

Interapy: A Controlled Randomized Trial of the Standardized Treatment of Posttraumatic Stress Through the Internet

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Online therapy offers many advantages over face-to-face therapy. Interapy includes psychoeducation, screening, effect measures, and a protocol-driven treatment via the Internet for people suffering from posttraumatic stress. The present article reports the results of a controlled trial on the Internet-driven treatment of posttraumatic stress and grief in a group of people who manifested mild to relatively severe trauma symptoms. Participants in the treatment condition ($n = 69$) improved significantly more than participants in the waiting-list control condition ($n = 32$) on trauma-related symptoms and general psychopathology. The effect sizes were large. On most subscales, more than 50% of the treated participants showed reliable change and clinically significant improvement, with the highest percentages being found for depression and avoidance.

In recent years several articles have been devoted to psychological treatment through the Internet (e.g., Smith & Senior, 2001). The Internet enhances 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. In contrast to computer-guided therapy, where the computer itself both determines and provides the feedback to the patient (Marks, 2000), in Internet-mediated therapy, the therapist determines and provides the feedback (tailored to patient's needs) via the computer. Patients living in remote areas, physically disabled patients with restricted mobility, or patients who are reluctant to seek face-to-face therapy because of anxiety or fear of stigmatization may be reached through the World Wide Web. Although psychological treatment through the telephone has been increasingly applied in recent years, Internet technology is only sporadically used (VandenBos & Williams, 2000). So far, most of the Internet studies have involved psychoeducation followed by treatment through e-mail. Lange, Van de Ven, Schrieken, Bredeweg, and Emmelkamp (2000) described an Internet treatment of posttraumatic stress that does not involve e-mail, which they called Interapy. The entire treatment takes place through a database implemented on the Internet. The Interapy treatment is firmly rooted in research into posttraumatic stress and includes elements from established therapies for posttraumatic stress. Two mechanisms are widely considered to be crucial in overcoming

traumatic events: (a) habituation to the aversive stimuli, which is achieved by exposure to the traumatic memories and avoided stimuli (e.g., Jaycox, Foa, & Morral, 1998), and (b) cognitive reappraisal of the traumatic experiences (e.g., Ehlers & Clark, 2000). Imaginary exposure (self-confrontation) is used to help patients confront the sensory perceptions, emotions, and thoughts that they usually avoid. Cognitive reappraisal is brought about by treatment challenging dysfunctional automatic thoughts and stimulating the reinterpretation of misattributions about the traumatic event to engender in the patient a new symbolic meaning concerning the experience. The effectiveness of treatment by self-confrontation and cognitive therapy is well established (Emmelkamp, 2003). Other studies have emphasized the importance of sharing traumatic experiences with trusted people, who offer social support (Rimé, 1995; Schoutrop, 2000). In a large retrospective study of female victims of sexual abuse, Lange et al. (1999) found that the sooner victims shared their experiences with either a therapist or relatives, the less psychopathology they demonstrated years later. The degree of empathy they encountered also accounted for a significant part of the variance in psychopathology.

The Interapy treatment consists of structured writing assignments. The effects of structured writing on health and personal well-being have been investigated in numerous laboratory studies (e.g., Esterling, L'Abate, Murray, & Pennebaker, 1999; Smyth, 1998). Schoutrop (2000) demonstrated in randomized trials that writing was beneficial in patients with posttraumatic stress disorder (PTSD) diagnosis. Smyth (1998) calculated the effect size produced by relatively simple writing tasks without feedback in 13 studies. A mean weighed effect size of .47 was found, representing an additional improvement in subjective well-being of 23% in the participants in writing groups compared with control groups. Clinical case studies have further demonstrated the usefulness of structured writing assignments in the treatment of pathological grief and posttraumatic stress (Lange, 1996; Lepore & Smyth, 2002).

The Interapy writing protocol was derived from the studies mentioned above. It consists of self-confrontation, cognitive reap-

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praisal, and social sharing. An uncontrolled pilot study in a student sample produced promising results (Lange, Schrieken, Van de Ven, et al., 2000). The first controlled study, with a relatively small number of (student) participants, again produced highly significant improvement in the treatment condition compared with no improvement in the control condition (Lange, Van de Ven, Schrieken, & Emmelkamp, 2001). The present study evaluates the Internet-mediated treatment of pathological grief and posttraumatic stress symptoms in a large nonstudent community sample of traumatized persons, who applied for treatment through the World Wide Web. Further, potential predictor variables are studied using multiple regression analysis.

Method

The design of the study comprised two between-subjects conditions and two within-subject (pre–posttreatment) conditions. The participants were randomly assigned to the treatment or control condition. Treatment lasted 5 weeks. The participants in the treatment condition received treatment immediately after the screening procedure. Follow-up tests were completed 6 weeks after treatment. For ethical reasons, the participants in the control condition were not kept waiting until the treatment group had completed the follow-up. They received treatment directly after the treatment group had terminated treatment. The follow-up scores were used to establish whether improvements observed after the treatment were long lasting.

