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Interapy. Treatment of posttraumatic stress through the Internet: a controlled trial

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Abstract

On-line therapy offers many advantages over face-to-face settings. Interapy includes psycho-education, screening, effect measures and protocol-driven treatment via the Internet for clients. The present paper reports the results of a controlled trial on the Interapy treatment of posttraumatic stress and grief in students, gaining course credits. The participants in the experimental condition ($n = 13$) improved significantly than the participants in the waiting-list control condition ($n = 12$), on trauma-related symptoms and general psychopathology. The effect sizes were large. Eighty percent of the treated participants showed clinically significant improvement after treatment. The possibilities for future research with Interapy, including studies into moderating variables, are discussed. © 2001 Published by Elsevier Science Ltd.

Computer-mediated therapies have been developed for obesity (Burnett, Magel, Harrington, & Taylor, 1989; Taylor, Agras, Losch, Plante, & Burnett, 1991), depression (Selmi, Klein, Greist, Sorell, & Erdman, 1990), panic disorders (Carr, Ghosh, & Marks, 1988; Chandler, Burck, Sampson, & Wray, 1988; Newman, Kenardy, Herman, & Taylor, 1997) and substance 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 are as effective as the face-to-face treatment to which they were compared with (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,

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without the necessity of face-to-face contact. In contrast to computer-guided therapy, where the feedback to the patient is decided as well as given by the computer, in Internet-mediated therapy, feedback is decided and given by the therapist via a computer, tailored to clients' needs. People living in remote areas, physically disabled patients with restricted mobility or patients who are afraid to seek face-to-face therapy due to anxiety or stigmatization may be reached through the World Wide Web. Furthermore, a number of people prefer to reveal their innermost thoughts and feelings to a computer-screen instead of to a real person (Erdman, Klein, & Greist, 1985; Miller & Gergen, 1998; Postmes, 1997). These advantages might lower the barrier for people to engage in psychotherapy.

Two mechanisms are widely considered to be crucial in overcoming traumatic events: (1) habituation to the frightening stimuli which occurs after exposure to the traumatic memories and avoided stimuli (e.g. Jaycox, Foa, & Morral, 1998) and (2) cognitive reappraisal of the traumatic experiences (e.g. Davey, 1993; Ehlers & Clark, 2000; Lange, Richard, Gest, De Vries, & Lodder, 1998). Imaginary exposure (self-confrontation) is used to help patients to confront the sensory perceptions, emotions and thoughts they usually avoid. Cognitive reappraisal implies challenging dysfunctional automatic thoughts and stimulating reinterpretation of misattributions about the traumatic event, in order to accommodate a new symbolic meaning about the experience. The effectiveness of treatment by self-confrontation during sessions is well established (Emmelkamp, 2001; Jaycox & Foa, 1996). There is also ample evidence for the effectiveness of cognitive therapy with PTSD patients (Emmelkamp, 2001; Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998).

A number of studies emphasize the importance of sharing traumatic experiences with people one trusts and who offer social support (Rimé, 1995; Rimé, Mesquita, Philippot, & Boca, 1991; Sarason, Sarason, & Pierce, 1990; Schoutrop, 2000). In a large retrospective study of female victims of sexual abuse, Lange et al. (1999) found that the sooner the victims had shared their experiences with either a therapist or relatives the less psychopathology they demonstrated years later. The degree of empathy they encountered also explained a significant part of the variance in psychopathology.

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 the manner, location, frequency, and amount of time spent writing. In face-to-face sessions, therapist and patient discuss the influences of writing on the patient.

The effects of structured writing assignments on health and personal well-being have been investigated in laboratory studies (e.g. Esterling, L'Abate, Murray, & Pennebaker, 1999; Greenberg & Stone, 1992; Pennebaker & Francis, 1996; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995; Spera, Buhrfeind, & Pennebaker, 1994). Smyth (1998) calculated the effect—size produced by writing tasks across 13 studies. A mean weighted effect size of $d = 0.47$ was found, representing an additional improvement in subjective well-being of 23% for the participants in writing groups, compared with control groups.

