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# Treatment of panic disorder: live therapy vs. self-help via the Internet

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## Abstract

A randomized trial was conducted comparing 10 individual weekly sessions of cognitive behaviour therapy for panic disorder (PD) with or without agoraphobia with a 10-module self-help program on the Internet. After confirming the PD diagnosis with an in-person structured clinical interview (SCID) 49 participants were randomized. Overall, the results suggest that Internet-administered self-help plus minimal therapist contact via e-mail can be equally effective as traditional individual cognitive behaviour therapy. Composite within-group effect sizes were high in both groups, while the between-group effect size was small (Cohen's $d = 16$). One-year follow-up confirmed the results, with a within-group effect size of Cohen's $d = 0.80$ for the Internet group and $d = 0.93$ for the live group. The results from this study generally provide evidence to support the continued use and development of Internet-distributed self-help programs.
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*Keywords:* Internet; Panic disorder; Self-help techniques; Bibliotherapy

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## Introduction

Panic disorder (PD) with or without agoraphobia is associated with substantial impairment in quality of life (Massion, Warshaw, & Keller, 1993) and is fairly prevalent (Carlbring, Gustafsson, Ekselius, & Andersson, 2002). As evidenced by several trials there are highly effective treatments for PD (Taylor, 2000). However, only about 25% seek any kind of treatment (Lidren et al., 1994). Barriers to accessing expert assistance include shortage of skilled therapists, long waiting lists, and cost (National Institute of Health, 1991). These barriers particularly disadvantage geographically isolated people such as those in regional and rural areas where travelling time is an added burden (Richards, Klein, & Carlbring, 2003). Another problem is that those with agoraphobia may not seek therapy due to fear of leaving their homes or travelling certain distances (Newman, Erickson, Przeworski, & Dzus, 2003). A major challenge therefore is to increase the accessibility and affordability of evidence-based psychological treatments.

Printed self-help manuals have been developed to assist people with mental health problems who are unwilling or unable to access professional assistance although until recently, there has been little evaluation of their efficacy (Kurtzweil, Scogin, & Rosen, 1996; Rosen, Glasgow, & Moore, 2003). Recent reviews (e.g., Carlbring, Westling, & Andersson, 2000) suggest that CBT-based bibliotherapy for PD can be effective, with a medium to large effect size (ranging from $d = 0.5$ to 1.5).

A modern alternative to printed self-help manuals is computers (King & Moreggi, 1998; Smith & Senior, 2001). Computerized programs have been used for a number of years for assessment, diagnosis, and education (Newman, Consoli, & Taylor, 1997), but most controversial has been their use for psychological treatment (Proudfoot et al., 2003). Until recently, computer mediated therapies have often been offered without any patient–therapist interaction (Marks, Shaw, & Parkin, 1998). However, there now seems to have been a shift towards using the World Wide Web (WWW; Ritterband et al., 2003), to administer self-help treatment instructions, in conjunction with some sort of text-based human interaction (e.g., e-mail). However, there is not yet any golden standard for the delivery of these novel minimal therapist contact therapies (Ragusea & VandeCreek, 2003).

In an attempt to provide a cost-effective treatment for PD, two research groups have independently developed separate Internet-delivered self-help programs and provided minimal therapist contact via e-mail or telephone (Carlbring, Ekselius, & Andersson, 2003; Carlbring, Westling, Ljungstrand, Ekselius, & Andersson, 2001; Richards & Alvarenga, 2002). The programs have been evaluated in randomized controlled trials which showed that the participants generally achieved significant improvement in diary measurements of frequency of panic attacks, total intensity of each attack, total duration of each attack, and daily anxiety (Richards et al., 2003). Moreover, bodily sensations associated with the arousal accompanying anxiety were reduced, as well as anticipatory and catastrophic thoughts, agoraphobic avoidance, severity of anxiety symptoms, and depression. Finally, perceived life satisfaction was increased following treatment.

The results from these experiments generally provide evidence to support the continued use and development of self-help programs for PD distributed via the Internet. However, there has to our knowledge never been a direct comparison between an Internet-delivered self-help program and traditional CBT. The aim of this study was to compare the two formats of panic treatment. Given that both treatments have been evaluated in separate controlled trials with untreated waiting list

controls without any improvement in the waiting-list group, we decided not to include a no-treatment control group.