Treatment Protocol

During a period of 5 weeks participants engaged in ten 45-min writing sessions (2 a week). They were required to make a time schedule, which was registered in the system at the beginning of each of the three treatment phases (see following text). In the middle of each phase, the therapists provided the participants with feedback about their writings and instructions on how to proceed. The participants received these instructions within 1 working day following the submission of the essays that they had written during the sessions. This took place seven times. The feedback provided by the therapists consisted of about 450 words. The treatment protocol, which is described in detail by Lange, Schoutrop, Schrieken and Van de Ven (2002), comprised the following three phases:

First phase: Self-confrontation. At the start of treatment the participants received on-screen psychoeducation about the rationale of self-confrontation (exposure). Accordingly, the therapists instructed 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 was the theme of the first four writing sessions (Lange et al., 2002). The following is an example of feedback given after the first writing sessions:

I would like you to select a more specific moment from the episode of your car accident; this moment might be very tough and frightening for you, and you may well prefer not to think about it at all. As I mentioned previously, this may be something you still have occasional flashbacks about, that arouses emotions and physical reactions such as sweating, cold hands or difficulty breathing. It could, for example, be the moment when you see the flames coming out of the vehicle, or when you say goodbye to John in hospital. In your next two essays I would like you to write about this.

To stimulate self-confrontation, we required participants to write in the first person and in the present tense, describing in as much detail as possible the sensory perceptions that they experienced at the time of the traumatic event, including olfactory, visual, and auditory sensations. Participants

were instructed to write freely without concern for style, spelling, grammar, or chronology.

Second phase: Cognitive reappraisal. In this phase, participants received psychoeducation about the principles of cognitive reappraisal. The therapist's main goal was to instill new views in the participants concerning the traumatic event and to help them regain a sense of control (Resick & Schnicke, 1992). This was achieved by instructing participants to formulate encouraging advice for a hypothetical friend who had experienced a similar traumatic event. This advice should deal with issues such as the positive bearing of the event on the friend's life and what he or she could learn from it. The following is an example of feedback at this stage:

Please reread your previous essays and try to write a supportive letter to Marie, let her know how she would take a different perspective on what happened to her. What would you advise her? What ideas do you think are important for her to consider? Assume that she, like you, is struggling with the same feelings of shame and guilt.

Third phase: Sharing and farewell ritual. In the third phase, participants received psychoeducation about the positive effects of sharing. Subsequently, participants took symbolic leave of their traumatic experience by writing a letter to themselves or to significant others who had been involved in the traumatic event. The following is an example of feedback at this stage:

Try not to write about what happened only, but also about the way it changed you and how you are going to cope with it now and in the future.

The letter was not necessarily sent to the addressee.

Therapists

Twenty-eight female and 2 male graduate and postgraduate students in clinical psychology conducted the treatment. Their average age was 29 years ($SD = 7.5$). The therapists had followed advanced courses in behavioral cognitive psychotherapy and had received special training in using writing assignments in the treatment of posttraumatic stress and pathological grief. During the Interapy treatment, therapists used standard examples of the feedback and instructions. In response to clients' input, therapists tailored the standard instructions to clients' needs, within the boundaries of the protocol. During the treatment, licensed clinical psychologists (master's and doctoral level) supervised the therapists on a regular basis.

Internet Site

A Web site (www.interapy.nl) was developed to create a vehicle for Internet-mediated communication between participants and therapists. Participants and therapists use a standard Web browser (Netscape Navigator or Version 4.0, or higher, of Internet Explorer) to follow the complete therapeutic procedure. This includes the completion of questionnaires; writing assignments about the events, the feelings and the cognitions; and reading instructions concerning the next stage of the treatment protocol. The Interapy program was designed to be platform independent. Hence, it can be accessed on all current systems, including Unix, Windows, and 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, in which the information and functionality depend on the data that are available on the server side. At the server side, all information is gathered, collated, and stored. A dedicated computer, the Web server, examines every action performed by participants and therapists, stores the necessary information in a second dedicated computer, the relational database server, and finally provides relevant feedback. The Web link, which connects the Web server with the database server, also trans-

forms all information into the right format (HyperText Markup Language [HTML], the layout language for the World Wide Web). This HTML format, or interface, can be read with the Web browser. Besides transmission of information, the Web server provides the security of all information that is sent over the network connection. To ensure security, all coding remains proprietary in nature. The system was tested intensively.

Procedure

After the participants contacted the Interapy home page, they first browsed the Interapy information pages. These pages contain information about (a) structured writing assignments in overcoming posttraumatic stress and pathological grief; (b) supervisors and therapists; (c) the procedure and instructions on how to apply for treatment; (d) institutions where they could apply for therapy if they decided to stop the Interapy treatment or if they were excluded; and (e) references for further reading.

Participants then entered the screening procedure, during which they completed questionnaires (described in the section about screening measures) and indicated whether they were currently taking psychotropic medication and, if so, which drug and in what dosage. The Interapy system automatically analyzed the answers of the participants, computed scale scores, and compared these with the inclusion cutoff scores. The system informed the participants immediately whether they satisfied the inclusion criteria. Therapists checked the information relating to the type and dosage of medication to determine whether the stated medication formed a basis for exclusion. Participants who did not satisfy the inclusion criteria received information about other institutions where they could apply for treatment.