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 laboratory studies mentioned above. 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, Hanewald, Duurland, & Bermond, 1997). This protocol was further refined for its use in an Internet-mediated treatment: Interapy. The Interapy protocol was tested successfully in an uncontrolled pilot study (Lange et al., 2000). Twenty students who had experienced traumatic life events and showed the symptoms of posttraumatic stress participated in a treatment consisting of 10 writing sessions (45 minutes each). The subjects improved strongly from pre- to posttreatment, with follow-up on posttraumatic stress and grief symptoms.

Here, we present the results of the first controlled outcome study into this Internet-mediated treatment of pathological grief and posttraumatic stress symptoms. The effects of the Internet-mediated treatment on the experimental participants were tested against changes in the waiting-list control group which receives psycho-education only.

1. Method

1.1. Participants

Potential participants were 41 individuals who had experienced a traumatic event at least 3 months ago. They were recruited from a pool of 500 students in return for course credit-points. Applicants were excluded from Interapy if they met one of the following criteria: substance abuse; severe major depression; psychological dissociation; psychotic disorder or the use of anti-psychotic medication; extremely high scores in general psychopathology; presently involved in any other psychological treatment.

For various reasons, including fear of reviving the past, not having enough time, or spontaneous disappearance of symptoms, six potential participants did not complete the screening procedure. Five applicants appeared not to suffer from posttraumatic stress or pathological grief, but from other disorders, such as eating disorders or psychotic symptomatology. They were referred to other institutions. On the basis of a random table, the Interapy system automatically admitted each of the 30 applicants at random to either the experimental or the control group. Five participants dropped out from the study; two from the experimental group, three from the control group, for a variety of reasons. Some had no quiet place where they could do their writing; others could not limit themselves to one trauma; one had quit his studies and one had improved so much during the first part of the treatment that he did not consider it useful to participate any longer. The drop-outs showed a significantly lower score on the intrusion subscale of the impact of event scale before treatment than the completers ($F(26) = 6.66$, $p < 0.016$). There were no differences on other variables. Finally, 13 experimental participants and 12 control participants completed the posttest.

Altogether, 16 women and nine men participated in the study. Their average age was 22 years ($SD = 4.9$; range 18–37 years). Traumas included the loss of a beloved one, sexual abuse, physical abuse, and traffic accidents. On average, the traumas had occurred 6 years before the participants applied for participation in Interapy. Participants in the two conditions did not differ in the severity of trauma-related symptomatology: avoidance ($F(23) = 0.025$, $p > 0.87$) and Intrusions ($F(23) = 0.03$, $p > 0.88$), as measured by the impact of events scale (IES, Horowitz, Wilner, & Alvarez, 1979). For exploratory reasons, six weeks after termination of treatment a follow-up was held, which was completed by eight participants.

1.2. Design and measures

The study comprised a 2 between (condition) and 3 within (time: pre- postfollow-up) design. The participants were randomly allocated to the treatment or control condition. Treatment lasted 5 weeks; the follow-up tests were completed 6 weeks after treatment. The participants in the treatment condition received treatment immediately following the screening procedure. For ethical reasons, the participants in the control condition were not kept waiting till the treatment group had completed the follow-up. Instead, they received treatment directly after the experimental group had terminated treatment. The measures described below were used for screening, testing the hypotheses, or for exploratory sub-analyses.

1.3. Screening measures

Applicants are excluded from Interapy if they meet one of the following criteria:

- *Severely depressed mood.* Persons who suffered from dysthymia or from a relatively mild major depression were not excluded from Interapy. However, applicants were excluded from participation if they showed an extremely high score on the depression subscale of the symptom checklist (SCL-90; Derogatis, 1977) as compared to the Dutch norm tables for the psychiatric population (> 58 for women and > 53 for men; Arrindell & Ettema, 1986). The Dutch adaptation of the SCL-90 had been shown to be highly reliable and valid. Potential participants were excluded if they score above the cut-off score of the highly depressed group in the normtables for the psychiatric population. For these applicants it was considered inappropriate to follow a therapy protocol that stimulates self-confrontation without the possibility to adjust the protocol and add other elements, including medication.
- *Inclination 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 reliability of the SDQ-5 is good ($\alpha = 0.80$). The cross-validation is satisfactory and the instrument highly discriminates between groups of patients and non-patients (Nijenhuis et al., 1997). Potential participants were excluded if their scores were above the cut-off score of the SDQ-5.