## Method

### Recruitment and selection

Participants were recruited from a waiting list of people who had expressed an interest in taking part of an Internet-administrated self-help program for PD, after having heard about previous Internet studies on PD (e.g., Carlbring et al., 2001). Originally they were recruited by means of newspaper articles in national and regional papers, notices in health magazines, and by an Internet link from the home page of the Swedish National Association for people suffering from PD. Mean time on the waiting list was 7 months (range: 0–24 months).

A web page was created for the study, which included general information about CBT and its effectiveness in treating PD, an outline of the study, and an application form.

The selection of participants was achieved by a computerized screening interview consisting of the self-rated version of the Montgomery Åsberg Depression Rating Scale (MADRS-SR; Svanborg & Åsberg, 1994) and 53 additional questions derived from the entire PD sections of Composite International Diagnostic Interview (CIDI 2.1; World-Health-Organization, 1997), the Anxiety Disorders and Interview Schedule for DSM-IV (ADIS-IV; Di Nardo, Brown, & Barlow, 1994), and the entire PD, and social phobia section from the structured clinical interview for DSM-IV Axis I Disorders research version (SCID-I; First, Gibbon, Spitzer, & Williams, 1997).

The questions in the computerized interview were adapted according to the respondent's previous answer—that is, if the respondent said that he or she never drank alcohol, the questions regarding quantity and frequency of alcoholic intake were excluded.

To be included in the study, participants had to meet the following criteria: fulfil the DSM-IV (American Psychiatric Association, 1994) criteria for PD; PD duration of at least 1 year; age between 18 and 60 years; not suffering from any other psychiatric disorder in immediate need of treatment; have a depression point total on the MADRS-SR (Svanborg & Åsberg, 1994) of less than 21 points and less than 4 points on the suicide question (Item 9; "I often think it would be better to be dead, and though I don't really want to commit suicide it does seem a possible solution"; possible range 0–6 points); PD as the primary problem; if on prescribed drugs for PD: (a) the dosage had to be constant for 3 months before the start of the treatment and (b) the patient had to agree to keep the dosage constant throughout the study; if in therapy, this had to have been ongoing for more than 6 months and not be of CBT type; to rule out general medical conditions the participant must have had a previous contact with a physician, psychologist, or other health professional as a consequence of panic attacks; no epilepsy, kidney problems, strokes, organic brain syndrome, emphysema, or heart disorders.

All of the inclusion criteria above, except for the depression point total, are common in treatment studies for PD (e.g., Tsao, Lewin, & Craske, 1998; Öst & Westling, 1995). The addition of the depression-point-total criterion was motivated by the desire to reduce any risk of treating participants in need of additional treatment and specialist consultation for suicidal ideation.

All participants who fulfilled the inclusion criteria according to the computerized interview were called to an in-person SCID interview (First et al., 1997) to confirm the diagnosis.

The study protocol was approved by the ethics committee at Uppsala University.

### Material

All participants had access to a computer with an Internet connection and could print out training instructions, thought records, and other exercise materials. Participants were informed about the general risk of unauthorized people intercepting e-mail messages and were recommended to use a free online e-mail service that automatically encrypts messages (1024 bit).

### Dependent measures

A set of valid and commonly used questionnaires were used in the study. Cognitions were assessed with the Agoraphobic Cognitions Questionnaire (ACQ; Chambless, Caputo, Bright, & Gallagher, 1984) having 14 items (1–5 scale). According to Carlbring et al. (2004) the internal consistency on a Swedish panic-sample was excellent (Cronbach $\alpha = 0.84$), and the test–retest reliability was high ($r = 89$).

The Body Sensations Questionnaire (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984) has 17 items (1–5 scale) and was used to measure physiological sensations experienced by anxiety disorder patients. The internal consistency on a Swedish panic-sample was excellent (Cronbach $\alpha = 0.87$), and the test–retest reliability was high ($r = 0.81$; Carlbring et al., 2004).

The degree of agoraphobia was measured with the mobility inventory (MI; Chambless, Caputo, Jasin, Gracely, & Williams, 1985). It has two parts in which the patient rates the degree of avoidance when alone (26 items, 1–5 scale) and when accompanied by a trusted person (25 items, 1–5 scale). The internal consistency on a Swedish panic-sample was excellent with Cronbach's $\alpha$ ranging from 0.92 to 0.95. The test–retest reliability was high ($r = 0.94-0.96$; Carlbring et al., 2004).