Participants who were admitted completed the pretest online. Subsequently, they provided a short description of the traumatic event that had caused them to seek treatment. The participants were then randomly assigned to the treatment or control condition. Treatment started only after confirmation from the therapists that they had received by regular mail the downloaded Informed Consent form with the patient's signature.

After terminating the treatment, participants completed the posttest online. The posttest included the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the subscales of the Symptom Checklist-90 (SCL-90), which is described in the *Outcome Measures* section (Derogatis, 1977). Six weeks after treatment, participants were invited by e-mail to log in and to complete the follow-up test, which consisted of the same questionnaires as administered during the pre- and posttest.

Screening Criteria

Applicants were excluded from Interapy if they satisfied one of the following criteria:

Severely depressed mood. Potential participants were excluded if they had scores on the Depression subscale of the SCL-90 that were above the cutoff score of the highly depressed group in the Dutch norm tables for the psychiatric population (> 58 for women and > 53 for men; Arrindell & Ettema, 1986). A treatment protocol that stimulates self-confrontation but does not offer the possibility of adjusting the protocol or adding other elements, such as medication, was considered inappropriate for this group.

Tendency to psychological dissociation. This was measured by the five-item Somatoform Dissociation Questionnaire (SDQ-5; Nijenhuis, Spinhoven, van Dyck, van der Hart, & Vanderlinden, 1997). The internal consistency of the SDQ-5 is good ($\alpha = .80$). The cross-validation is satisfactory, and the instrument discriminates well between groups of patients and nonpatients (Nijenhuis et al., 1997). We excluded potential participants whose scores were above the cutoff score of the SDQ-5.

Risk of psychosis. Risk of psychosis was measured by the Dutch Screening Device for Psychotic Disorder (Lange, Schrieken, Blankers, Van de Ven, & Slot, 2000). This seven-item inventory has a high internal consistency ($\alpha = .82$) and is a good predictor of psychotic episodes. Agreement found between self-report of 33 patients and the reports about them by their clinicians is high ($r = .85$). Participants were excluded if they scored above the cutoff score of the Dutch norm group. Furthermore, participants were excluded if their answers to the questions about medication indicated the use of neuroleptics.

The following exclusion criteria were established by the Biographical Information Questionnaire (Lange, Schrieken, Van de Ven, et al., 2000): substance abuse, trauma occurrence within past 3 months, incest, age younger than 18 years, and treatment being received elsewhere.

Outcome Measures

IES (Dutch version by Kleber & Brom, 1986). The IES assesses symptoms that are related to avoidance and intrusions, the two main characteristics of psychological dysfunction after a traumatic life event. Participants indicated on a 5-point Likert scale whether they had experienced a given symptom during the past week. Cronbach's alpha varies between .66 and .78 for the Avoidance subscale and between .72 and .81 for the Intrusions subscale; the external validity of both scales is good (Kleber & Brom, 1986).

SCL-90 Anxiety, Depression, Somatization, and Sleeping Problems subscales. These subscales were used to measure the effects of treatment on psychological dysfunction in dimensions that are related to posttraumatic stress symptoms.

Exploratory Measure

The Biographical Information Questionnaire was used to gather miscellaneous information, including the time passed since trauma, educational level, degree of computer and Internet experience, and level of typing skills.

Participants

In the Netherlands, the Interapy treatment program enjoyed ample media attention. As a consequence, 1,217 people visited the Web site to consult the psychoinformation pages. Three hundred one potential participants did not commit themselves to the screening procedure, and 479 were excluded on the basis of the criteria described earlier and were referred to other institutions. Figure 1 shows an overview of dropouts in the various stages and provides a specification of the various exclusion rates.

Of the 437 clients who passed the screening, 184 persons committed themselves to treatment by returning the Informed Consent form. The reasons that the other 253 participants who passed the screening did not return the Informed Consent form are not known. However, analyses revealed that there were no significant differences on the SCL-90 and IES between the participants who did not commit themselves to the Interapy treatment and the participants who signed the Informed Consent form. Because we had a fairly large sample of participants, we decided to assign about twice as many participants to the immediate treatment condition while retaining a sufficiently large sample in the control condition to ensure sufficient statistical power to detect treatment effects. The computer assigned participants randomly to the (immediate) treatment condition (probability 2:3) or to the control condition (probability 1:3). This yielded a treatment condition of 122 persons and a control condition of 62 persons. A substantial number of participants ($n = 44$) in the treatment condition did not complete the treatment. These participants were sent an extra questionnaire by e-mail to determine the reasons for their dropping out. Thus, we could establish that 18 persons (41.0%) quit because of technical problems (network and computer), 13 persons (29.5%) dropped out be-