- *Risk of psychosis*. Risk of psychosis was measured by the Dutch *screening device for psychotic disorder* (SDPD; Lange, Schrieken, Blankers, Van de Ven, & Slot, 2000). This seven-item inventory is highly reliable ($\alpha = 0.82$) and a valid predictor of psychotic episodes. Agreement between self-report of a group of 33 patients and the reports about them by their therapists was high ($r = 0.85$). Participants were excluded if they scored above the cut-off score of the Dutch norm group. Furthermore, participants were excluded if their answers to the questions about medication indicated the use of neuroleptic medication.
- *Substance abuse, current traumatic experiences and current treatment*. These criteria were established by the *biographical information questionnaire* (BIQ; Lange et al., 2000).

1.4. Outcome measures

- The *impact of events scale* (IES; Horowitz et al., 1979; Dutch version by Kleber & Brom, 1986): The IES assesses symptoms that are related to avoidance and intrusion, the two main characteristics of psychological dysfunction after a traumatic life event. Participants indicated on a five-point Likert scale whether they had experienced a given symptom during the last week. The reliability varies between $\alpha = 0.66$ and 0.78 for the avoidance scale and between $\alpha = 0.72$ and 0.81 for the intrusion scale; the external validity of both scales has been found to be good (Kleber & Brom, 1986). The IES was chosen because it is the only validated instrument for the measurement of posttraumatic stress for which normtables exist for the Dutch population.
- *The subscales anxiety, depression, somatization and sleeping problems of the* SCL-*90* were used to measure the effects of treatment on psychological disfunctioning in dimensions that are related to posttraumatic stress symptomatology. The SCL-90 was chosen since it is the only measure of psychopathology for which normtables for the Dutch population are established.
- The *profile of mood states* (POMS, Wald, & Mellenbergh, 1990). This scale was used to assess depressed mood, fatigue, anger, tension and loss of vigor.

1.5. Exploratory measures

- The *survey of recent life experiences* (SRLE; De Jong, Timmerman, & Emmelkamp, 1996) was used to estimate the influence of daily hassles on the effect of treatment.
- Three questions of *the biographical information questionnaire* (BIQ; Lange et al., 2000) were used for exploratory use, i.e. degree of computer and Internet experience, and level of typing skills.

1.6. The therapists

Six female graduate students and one male student in clinical psychology conducted the treatment. Their average age was 29 years ($SD = 3.5$) varying from 25

to 46 years. The therapists had followed advanced courses in behavioral and cognitive psychotherapy, and 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 they could forward to patients in each particular phase of treatment. There were regular supervision sessions by experienced consultants.

1.7. The internet site (interapy.nl)

A website was developed to create an Internet-mediated communication between participants and therapists. Participants and therapists may use a normal web-browser 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 or internet explorer (up from version 4.0) is sufficient. These browsers are distributed freely via the Internet. The Interapy program 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 in which the information and functionality 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 into 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 ensure 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).

1.8. Procedure

All interactions between participants and therapists took place through the Interapy website. Before treatment began, participants received the following items by traditional mail:

- An *informed consent* document. Participants were required to sign and return this document by traditional mail with a written signature, indicating that they had been informed about the aim and procedures of the research project and were 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 could log in to Interapy.

After the participants have contacted the Interapy home page, their first step in the treatment process included browsing 30 *interapy information pages*. These pages comprised information about: (a) 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 they could apply for therapy if they decided not to continue with Interapy 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 which psychotropic medication they were currently using and in what quantity. The Interapy system automatically analyzed the answers of the participants, computed scale scores and compared these to the inclusion cut-off scores. The system informed the participants immediately whether they fit the inclusion criteria, or not. Therapists checked the questions about quantity and type of medication, to decide whether the pharmacological situation of the participant allowed inclusion or not. Participants who did not meet the inclusion criteria received information about other institutions where they could seek help.