Generalized anxiety was assessed with the Beck anxiety inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) which consists of 21 items rated on a 0–3 scale. The internal consistency on a Swedish panic-sample was excellent ($\alpha = 0.90$) and the test–retest reliability was high ($r = 0.84$; Carlbring et al., 2004).

Level of depression was measured with the Beck depression inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) which consists of 21 items rated on a 0–3 scale. The internal consistency on a Swedish panic-sample was excellent ($\alpha = 0.90$) and the test–retest reliability was high ($r = 0.94$; Carlbring et al., 2004).

The patients' quality of life was measured with the quality of life inventory (QOLI; Frisch, Cornell, Villanueva, & Retzlaff, 1992) which has 16 areas rated for importance (0–2) and satisfaction ($-3$ to $+3$), which are then multiplied. The internal consistency on a Swedish panic-sample was excellent ($\alpha = 0.81$) and the test–retest reliability was high ($r = 0.92$; Carlbring et al., 2004).

As the validity of Internet-administered questionnaires is not yet clear, all outcome measures were administered on paper-and-pencil (cf. Andersson, Kaldo-Sandström, Ström, & Strömgren, 2003; Buchanan, 2003). To investigate if a subject's opinion of the treatment's credibility could

predict treatment outcome, participants were given a five-item, 10-point scale adapted from Borkovec and Nau (1972). To determine the clinical significance of the treatment a clinical re-interview (SCID) was administered by an independent psychologist blind for treatment condition. This was done 1 month after the treatment ended, and at a 1-year follow-up. To ensure the reliability of the diagnosis made, 10% of the tapes was randomly selected and reassessed by an independent psychiatrist with extensive SCID training. The agreement across all diagnosis was excellent (Cohen's $\kappa = 0.90$). The individual value for both PD and agoraphobia was $K = 0.80$.

## Procedure

### Participants, attrition, and statistical analysis

Out of the 427 people who completed the computerized interview 363 (85%) were excluded. The most common reasons for exclusion were that: the panic attacks were better accounted for by social phobia ($n = 218$), the panic attack frequency was too low ($n = 43$), three or fewer symptoms ($n = 33$), recent commencement of medication ($n = 25$), recently commenced or intensified another unrelated psychotherapy ($n = 18$), or that the depression point total was too high ($n = 15$). Another reason for exclusion was if the person lived too far from the study site and did not agree to come to Uppsala for treatment if he/she was randomized to treatment in person ($n = 11$).

Sixty-four people were called to an in-person SCID interview, but five failed to show up. Of the 59 people interviewed 10 were excluded because the panic attacks were better accounted for by social phobia ($n = 4$), post-traumatic stress disorder ($n = 1$), dysthymia ($n = 1$), generalized anxiety disorder ($n = 2$), anxiety not otherwise specified ($n = 1$), and Asperger syndrome ($n = 1$). Demographic data on the 49 participants included in the study are presented in Table 1. Except for one Latin–American immigrant all participants were Caucasian.

Participants were divided into two groups, live therapy (LIVE) or Internet-based (IT) by a true random-number-service (http://www.random.org). After randomization, six people dropped out during the course of the study. There were three dropouts from the LIVE therapy group and three from the IT group. Lack of time was given as the main reason for discontinuing. However, in accordance with the intention to treat paradigm (e.g., Nich & Carroll, 2002; Newell, 1992) post-treatment data were collected from all dropouts. Six participants did not return their follow-up questionnaires, and their post-treatment scores were carried forward to the follow-up assessment point. Hence, all 49 participants that were randomized to one of the two conditions are included in the statistical analysis.

## Treatment

The treatment was manualized and divided into 10 modules: (1–2) psychoeducation and socialization, (3) breathing retraining and hyperventilation test, (4–5) cognitive restructuring, (6–7) interoceptive exposure, (8–9) exposure in vivo, and finally (10) relapse prevention and assertiveness training. Each module consisted of approximately 25 pages, and was in large part similar to the previously tested self-help material by Carlbring et al. (2001).