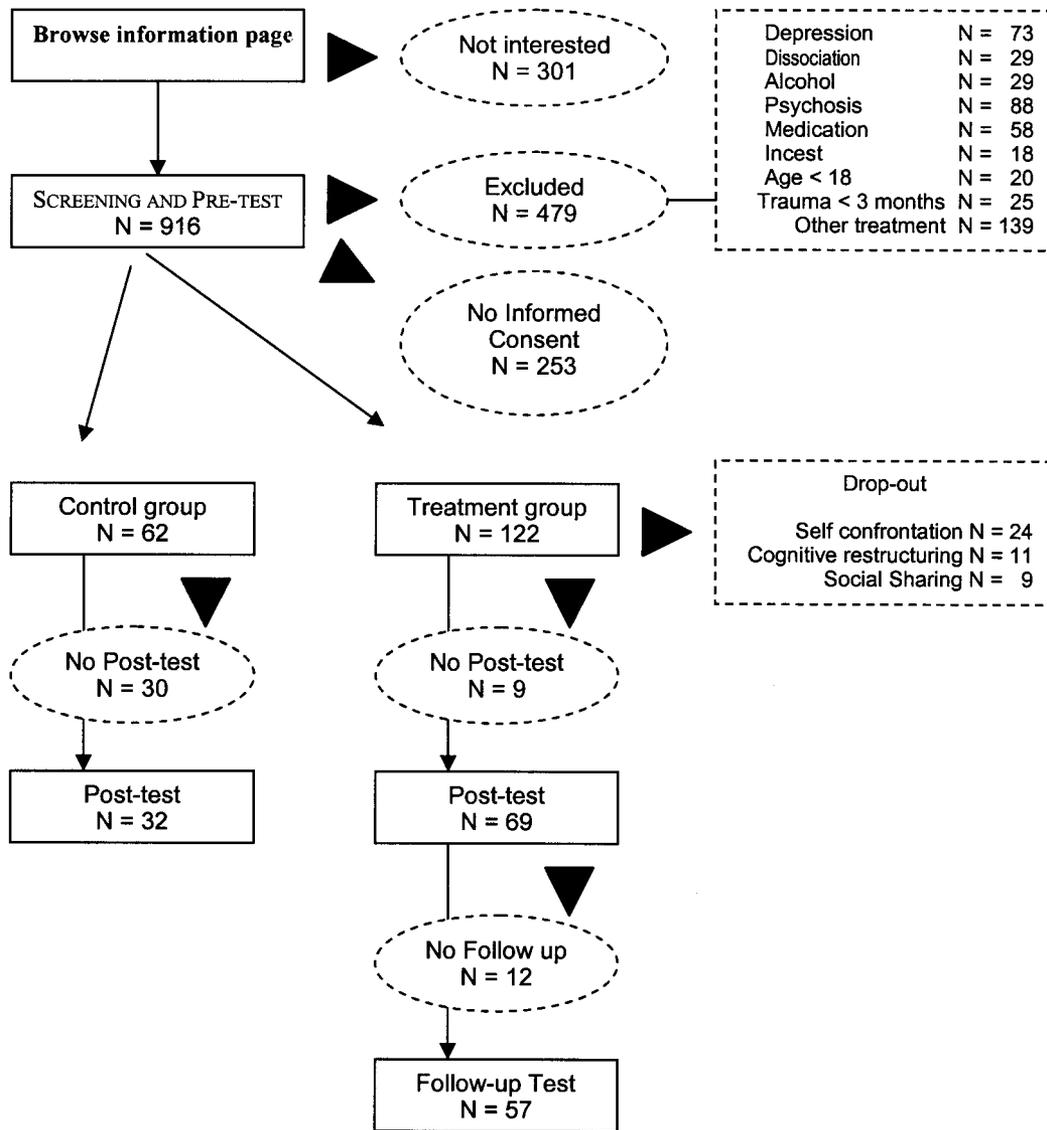


Figure 1. Flowchart of Interapy treatment program: From time of participant applying for treatment through follow-up.

cause they preferred face-to-face contact; 13 persons (29.5%) dropped out because they experienced the writing about their stressful events to be too much of a burden.

Figure 1 reveals that most participants from the treatment condition dropped out in the first treatment phase, which is emotionally the most demanding. Seventy-eight participants completed the treatment. We checked for differences between completers and dropouts and found that these groups differed significantly on a few characteristics only. More men (71%) than women (19%) dropped out of treatment. Completers were older ($M = 38.0$ years, $SD = 10.6$ years) than dropouts ($M = 33.0$ years, $SD = 10.3$ years), and more completers than dropouts lived with a partner (73% vs. 27%). Dropouts were more experienced with computers and the Internet than completers. No differences were found in level of education, time elapsed since trauma, degree of disclosure of the trauma, and general psychological functioning measured with the IES and the SCL-90. Nine participants in the treatment group did not complete the posttest. Of the

remaining 69 participants, 12 participants in the treatment condition failed to complete the 6-week follow-up tests. In the waiting-list control condition, 30 participants did not complete their posttest. Most of them failed to respond; others mentioned that they did not wish to wait or had decided on other therapy. The control group finally comprised 32 participants.

There were no significant differences at pre- and posttest between those who had not completed the follow-up and those who had. The average age of the group that completed the whole therapy and the follow-up was 39.0 years ($SD = 10.5$; range: 19–71 years). Twenty percent were men and 80% women. On average, the traumas had occurred 9.0 years before the participants applied for participation in Interapy ($SD = 11.6$; range: 0.5–57.0 years). Traumas included the sudden loss of a beloved one (21); sexual abuse (3); physical abuse and/or robbery (7); loss of health, house, or job (6); traffic accidents (3); and divorce or other traumatic events within the family (13). Their scores on the IES indicated that the participants suffered greatly. The mean scores on the Intrusions ($M = 20.6$, $SD = 7.9$) and

Avoidance ($M = 15.4$, $SD = 8.3$) subscales were in the upper regions of the norm table for Dutch PTSD patients (Kleber & Brom, 1986). Of the 101 participants finally included, 91 scored above the Dutch cutoff score for PTSD (90%). The participants also showed a high level of psychological dysfunctioning as measured by the Dutch adaptation of the SCL-90. There were no differences between the control group and the treatment group on any of these variables. Finally, we note that the treatment was free of charge, but patients received no financial reward for their participation.