Participants who were admitted completed the pretest on-line. Subsequently, they provided a short description of the traumatic event causing the distress for which they were seeking treatment. The system then randomly assigned each participant to one of the therapists, ensuring that each therapist received the same number of patients. Treatment started only after confirmation from the therapists that they had received the informed consent form with a written signature from their patient. Fig. 1 presents an overview of the Interapy procedures for screening and treatment.

After terminating treatment, participants completed the posttest on-line, which consists of the IES (Horowitz et al., 1979), the SCL-90 (Derogatis, 1977) and the POMS (Wald & Mellenbergh, 1990). Two weeks later participants received the

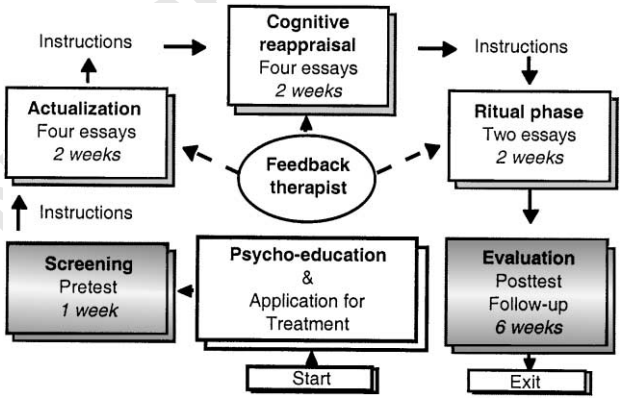

Fig. 1. Overview of the Interapy procedure.

Evaluation Questionnaire (EQ); 6 weeks after treatment, participants logged in again and completed the follow-up test, which consisted of the same questionnaires as the posttest.

1.9. Elements of treatment

During a period of 5 weeks participants had 10 writing sessions, two 45-minute sessions 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. 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 one working day after they had sent their essays. This took place seven times. Each feedback by the therapists consisted of about 45 lines of about 10 words. The treatment protocol comprised the following three phases:

- *First phase: self-confrontation*. At the start of treatment the participants received on-screen psycho-education about the rationale of self-confrontation (exposure). Accordingly, the therapists instructed the participants not only to describe their traumatic event in detail but to also write about their intimate fears and thoughts concerning the traumatic events. This was the theme of the first four writing sessions (Lange, 1994; Schoutrop et al., 1997). To stimulate self-confrontation, participants were required to write in the first person and in the present tense, describing in as great detail as possible the sensory perceptions they experienced at the time of the traumatic event, including olfactory, visual and auditory stimuli. Participants were instructed to write freely without concern for style, spelling, grammar or chronology.
- *Second phase: cognitive reappraisal*. Participants received psycho-education about the principles of cognitive reappraisal. The main goal in this phase was to develop new views on the traumatic event, and to regain a sense of control (Resick & Schnicke, 1992; Schoutrop et al., 1997). This was achieved by instructing participants to write an encouraging advice for a hypothetical friend who has experienced the same traumatic event. The advice should deal with issues such as the positive bearing of the event on this person's life and what could be learned from it.
- *Third phase: sharing and farewell ritual*. Participants received psycho-education about the positive effects of sharing. Subsequently, participants took symbolic leave of the traumatic experience by writing a letter to a significant other person, a person who had been involved in the traumatic event, or to themselves (Lange, 1994; Schoutrop, 2000, chapter 7). The letter was not necessarily to be sent to the addressed person.

2. Results

Since the data showed a fairly normal distribution we used parametric tests including *T*-tests for the main effects of time, MANOVA and ANOVA testing the

differences in improvement between the treatment and the control condition (the interaction effects). First the differences between post- and pretreatment are analyzed (Section 2). In Section 3, the follow-up scores are compared with the pre- and posttreatment scores. Effect sizes were calculated for the interaction effects comparing improvement in the experimental group with improvement in the control group. Effect sizes of $d = 0.80$ are considered to be large (Cohen, 1992).

