLING, B. A., L'ABATE, L., MURRAY, E. L., & PENNEBAKER, J. (1999). Empirical foundations for writing in preventions and psychotherapy: Mental and physical health outcomes. *Clinical Psychology Review*, *19*, 79–98.
- FOA, E. B., & RIGGS, D. S. (1995). Posttraumatic stress disorder following assault: Theoretical considerations and empirical findings. *Current Directions in Psychological Science*, *4*, 61–65.
- FOA, E. B., ROTHBAUM, B. O., RIGGS, D. S., & MURDOCH, T. B. (1991). Treatment of posttraumatic stress disorder in rape victims; A comparison between cognitive-behavioural procedures and counselling. *Journal of Consulting and Clinical Psychology*, *59*, 715–723.

- FOA, E. B., STEKETEE, G., & OLASOV-ROTHBAUM, B. (1989). Behavioural/cognitive conceptualizations of PTSD. *Behaviour Therapy, 20*, 155–176.
- FRANK, E., ANDERSON, B., STEWART, B. D., DANCU, C., HUGHES, C., & WEST, D. (1988). Efficacy of cognitive behaviour therapy and systematic desensitization in the treatment of rape trauma. *Behaviour Therapy, 19*, 403–420.
- GHOSH, A., & MARKS, I. (1987). Self-treatment of agoraphobia by exposure. *Behaviour Therapy, 18*, 3–16.
- GHOSH, A., MARKS, I., & CARR, A. C. (1988). Therapist contact and outcome of self-exposure treatment for phobias. *British Journal of Psychiatry, 152*, 234–238.
- GREENBERG, M. A., & STONE, A. A. (1992). Emotional disclosure about traumas and its relation to health effects of previous disclosure and trauma severity. *Journal of Personality and Social Psychology, 63*, 75–84.
- 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. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*, 12–19.
- KLEBER, R. J., & BROM, D. (1986). *Traumatische ervaringen, gevolgen en verwerking*. Lisse: Swets & Zeitlinger.
- KUBANY, E. S., & MANKE, F. P. (1995). Cognitive therapy for trauma-related guilt: Conceptual bases and treatment outlines. *Cognitive and Behavioural Practice, 2*, 27–61.
- L'ABATE, L. (1991). The use of writing in psychotherapy. *American Journal of Psychotherapy, 45*, 87–98.
- LANGE, A. (1994). Writing assignments in the treatment of grief and traumas from the past. In J. Zeig (Ed.), *Ericksonian approaches, the essence of the story*. New York: Brunner/Mazel.
- LANGE, A. (1996). Using writing assignments with families managing legacies of extreme traumas. *Journal of Family Therapy, 18*, 375–388.
- LANGE, A., RICHARD, R., GEST, A., DE VRIES, M., & LODDER, L. (1998). The effects of positive self-instruction: A controlled trial. *Cognitive Therapy and Research, 22*, 225–236.
- LANGE, A., VRIES, M. DE, GEST, A., & OOSTENDORP, E. VAN (1994). A self-management programme for bulimia nervosa: The elements, the rationales and a case study. *Eating Disorders, 2*, 329–340.
- MONCHER, M. S., PARMS, C. A., ORLANDI, M. A., SCHNICKE, S. P., MILLER, S. O., PALLEJA, J., & SCHNICKE, M. B. (1985). Microcomputer-based approaches for preventing drug and alcohol abuse among adolescents from ethnic-racial minority backgrounds. *Computers in Human Behaviour, 5*, 79–93.
- NEWMAN, M. G., KENARDY, J., HERMAN, S., & TAYLOR, C. B. (1997). Palmtop computer assisted therapy for panic disorder: Development of a new technology. *Journal of Consulting and Clinical Psychology, 65*, 178–183.
- NIJENHUIS, E. R. S., SPINHOVEN, PH., VAN DYCK, R., VAN DER HART, O., & 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.
- PENNEBAKER, J. W., & FRANCIS, M. E. (1996). Cognitive, emotional, and language process in disclosure. *Cognition and Emotion, 10*, 601–626.
- PENNEBAKER, J. W., & KLIHR-BEALL, S. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*, 274–281.
- PETRIE, K. J., BOOTH, R. J., PENNEBAKER, J. W., DAVISON, K. P., & THOMAS, M. G. (1995). Disclosure of trauma and immune response to a Hepatitis B vaccination programme. *Journal of Consulting and Clinical Psychology, 6*, 787–792.

- POSTMES, T. (1997). *Social influences in computer-mediated groups*. Amsterdam: PhD thesis, University of Amsterdam.
- RESICK, P. A., & SCHNICKE, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology, 60*, 748–756.
- ROSNOW, R. L., & ROSENTHAL, R. (1988). Focused tests of significance and effect size estimation in counselling psychology. *Journal of Counseling Psychology, 35*, 203–208.
- SCHOUTROP, M., & LANGE, A. (1997). Gestructureerd schrijven over schokkende ervaringen: Resultaten en werkzame mechanismen (Structured writing about traumatic event: Results and mechanisms). *Directieve Therapie, 17*, 77–96.
- SCHOUTROP, M. J. A., LANGE, A., HANEWALD, G., DUURLAND, C., & BERMOND, B. (1997). The effects of structured writing assignments on overcoming major stressful events: An uncontrolled study. *Clinical Psychology and Psychotherapy, 4*, 179–185.
- SELMI, P. M., KLEIN, M. H., GREIST, J. H., SORRELL, S. P., & ERDMAN, H. P. (1990). Computer-administered cognitive-behavioural therapy for depression. *American Journal of Psychiatry, 147*, 51–56.
- SMYTH, J. M. (1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66*, 174–184.
- SPERA, S. P., BUHRFEIND, E. D., & PENNEBAKER, J. W. (1994). Expressive writing and coping with job loss. *Academy of Management Journal, 37*, 722–733.
- TAYLOR, C. B., AGRAS, W. S., LOSCH, M., PLANTE, T. G., & BURNETT, K. (1991). Improving the effectiveness of computer-assisted weightloss. *Behaviour Therapy, 22*, 229–236.
- VANDERLINDEN, J., VAN DYCK, R., VANDEREYCKEN, W., VERTOMMEN, H., & VERKES, R. J. (1993). The Dissociation Questionnaire: Development and characteristics of a new self-reporting questionnaire. *Clinical Psychology Psychotherapy, 1*, 21–27.
- VAUGHAN, K., & TARRIER, N. (1992). The use of image habituation training with posttraumatic stress disorders. *British Journal of Psychiatry, 161*, 658–664.