Results

Data Reduction and Analyses

Because the data showed a fairly normal distribution, we used parametric tests including multivariate analyses of variance (MANOVAs) and analyses of variance (ANOVAs) to test the differences in improvement between the treatment and control condition from pre- to posttreatment. Further, effect sizes of the interaction effects were calculated to facilitate comparison of improvement in the treatment group with improvement in the control group. We carried out stepwise regression analyses to investigate the effect of possible mediating variables.

Symptoms of Posttraumatic Stress

Table 1 shows the means on the Intrusions, Avoidance, Depression, Anxiety, Somatization, and Sleeping Problems subscales in the treatment and control group. These results show that Intrusions and Avoidance decreased strongly in the treatment group between pre- and posttreatment. The control group showed no decrease in these symptoms of posttraumatic stress.

A MANOVA for repeated measures (Avoidance and Intrusions) with time (pre–posttest) as the within-subject variable and condition (treatment–control) as the between-subjects variable showed

significant main effects for time, $F(2, 95) = 6.57$, $p < .002$, and condition, $F(2, 95) = 14.12$, $p < .0001$. The interaction effect, $F(2, 95) = 12.49$, $p < .0001$, confirms that the decrease in symptoms in the treatment condition is significantly larger than in the control condition. Univariate analyses of Avoidance and Intrusions subscale scores showed the same pattern of results. Improvement in the treatment group was significantly larger than in the control group, with large effect sizes for both Intrusions, $F(1, 96) = 23.94$, $p < .0001$; $d = 1.28$, and Avoidance, $F(1, 96) = 15.00$, $p < .001$; $d = 1.39$. Inspection of Table 1 also shows that there is no relapse at 6-week follow-up. The trauma symptoms show a slight but not statistically significant decrease as compared with the posttest.

General Psychopathology

As is clear from the results in Table 1, mean levels of general psychopathology decreased during treatment. Means on the Anxiety, Depression, Somatization, and Sleeping Problems subscales of the SCL-90 decreased significantly. The control group showed no reduction in any of these measures. MANOVA for repeated measures of all four subscales with time (pre–posttest) as the within-subject variable and condition (treatment–control) as the between-subjects variable revealed a significant main effect for time, $F(4, 96) = 4.69$, $p < .002$. The main effect for condition was not significant, $F(4, 96) = 1.35$, $p < .30$. The interaction effect, $F(4, 96) = 9.19$, $p < .0001$, supports the finding that the decrease in psychopathology in the treatment condition is significantly larger than in the control condition. Separate ANOVAs for these variables revealed that in all four measures the improvements in the treatment group were significantly larger than in the control group. The observed effect sizes for Depression, $F(1, 99) = 33.11$,

Table 1
Measures Over Time in Treatment and Control Group

Scale and group	Pretest		Posttest		Follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Impact of Event						
Intrusions						
Treatment	20.22	7.50	11.12	9.27	10.46	9.42
Control	19.91	8.22	21.97	8.60		
Avoidance						
Treatment	14.05	8.02	6.17	7.14	5.70	7.51
Control	16.78	8.48	17.28	8.29		
Symptom Checklist–90						
Depression						
Treatment	37.90	9.79	26.42	10.33	25.70	12.28
Control	35.50	10.96	37.25	9.67		
Anxiety						
Treatment	20.12	6.88	15.32	5.65	14.84	7.33
Control	19.59	6.77	20.41	7.38		
Somatization						
Treatment	22.29	7.04	17.52	6.34	16.34	7.02
Control	21.56	8.22	22.88	7.74		
Sleeping Problems						
Treatment	7.25	3.67	5.80	2.96	5.18	2.79
Control	5.10	2.00	5.50	2.40		

Note. Treatment group (pretest and posttest): $n = 69$, control group: $n = 32$, treatment group at follow-up: $n = 57$.

$p = .0001$; $d = 1.04$; Anxiety, $F(1, 99) = 19.16$, $p = .001$; $d = 0.76$; Somatization, $F(1, 99) = 21.68$, $p = .0001$; $d = 0.73$; and Sleeping Problems, $F(1, 99) = 15.17$, $p = .0001$; $d = 0.60$, are large. Table 1 also shows that the improvement in psychological functioning was sustained at follow-up, with a slight but statistically insignificant decrease in symptoms.