2.1. Posttraumatic stress symptomatology

Table 1 shows the means on intrusions and avoidance, general psychopathology and mood at the different assessment time points for the treatment- and the control group. As the table demonstrates, PTSD symptoms intrusions and avoidance decreased strongly in the experimental group between pre- and posttreatment.

Unexpectedly, the control group also showed some decrease in symptomatology. Still, multivariate analysis of variance (MANOVA) for repeated measures (avoidance and intrusions) with time as the within-factor and condition as the between-factor revealed a significant interaction ($F(2,22) = 5.14$, $p < 0.015$). The decrease in symptoms in the experimental groups was significantly larger than the decrease in symptoms in the control group. Avoidance and intrusions separately showed the same pattern. Univariate testing by ANOVAs showed that the improvement in the experimental group was significantly larger than in the control group with large effect sizes, for both intrusion: ($F(1,23) = 10.00$ ($p < 0.004$); $d = 1.10$) and avoidance: ($F(1,23) = 5.32$ ($p < 0.03$), $d = 0.70$).

2.2. General psychopathology

As Table 1 also demonstrates, general psychopathology decreased during treatment. Means on the subscales of the SCL-90 demonstrated a large reduction in anxiety, depressed mood and somatization. The control group showed a slight reduction in anxiety and depressed mood. Multivariate analysis of variance (MANOVA) for repeated measures of all five subscales with time as the within-factor and condition as the between-factor showed a not significant interaction-effect. However, MANOVA without the subscales hostility and sleeping problems demonstrated anxiety, depressed mood and somatization to decrease significantly in the experimental group compared with the control group: $F(3,21) = 3.69$ ($p = 0.028$). Separate ANOVAs for these variables revealed that the large improvements in the experimental group appeared especially in depressed mood ($F(1,23) = 7.01$, $p = 0.01$; $d = 1.04$) and somatization ($F(1,23) = 7.87$, $p = 0.01$; $d = 1.07$).

2.3. Mood

The means in Table 1 show a strong improvement in mood between pre- and postmeasurement in the experimental groups. As expected, there was no improve-

Table 1
Means and standard deviations on the IES subscales, the SCL-90 and POMS, in the experimental ($N = 13$) and control condition ($N = 12$)

Scale	Condition	Premeasure		Postmeasure		Follow-up[a]	
		M	*SD*	*M*	*SD*	*M*	*SD*
IES							
Intrusions	Experimental	17.5	6.5	6.5	4.5	2.9	2.4
	Control	13.6	7.0	10.0	8.7		
Avoidance	Experimental	12.5	8.6	2.9	3.0	0.9	1.9
	Control	11.7	8.6	8.8	7.2		
SCL-90							
Depression	Experimental	29.2	8.1	21.1	3.8	20.8	5.2
	Control	27.2	6.5	26.8	6.7		
Anxiety	Experimental	16.5	5.2	11.8	1.7	12.6	5.3
	Control	17.9	7.0	16.0	5.5		
Somatization	Experimental	19.6	6.1	14.0	1.9	13.5	1.4
	Control	18.9	4.3	19.0	4.7		
Sleeping problems	Experimental	4.1	1.3	4.3	1.0	3.7	1.0
	Control	5.1	2.0	5.5	2.4		
Hostility	Experimental	7.8	1.8	6.8	0.9	6.7	1.0
	Control	8.8	3.4	7.9	3.2		
POMS							
Depressiveness	Experimental	6.9	5.4	1.9	1.8	1.6	2.3
	Control	5.4	5.4	5.3	4.0		
Fatigue	Experimental	7.2	5.4	2.9	2.7	2.5	2.9
	Control	6.3	4.0	6.5	3.9		
Loss of vigor	Experimental	11.2	3.4	8.7	4.2	9.3	3.4
	Control	13.7	3.4	13.3	4.3		
Tense	Experimental	6.5	4.4	2.3	1.6	2.1	2.1
	Control	7.3	5.0	7.5	4.7		
Anger	Experimental	4.8	3.4	2.1	2.2	1.9	2.5
	Control	4.8	4.8	4.3	5.7		