The therapists were four clinical licensed psychologists with research and/or clinical experience with anxiety disorders, three advanced graduate students with a master's degree in clinical psychology, and one person with 4.5 years of psychologist training (i.e., the last semester of the

Table 1
Demographic data with mean and (SD) for the sample

| | Group | | Both groups |
|---|---|---|---|
| | LIVE | IT | |
| *n* | 24 | 25 | 49 |
| Age | 35.8 (9.3) | 34.2 (6.0) | 35.0 (7.7) |
| Female | 75% | 68% | 71% |
| Years with PD | 9.9 (11.1) | 8.2 (7.2) | 9.0 (9.3) |
| *Medicine* | | | |
| SSRI[a] | 25% | 36.0% | 30.6% |
| Benzodiazepines | 12.5% | 4.0% | 8.2% |
| Tricyclic antidepression | 8.3% | 4.0% | 6.1% |
| $\beta$ blockers | 4.2% | 8.0% | 6.1% |
| *Psychotherapy* | | | |
| Ongoing non-CBT | 4% | 4% | 4% |
| Earlier CBT | 21% | 28% | 24% |
| Earlier non-CBT | 25% | 36% | 31% |
| *Comorbid diagnosis*[b] | | | |
| Ongoing | | | |
|   Agoraphobia | 54% | 48% | 51% |
|   Other anxiety disorder | 50% | 48% | 49% |
|   Depression | 8% | 4% | 6% |
| Past diagnosis | | | |
|   Anxiety disorder | 25% | 8% | 16% |
|   Depression | 38% | 28% | 33% |
| *Treatment credibility*[c] | | | |
| Live therapy | 41.7 (7.0) | 39.6 (5.6) | 40.6 (6.3) |
| Internet therapy | 34.1 (8.5) | 32.7 (6.0) | 33.4 (7.3) |
| Modules completed | 9.0 (2.7) | 7.4 (2.2) | 8.2 (5.6)[d] |
| Range | 0–10 | 2–10 | 0–10 |

[a]Selective serotonin re-uptake inhibitors.
[b]Proportion of subjects with a specific diagnosis. As a subject may appear in more than one diagnosis category the total sum exceeds 100%.
[c]The treatment credibility was significantly higher for live therapy in both groups (all *p*'s$<0.001$).
[d]The live therapy group completed more modules ($t_{(47)} = 2.3$; $p = 0.26$).

master's degree program). During eight of the 10 treatment weeks the therapists received a total of 16 h of group supervision by a person licensed as psychologist, CBT-therapist, and CBT-supervisor, with extensive experience of working with PD treatments.

*Internet-based therapy*

In the IT group, each module was converted into web pages and was accessible via the WWW. Each module included information and exercises, and ended with 3–8 essay questions. Participants were asked to explain, in their own words, the most important sections of the module they had just completed, provide thought records and describe their experience with and

results of their exposure exercises. The questions were intended to promote learning and to enable the research supervisors to assess whether the participants had assimilated the material, and completed their homework. Also, each module ended with an interactive multiple-choice quiz that the participants needed to get 100% correct in order to proceed. If they were unsuccessful they received immediate automatic feedback on what specific questions they failed and what the correct answer was, together with an explanation on why that was the correct response. Another thing that separated this Internet-based treatment from regular bibliotherapy was that in every module the participants were required to post at least one message in an online discussion group about a predetermined topic. As fellow participants were able to read and comment on each others messages a rather warm and supportive atmosphere developed.

Feedback on the homework was usually given within 36 h after sending their answers via e-mail. On the basis of these e-mails, a subjective assessment was made by the therapist of whether the participant was ready to continue; if so, the password to the next module was sent. If not, the participant received instructions on what needed to be completed before proceeding to the next module. All contact was exclusively via e-mail. The participants were encouraged to come up with questions or reflections during treatment, and they were free to send an unlimited number of e-mails. The total number of reciprocal contacts (receive and send) ranged from 4 to 31 ($M = 15.4$; $SD = 5.5$). As the e-mail response to the participants often were very similar much text could be recycled. The mean total time spent on each participant was approximately 150 min, including administration, and responding to the e-mails.

*Live therapy*

Participants in the live therapy condition received 10 weekly individual sessions lasting 45–60 min. Between each session the participant was expected to do homework, which included reading a module handout identical to the text in the IT condition. Furthermore, each session was tape recorded and the participant was instructed to listen to it after the sessions to consolidate learning (Clark, 1989). The tapes were later used for adherence checks and supervision.

## Results

The two groups did not differ significantly on any of the measures at pre-treatment. Results will be presented in the following order: self-report inventories, including effect size, clinical re-interview, and finally the questionnaire assessing participants' responses to the program.