Reliable Change and Clinically Significant Improvement

We assessed the importance of the improvement in the 91 participants who had pretreatment IES scores above the cutoff score for PTSD on the IES (as established in the Dutch population). We evaluated the importance of improvement using two indicators: reliable change and clinically significant improvement. These indicators were originally proposed by Jacobson and Truax (1991). Reliable change means that a participant's score improved from pretest to posttest. Maassen (2000) argues that the best test of the null hypothesis of no change is conducted using the statistic reliable change = $(X_{\text{post}} - X_{\text{pre}}) / SE\sqrt{2}$, where SE is the standard error of measurement of the test. Effect sizes of .80 are considered to be large (Cohen, 1992). For each participant, the hypothesis of no change was rejected only if reliable change > 1.96 ($p < .05$). Table 2 shows the percentage of people in both conditions that improved reliably according to this criterion for each variable. Chi-square tests were used to test the differences in percentages of reliable change between treatment and control group. Table 2 indicates that the percentage of reliable change after treatment is highest in Avoidance and Depression. Table 2 also shows that a considerable percentage of participants in the control group had improved as well. Yet, the differences in percentages between treatment and control group are large, as shown by the very large chi-square values.

Clinical significance means that a participant has improved such that his or her posttest score exceeds a given cutoff point. The null hypothesis that a participant's posttest score is equal to the cutoff was tested using the statistic clinical significance = $(X_{\text{post}} - X_{\text{cut}}) / SE$. This hypothesis was also tested one-sided at the 5% significance level. For each of the participants, the null hypothesis was rejected if clinical significance > 1.96 . By this criterion, the results are similar to those obtained for reliable change in Intrusions and Avoidance, but they were slightly different for the subscales of the SCL-90 (see Table 3). Improvement in Depression, although still substantial, is less pronounced. Clinical improvement is greater in

Table 2
Percentage by Group Reliable Change

Scale	Reliable change %		χ^2 (1)	$p <$
	Treatment	Control		
Impact of Event				
Intrusions	57	12	13.29	.0005
Avoidance	53	4	16.81	.0005
Symptom Checklist-90				
Depression	71	23	14.10	.0005
Anxiety	49	5	11.78	.001
Somatization	38	5	7.28	.007
Sleeping Problems	25	9	1.71	.091

Note. Treatment group posttest $n = 69$. Control group posttest $n = 32$.

Table 3
Percentage by Group Showing Clinically Significant Improvement

Scale	Clinically significant improvement %		χ^2 (1)	$p <$
	Treatment	Control		
Impact of Event				
Intrusions	45	8	9.83	.002
Avoidance	50	8	12.24	.0005
Symptom Checklist-90				
Depression	55	5	14.94	.0005
Anxiety	52	0	16.36	.0005
Somatization	52	5	13.30	.0005
Sleeping Problems	21	5	2.01	.07

Note. Treatment group posttest $n = 69$. Control group posttest $n = 32$.

Anxiety, Somatization, and Sleeping Problems. Again, in the control condition quite a few participants showed clinically significant improvement.

Explorations

Mediating variables. Lange et al. (2002) found that disclosure is a powerful predictor of positive outcome: Participants who had previously disclosed their experiences were found to benefit most from treatment. Also, younger participants were found to benefit more than older participants (Lange et al., 2002). In the present study, additional predictor variables were added to the variables that had been established as important in previous studies. Regression analyses were carried out on the data of all participants, including those in the control group (i.e., the participants who were treated 5 weeks after the treatment group). The large number of participants ($n = 101$) permitted us to conduct multivariate stepwise regression analyses with a considerable number of predictor variables. To investigate whether waiting 5 weeks influenced the outcome, we included this variable as a predictor in the multiple regression analyses. Analyses were carried out with the IES as the dependent variable for posttreatment and follow-up, respectively. The pretreatment scores on the IES were entered as the first independent variable to control for pretreatment level of trauma symptoms. The other independent variables were waiting list versus immediate treatment, age, disclosure, degree of depression prior to treatment, duration of treatment (delay during treatment or not), intentional versus unintentional trauma (whether the trauma was caused intentionally, as in a violent crime, or not, as in the natural death of a loved one). None of these variables intercorrelated higher than .45.

Table 4 shows that intentionality of the trauma predicts 19% of the variance in posttreatment score on the IES. Participants who suffered from an intentionally caused trauma benefited more than participants who had suffered an unintentional trauma. Disclosure predicts 14% of the variance in follow-up scores of the IES (Table 5). Participants who had not previously disclosed their traumatic experiences to significant others benefited more than participants who had shared their experiences.

Evaluations by the participants. Hammer and Holleman (2003) approached the participants who terminated treatment 18

Table 4
Multiple Regression Analysis of Outcome Predictors With the Impact of Event Scale (IES) Total at Posttest as Dependent Variable

Variable	<i>R</i>	<i>R</i> ²	β	<i>p</i>
IES total at pretest	.32	.10	.39	.00
Intentionality of trauma	.44	.19	-.31	.00

months before ($n = 61$) to assess their experience of various aspects of the Internet treatment. A new Web page was generated on which these participants could complete the questionnaires (IES and SCL-90 subscales) and newly constructed evaluation questionnaires were administered by e-mail. Of these participants, 17 could not be reached because their addresses had changed and 4 refused to cooperate. Assessments were carried out by means of a questionnaire. The response format was a 5-point scale, from 1 (*most negative*) to 5 (*most positive*). These participants expressed positive experiences concerning writing about their feelings ($M = 4.36$, $SD = 0.91$). The participants expressed great confidence in the therapists and their treatment ($M = 4.09$, $SD = 0.78$). Their average overall evaluation of the Internet treatment was positive ($M = 3.73$, $SD = 1.28$).