[a] $N = 8$.

ment in mood in the control group. MANOVA for all subscales demonstrated that the participants from the experimental condition improved significantly more in mood than the participants in the control condition ($F(4,20) = 3.05$; $p = 0.04$). ANOVAs for the separate scales demonstrated that they felt especially less depressive ($F(1,23) = 6.90$, $p = 0.01$; $d = 0.91$), that they were less tired ($F(1,23) = 7.08$, $p = 0.01$; $d = 0.86$), and less tense ($F(1,23) = 7.27$, $p = 0.01$; $d = 0.89$). The effect sizes for the other mood scales are medium ($d = 0.62$ for vigor and $d = 0.53$ for anger).

2.4. Clinical relevance

Inspecting the scores of the individual participants instead of group means shows that some participants in the control condition show some improvements. However, these improvements were minimal if compared with the participants who had followed the writing therapy. To establish the clinical relevance of these improvements the reliable change index as developed by Jacobson and Truax (1995) was most appropriate. According to this criterion, 86% of the participants in the treatment condition showed a clinically relevant change on avoidance symptomatology, whereas 29% in the control group changed to a relevant degree. On intrusions, 82% of the treated participants and 56% of the control group showed marked improvements. All (100%) of the treated participants showed clinically relevant changes in anxiety and somatization (in the control group, respectively, 58% and 20%). Eighty eight percent of the participants showed clinically significant changes in depressed mood (50% in the control group).

3. Explorations

3.1. Follow-up

As Table 1 indicates, decrease in trauma symptomatology continues during the follow-up period. *T*-tests for paired observation demonstrated that after follow-up, the treated participants still showed less intrusions $t(12) = 2.70$, $p < 0.02$ and avoidance ($t(12) = 2.24$, $p < 0.05$) than prior to treatment. General psychopathology as measured by the SCL-90 remained at the low level in posttreatment. Participants remained significantly less depressed ($t(12) = 3.55$, $p < 0.05$), showed less somatization ($t(12) = 3.68$; $p < 0.05$) and less hostility ($t(12) = 2.69$; $p < 0.05$) than at pretreatment. The positive changes in mood as expressed in the POMS stabilized or even increased during the follow-up period. There were no significant differences between posttreatment and follow-up.

The control group was offered the same treatment after the experimental group had terminated treatment. Seven participants of the control group completed treatment and completed the posttest. As mentioned before, their level of intrusion had already improved during the waiting period. Yet, they showed similar beneficial effects of the writing assignments as the participants in the experimental condition.

3.2. Moderators of improvement

The results of all participants who had completed the study, including the control condition after treatment, were subjected to analyses in relation to their answers on the questions of the evaluation questionnaire (EQ) and the SLRE. We summarize our findings from these analyses; Van Gelderen (2000) gives extensive descriptions.

- *Disclosure and sharing*. Participants who had not shared their traumatic experiences prior to treatment showed more trauma symptoms prior to treatment. Yet, they appeared to have improved to the same level as the participants who had previously shared their traumatic events.
- *Experience with Internet*. MANOVAs demonstrated no differences in improvement in participants with much experience on the Internet compared to participants who, prior to Interapy, had hardly any or no experience at all with the Internet.
- *Daily hassles*. The participants were divided into three groups: low level of daily hassles (as measured by the SLRE), average, and high level of daily hassles. The participants with many daily hassles showed most symptoms of fatigue prior to treatment and improved most in this respect compared to the other groups ($F(1,14) = 7.04$, $p < 0.02$). No differences in improvements in the other variables were found between the groups.
- *Depression*. Although potential participants had been excluded if their score on the depression subscale of the SCL-90 was very high, the range and variance on depression in the participants were high enough (range 18–45, $SD = 7.7$) to allow for dividing the group into a group showing a low level of depressed mood (score $\leqslant 26$, $N = 9$) and a group with relatively high level of depressed mood (score $\geqslant 28$, $N = 8$). At pretest, the more depressed participants showed more symptoms of avoidance and somatization, and they felt more tense. The depressed participants improved strongly in these variables, reaching the same posttreatment level as the participants who had not been as depressed before participation.