*Self-report scales and effect size*

Repeated measures ANOVA revealed no significant interactions (smallest $p = 0.19$). However, as evident from Table 2, all self-report measures showed significant improvements both at pre-treatment vs. post-treatment and at pre-treatment vs. follow-up (all $p$'s $< 0.025$ with one-tailed paired samples $t$-test). There were no differences between post-treatment and follow-up.

The within-group effect size (pooled SD) differed greatly across the different measures. Highest value was found on BSQ (Cohen's $d = 2.14$ for the LIVE group and 1.45 for the IT group). Lowest value was found for QOLI ($d = 0.48$ and 0.37, respectively). There were no significant

Table 2
Mean (SD), Cohen's pooled within-group effect size (ES) for the questionnaires used at pre- and post-treatment, and 1-year follow-up for the two treatment groups respectively

| Measure | Group | Pre | Post | Follow-up | Within effect size (Cohen's $d$) | |
|---|---|---|---|---|---|---|
| | | | | | Pre vs. post | Pre. vs. follow-up |
| BSQ | LIVE | 52.6 (10.8) | 31.3 (9.1) | 31.9 (10.7) | 2.14* | 1.92* |
| | IT | 48.7 (11.7) | 31.8 (11.6) | 32.1 (11.5) | 1.45* | 1.43* |
| ACQ | LIVE | 34.6 (9.3) | 23.6 (7.2) | 23.1 (8.6) | 1.33* | 1.29* |
| | IT | 34.5 (8.6) | 23.8 (9.0) | 23.0 (9.6) | 1.22* | 1.27* |
| MI-alone | LIVE | 2.7 (0.9) | 1.9 (0.8) | 2.0 (0.9) | 0.85* | 0.76* |
| | IT | 2.2 (0.9) | 1.7 (0.7) | 1.6 (0.7) | 0.64* | 0.68* |
| MI-accomp. | LIVE | 2.1 (0.8) | 1.5 (0.6) | 1.5 (0.6) | 0.84* | 0.81* |
| | IT | 1.8 (0.5) | 1.4 (0.4) | 1.5 (0.5) | 0.71* | 0.63* |
| BAI | LIVE | 24.5 (10.4) | 12.3 (7.7) | 12.3 (10.1) | 1.35* | 1.18* |
| | IT | 18.7 (10.3) | 10.9 (7.1) | 10.7 (7.9) | 0.90* | 0.88* |
| BDI | LIVE | 15.9 (9.0) | 10.2 (7.0) | 8.8 (6.7) | 0.71* | 0.91* |
| | IT | 11.8 (7.8) | 6.6 (5.5) | 6.2 (5.4) | 0.78* | 0.83* |
| MADRS | LIVE | 16.0 (4.3) | 10.4 (5.6) | 10.1 (6.9) | 1.15* | 1.05* |
| | IT | 13.4 (5.3) | 8.6 (5.7) | 8.1 (5.7) | 0.87* | 0.97* |
| QOLI[a] | LIVE | 0.9 (1.6) | 1.7 (1.5) | 1.7 (1.3) | −0.48* | −0.50* |
| | IT | 1.4 (1.7) | 2.0 (1.4) | 1.9 (1.4) | −0.37* | −0.31* |
| Free from PD | LIVE | 0% | 67% | 88% | | |
| | IT | 0% | 80% | 92% | | |

*Note*: BSQ, Body Sensations Questionnaire; ACQ, Agoraphobic Cognitions Questionnaire; MI, Mobility Inventory for Agoraphobia (alone or accompanied); BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; QOLI, Quality of Life Inventory; MADRS, Self-rated Version of the Montgomery Åsberg Depression Rating Scale.
*All $p$'s $< 0.025$ with one-tailed paired samples $t$-test pre vs. post-treatment or follow-up.
[a] A higher value indicates higher life quality.

differences between the two conditions, but in 31 of the 32 effect size calculations the LIVE group scored higher. The overall effect size was 0.99 for the LIVE group and 0.78 for the IT group at post-treatment, and 0.93 and 0.80, respectively, at follow-up.

The between effect size was small both at post-treatment (average $d = 0.16$; range QOLI: $d = -0.21$ to BDI: $d = 0.58$) and follow-up (average $d = 0.16$; range QOLI: $d = -0.15$ to MI-alone: $d = 0.50$) and in the direction of superior performance in the LIVE group.