Discussion

This is the first randomized controlled study in which the effects of Internet-driven therapy were evaluated in a nonstudent sample of participants suffering from posttraumatic stress symptoms. The results of the present study replicate the results of the first uncontrolled trial (Lange, Schrieken, Van de Ven, et al., 2000) and the previous controlled trial (Lange et al., 2001). Participants in the experimental condition displayed substantial improvement that was significantly greater improvement than that displayed by the participants in the waiting-list control condition. In the previous studies (Lange, Schrieken, Van de Ven, et al., 2000; Lange et al., 2001), the participants were students and had suffered relatively mild traumas. The present study demonstrates the usefulness of this Internet-driven treatment in a sample of nonstudent clients from the community. The participants displayed a wide range in the severity of trauma symptomatology. Because it was not possible to assess the participants by means of a structured diagnostic interview, the present findings may not be generalized to the population of PTSD patients who meet the fourth edition *Diagnostic and Statistical Manual of Mental Disorders* criteria. Yet, the scores on the IES (Horowitz et al., 1979) indicate a high average level of trauma symptoms in these participants: Their mean scores exceed the mean score established in PTSD patients. For example, the mean IES score in the present study ($M = 36.0$) is considerably higher than the means reported in other Dutch studies with trauma victims. These include victims of traffic accidents ($M = 17.4$; Brom, Kleber, & Hofman, 1993) and victims of bank robbery ($M = 13.8$; Kamphuis & Emmelkamp, 1998). The present mean is comparable to that of victims of stalking ($M = 39.7$; Kamphuis & Emmelkamp, 2001). Furthermore, the pretreatment scores of 91 of the 101 participants on the IES are above the cutoff score for PTSD on the IES.

We had excluded clients who were prone to psychosis and dissociation, used hard drugs, drank large quantities of alcohol, were extremely depressive, and were the victim of incest, as well as those who were currently in treatment elsewhere. These exclusion criteria limit the generalizability of our findings. Yet, the problems of those who did participate indicate that Interapy can by no means be viewed as mainly suitable for "light cases." The present data and those in the Lange et al. (2001) study show that depressed, anxious, and highly traumatized chronic patients benefited as well as participants did who displayed mild trauma symptoms.

The effect sizes in the present study are considerably higher than those found in face-to-face experiments (Schoutrop, 2000; Smyth, 1998). There is a clear need now to compare Internet-driven treatment directly with matched face-to-face treatments in a randomized controlled trial with diagnoses based on structured interviews. Although the averages in the control group suggested no improvement over time in this group, quite a few participants in the control condition showed relevant improvement on some subscales. This might be due to random fluctuation over time. For ethical reasons, all potential participants had received extensive information about posttraumatic stress and methods of treatment. This knowledge and possible related expectations might also have given rise to improvement in some of the control participants.

The indicators of the relevance of individual change show mixed results: With respect to Avoidance and Depression, the percentages of reliable change are substantial. These percentages are clearly lower in Intrusions. This might be due to the emphasis on self-confrontation and cognitive restructuring, which probably has a lower impact on Intrusions than on cognitive and behavioral Avoidance.

It is likely that the relatively positive outcome is due in part to the fact that the protocol is highly structured (10 sessions of writing in a specific order) and based on an established theoretical model. The protocols in most of the face-to-face experiments reported by Smyth (1998) and Schoutrop (2000) were simpler, with fewer writing sessions, less order in the writing, and less precise feedback or no feedback at all. An advantage of Interapy over face-to-face contact is that the therapists do not have to react immediately, which gives the therapist time for reflection and to formulate appropriate feedback. Whenever therapists felt uncertain about how best to proceed, they discussed the participant's written material and their own previous feedback with a colleague or supervisor. The last phase of the Interapy treatment comprised the writing of a dignified letter. This is supposed to be beneficial because of the extra effort made by the participant in creating a meaningful document and the symbolic power this exerts. The fact that the letter may be shared with a significant other might also be

Table 5
Multiple Regression Analysis of Outcome Predictors with the Impact of Event Scale (IES) Total at Follow-Up as Dependent Variable

Variable	<i>R</i>	<i>R</i> ²	β	<i>p</i>
IES total at pretest	.26	.07	.25	.02
Disclosure	.37	.14	.26	.01

beneficial. Reports from clinical practice (Lange, 1996) and studies including Rimé (1995) and Schoutrop (2000) support this notion.

Structured writing may be difficult for patients or clients, as they have to confront highly painful feelings and memories. It is therefore important that therapists offer unconditional support when they are required to confront patients with their avoidance of painful elements. The Interapy studies show that it is possible to express support and commitment through the Internet. In the 18-month follow-up, the participants indicated that they had great confidence in the therapists and in the way the therapists treated them. These findings are in line with recent studies of treatment by e-mail (King, Engi, & Poulos, 1998; Murphy & Mitchell, 1998; Sampson, Kolodinsky, & Greeno, 1997).