3.3. Evaluation of Interapy by the participants

The answers on the EQ show that 80% of the participants had found it difficult to write about the traumatic experiences. Nevertheless, 95% of the participants felt that writing the essays and receiving the feedback by the therapists had helped them to a great extent in overcoming their traumatic experiences. The few participants who had not experienced much difficulty in writing improved to the same extent as those who had found it difficult.

The EQ comprised explicit questions into the motivation of the participants. The participants who were initially less motivated improved to the same extent as the participants who had been highly motivated from the beginning. All participants except one had been highly satisfied with the contact with their therapist. Ninety percent of the participants agreed more or less (40%) to very much (50%) with the feedback they received on their writings. The answers to the open-ended questions comprised mainly positive comments. Two representative examples:

> … For me it was not especially important to write on the Internet, but the writing as such has been very important. Besides, I liked the type of contact at distance that I had with my therapist.
>
> … I find this a mega-good method to help people. Considerable time has now passed since I had contact with my therapist, but I will miss it.

4. Discussion

The writing model we advocate, whether face-to-face or through the Internet, is based on clinical practice. The elements of the protocol were derived from numerous case studies (Lange, 1994). Several of the details seem to be important, including the fixed amount of time and the exact schedule, both helping the patient not to 'lose himself'. Since structured writing may be hard on patients (they have to confront themselves with utterly painful feelings and cognitions), it is important that the therapist offers unconditional support when he or she has to confront patients with their avoidance of painful elements. The Interapy studies prove that it is possible to demonstrate support and commitment through the Internet. Nearly all participants expressed their satisfaction with the support they received and experienced the relationship with their therapist as satisfactory. These findings are in line with recent studies into treatment by e-mail (King, Engi, & Poulos, 1998; Murphy & Mitchell, 1998; Sampson, Kolodinsky, & Greeno, 1997).

Structured writing seems to be effective for the following problem areas: posttraumatic stress after violence, robbery, pathological grief after loss of loved ones through death or divorce, loss of jobs, and loss of health (Schoutrop, 2000; Smyth, 1998; Smyth, Stone, Hurewitz, & Kaell, 1999). Clinical practice has suggested that structured writing is also effective in cases where rancor or fears with regard to the family of origin play an important role. This ties in with the theoretical framework of cognitive therapy and of intergenerational family therapy (Bedrosian & Bozicas, 1994; Lange, 1996).

The results of the present controlled experiment replicate the results of the first uncontrolled trial (Lange et al., 2000). Effect sizes were 3 times as high as the effect sizes found in face-to-face experiments as reported by Schoutrop (2000) and in Smyth' meta-analysis (1998). More than 80% of the participants in the experimental group showed clinically reliable improvement in trauma symptomatology, general psychological functioning and mood. It is reasonable to argue that the present study relies on students, gaining credit points, which does not allow generalization to the general population. However, preliminary data from a new study in which only non-students participated with a high level of posttraumatic stress strongly confirm the present data. The effect sizes are even higher, all higher than $d = 1.0$ (Van Asselt & Peetoom, 2001). Moreover, the first data of this study demonstrate no improvement at all in the control group during the waiting period, as it took place in the students control group.

The positive outcome might be due to the elegance of the protocol with its 10 sessions of writing in a specific order that is based on an established theoretical model. Hence, the Interapy protocol has high external validity. 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. Furthermore, most of the participants indicated that the Interapy format was highly appealing to them. They did not object sharing their inner feelings through the Internet rather than sitting face-to-face with a therapist. On the contrary, they felt and appreciated the existence of the Interapy-therapist on the

other side of the line, suggesting a positive therapist–patient relationship. The positivity of this relationship was probably enhanced by the fact that the therapists did not have to react immediately, preventing them from giving less appropriate feedback. Whenever one of the therapists felt unsure, he or she showed the participants' written material and his or her previous feedback to a colleague or a supervisor.

The transparency of the entire process is probably not only beneficial for the patient–therapist relationship, it is also important for enhancing treatment integrity. For researchers, furthermore, it is a blessing to have complete sets of data with all items and all questionnaires fully completed. The Interapy program automatically prevents participants from proceeding to a next question if a previous one is not completed. Of course, participants were sometimes unable to log in and complete their essays. Also, some participants simply forgot to complete the follow-up questionnaires. So far, these participants were considered as drop-outs. In the future, some of these practical problems will probably decrease, since the technical equipment and Internet technology will further improve. We have also planned to create a more complete help-function on the Interapy-site and a good help-desk service to reduce the number of drop-outs, which are now about 20%.

The data presented in this paper comprise the standard Interapy treatment including the 6-week follow-up. Of course, it is important to investigate the long-term effects. In a long-term follow-up study on our first Interapy study, Roemer and Skøgerbø (2000) found the improvements from pretreatment to first and second follow-up (after 18 months) to be highly significant; all p-values <0.0005. The effect sizes were moderate to large, with d varying from $d = 0.60$ (intrusions from pretreatment to 18 months follow-up) to $d = 0.79$ (avoidance from pretreatment to 18 months follow-up).

The last phase of Interapy treatment comprises the writing of a worthy dignified letter, a letter the participants might send or give to a significant other. A face-to-face writing trial by Schoutrop (2000) demonstrated the long-term additional positive effects of writing such a letter. This might be due to the extra effort made by the participant in creating a meaningful document and the symbolic power it exerts. The fact that the letter is in fact also shared with a significant other might of course also explain the positive effects. We have no evidence, but reports from clinical practice (Lange, 1996) and studies including Rimé (1995), support this notion. It would be interesting to inquire in future follow-up studies on writing assignments whether participants have sent their letters off and whether it helped them to overcome their traumatic events. Subsequently, improvement of those who did send the letters off and those who did not might be compared. Future experiments, in which some participants send the letter while others are requested to refrain from doing so, may clarify this theoretically interesting and clinically relevant issue in a conclusive way.

The Interapy protocol combines three main elements: self-confrontation (exposure to painful stimuli), cognitive reappraisal and social sharing. Schoutrop (2000) tried to investigate the relative contribution of all three of them in experimental designs, manipulating each of these variables. Her data were not conclusive, yet they suggest that all three of these elements contribute to improvement. In the future, Interapy

will allow larger samples and measurements at more times during the process, i.e. after each phase in the protocol. This will possibly render insight into the relative contributions of the different elements, which will be of theoretical and practical value.

Our results suggest that participants who had been most depressed before profit most. However, we cannot draw conclusions yet. A proper analysis of moderators requires a multiple regression analysis, where the relative contribution of potential moderators (predictors of improvement) is established while controlling the other variables. Our sample was too small for such an analysis. The Interapy format will make it possible to gather enough data in the near future to conduct methodologically sound analyses of variables that might predict improvement in therapies as these.

Van Zuuren, Schoutrop, Lange, Louis and Slegers (1999) conducted a content analysis on the writings of participants in a traditional experiment on the effects of writing in processing traumatic events. They found various variables that are indicative for improvement including motivation, length of writing (the longer the better) and orientation on the future. The Interapy format will probably make it easier to subject the writing of many participants to content analyses by using computer programs.

Since the Interapy protocol is a demanding therapy we do consider it safe to exclude applicants who have a tendency to dissociate, have a high risk for psychosis or suffer from a severe major depression. Yet, Interapy appeared not to be the therapy for 'light cases'. Although we have to be cautious in our interpretation of the predictor analyses because they were only univariate, our data do conclusively show that depressed, anxious and highly traumatized participants did not benefit less than participants who 'only' suffered from mild trauma symptomatology did.

So far, Interapy is a Dutch phenomenon, only open to Dutch speaking participants. In the near future we will adapt Interapy into English and other languages, providing cross-national help in the context of a research program.

5. Uncited References

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