Some participants quit therapy because of technical problems with the network or computer ($n = 18$). These participants were considered dropouts. As the technical equipment and Internet technology is subject to ongoing improvement, we expect these technical problems to decrease in the future. The other 26 dropouts were related to the form and content of the therapy. Because of the specific procedures of Interapy, we were not able to acquire posttest data from the dropouts. In future studies, procedures will be changed to ensure posttest data are obtained from those who drop out, so that we may conduct intent-to-treat analyses. Also, we hope to collect data on people who initiated contact with Interapy but did not commit themselves to therapy.

The presented Internet treatment is clearly not suitable for every possible case. It has the same limitations as face-to-face protocol treatments: Clients may differ in the pace of therapy, needing more or less time for specific steps. Some clients would like attention for certain topics that are not included in the protocol. Although clients make use of the ways possible to share their emotions with their Internet therapists, nonverbal reactions, which may be an important source of information, are obviously lost. This may be an important disadvantage in comparison to face-to-face therapies. For instance, this led to an infelicitous event with one of the clients. He was at the last phase of treatment. The therapy had gone well, and this client had expressed his satisfaction with his therapist on several occasions. Having written his "taking leave letter," he asked the therapist whether he should actually mail the letter. The letter expressed his rancor with the verdict by the juvenile court that had prevented him from seeing his child after a nasty divorce and a difficult custody case. The therapist consulted the supervisor, who advised against mailing the letter. On learning this advice, the client became furious, quit therapy, and sent a complaint to the Dutch Association of Psychologists. The therapist's supervisor contacted the client by e-mail and arranged to see the client in person. During the subsequent meeting, it emerged that the client had interpreted the advice of the therapist as a sign that she was siding with the court and his wife and against him. The supervisor explained that the therapist did not side with his wife, and the advice was meant to protect him because the letter could have been used against him. The client was satisfied with the explanation, withdrew his complaint, and completed treatment. Clearly, in a face-to-face therapeutic situation, the therapist would have noted the client's reaction and would have discussed the misunderstanding immediately.

In previous Interapy studies, we explored several variables that might mediate the impact of Interapy. Age, degree of depression,

and disclosure were found to be predictive of success in the past. Gender, time passed since the trauma, and experience with Internet did not affect the outcome (Lange et al., 2001). The multivariate analysis in the present study replicated the result with respect to the impact of disclosure. Participants who had not spoken about the traumatic events prior to the therapy benefited significantly more than those who had previously shared their suffering. At posttest, this phenomenon had not yet emerged. This may be because the effects of disclosure take effect *after* terminating therapy, when the participant's final writing (the dignified letter) is shared with significant others. We also found that participants who had suffered from a traumatic event that was intentional (e.g., violent crime) benefited more at posttest than participants who had suffered traumatic losses or had been harmed unintentionally. Inspection of the data revealed that the intentionally harmed participants showed substantially higher trauma scores at pretest than the participants who were not intentionally harmed. At posttest and at follow-up, the levels of trauma symptoms were about the same. It is possible that the greater effect is due to the fact that this group is truly more affected (traumatized) and therefore has more improvement to make. In addition, the factor that a perpetrator or guilty party is involved may facilitate the treatment, as the patient then has someone toward whom he or she can direct rancor.

Many therapists participated in the study. The fact that many of the therapists were graduate students supports the external validity of the treatment protocol. It is unlikely that the positive results are attributable to the particular skills of specific therapists. All therapists underwent detailed training in implementing the protocol. Furthermore, the Interapy procedure includes facilities to monitor the participants' input and the therapists' instructions and feedback. These facilities are not only beneficial for the patient-therapist relationship, they are also important for enhancing replicability and treatment integrity. For researchers, the availability of complete sets of data (with all items and all questionnaires fully completed) is a great boon. The Interapy program prevents participants from proceeding to a next question if a previous one has yet to be answered. In the event that a participant did not want to answer a given question, for whatever reason, he or she could indicate this by e-mail. Measures were then taken so that the participant could skip the question and proceed. In the present study this did not happen.

The Interapy protocol combines three main elements: self-confrontation (exposure to painful stimuli), cognitive reappraisal, and social sharing. Further studies are needed to investigate the relative contribution of each element to the outcome of Interapy.

The present results are limited to self-report. There is a clear need to investigate the effectiveness of Interapy in formerly diagnosed PTSD cases by using independent assessment of outcome in addition to self-report.

So far, Interapy is a Dutch phenomenon and, as such, is open only to participants who read and write Dutch. In the near future, we will translate and adapt Interapy for clients who speak other languages. This will provide us with the possibility of offering this type of help internationally and of conducting cross-cultural research.

Interapy provides patients with a form of therapy that makes them less dependent on the procedures of institutions for mental health and private practitioners. The transparency of the system and the control by patients over their own contributions have

ethical advantages. This type of Internet therapy should be seen as a first step in a stepped-care mental health system. Relatively cheap and well-defined brief therapies should be available to patients on entry into the healthcare system. Should this form of therapy be insufficient or considered inappropriate, patients can be referred to other agencies that provide more in-depth (face-to-face) therapies that are covered by insurance. In principle, this is the case in the Netherlands. In other countries, including the United States, this is not necessarily so. Agencies that provide Internet treatment should then try and provide information about other agencies where clients could apply for therapy if the Internet treatment is not enough.

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