*Clinical significance and treatment credibility*

The clinical significance of the treatment was assessed in two ways. One using a statistical method, and the other using clinical judgement in a re-interview administered by an independent psychologist blind for treatment condition.

The conservative method suggested by Jacobson and Truax (1991) was used to calculate the proportion of clinically significantly improved patients. With the exception of one measure there

were no significant differences between the two conditions at post-test (ACQ: LIVE = 83% vs. IT = 68%; MI-alone: LIVE = 46% vs. IT = 48%; MI-accomp.: LIVE = 42% vs. IT = 32%; BAI: LIVE = 79% vs. IT = 76%; BDI: LIVE = 71% vs. IT = 72%; MADRS-S: LIVE = 50% vs. IT = 44%; QOLI: LIVE = 83% vs. IT = 68%). The LIVE treatment had a superior effect on BSQ at post-treatment (LIVE = 96% vs. IT = 67%; $\chi^2_{(1)}$ = 3.93; $p < 0.05$). However, at the 1-year follow-up there were no significant differences between the conditions (BSQ: LIVE = 88% vs. IT = 72%; ACQ: LIVE = 83% vs. IT = 72%; MI-alone: LIVE = 46% vs. IT = 68%; MI-accomp.: LIVE = 46% vs. IT = 24%; BAI: LIVE = 83% vs. IT = 76%; BDI: LIVE = 67% vs. IT = 64%; MADRS-S: LIVE = 54% vs. IT = 48%; QOLI: LIVE = 83% vs. IT = 68%). For the LIVE condition the average proportion clinically significant improved was 68.8% at post-treatment, and 68.8% at follow-up. The corresponding figures for the IT condition were 61.5% at post-treatment, and 60.5% at follow-up.

Using a clinical re-interview (SCID) to determine the clinical significance of the treatment revealed no difference between the two groups in the proportion of participants no longer meeting criteria for PD. One month after the treatment ended, 80% in the IT group and 67% in the LIVE group no longer met criteria for PD (ns). At the 1-year follow-up the figure was 92% in the IT group and 88% in the LIVE group (ns). However, 20% in each group of those participants not meeting the criteria for PD still had some residual problems (i.e., occasional brief low-intense subclinical panic attacks with only one or two symptoms and without concern, worry or change in behaviour).

The treatment credibility scale did not predict outcome except in two cases. For the IT group the treatment credibility for the IT condition correlated significantly with the change scores on BSQ ($r = 0.46$; $p = 0.02$). Parallel, for the LIVE group the treatment credibility for the LIVE condition correlated significantly with the change scores on BSQ ($r = 0.44$; $p = 0.03$).

*Participants' responses to the program*

Most participants in both conditions were satisfied or very satisfied with the treatment (ns). However, almost all of the participants felt that the pace was too high. This was especially emphasized in the IT group, where only 28% finished all modules within the intended 10-week time frame. The corresponding figure in the LIVE group was 88%. Even though there was a significant difference in the number of modules completed it was not correlated to the change score on any measure (all $r$'s $< 0.26$; all $p$'s $> 0.21$). After post-treatment the IT group was given access to all modules and during the time to follow-up all participants had accessed the material. Albeit, without e-mail feedback from the therapist.

**Discussion**

The results from the present study suggest that Internet-administered self-help plus minimal therapist contact via e-mail can be equally effective as 10 sessions of manualized individual cognitive behaviour therapy. Both treatments showed large within effect sizes both at post-treatment and at follow-up. Specifically, bodily sensations associated with the arousal accompanying anxiety were reduced, as well as anticipatory and catastrophic thoughts,

agoraphobic avoidance, severity of anxiety symptoms, and depression. Finally, overall life satisfaction was increased and a large proportion did not meet diagnostic criteria for PD after treatment.

While the efficacy was equivalent, there were substantial differences between the groups in the proportion of treatment modules finished in time. Perhaps contact purely via e-mail is not powerful enough to stimulate the maintenance of the treatment pace. However, one of the advantages of Internet-based self-help is that the treatment can be done at a time that fits the client's individual agenda. It is possible that the pace of one module per week is too rapid. Perhaps the first five modules should be administered once a week and the following every fortnight. That would give patients more time for in vivo exposures. On the other hand, having extended time limits or no deadlines at all seem to have disadvantageous effects (cf. Carlbring et al., 2003).

There is a need to investigate the optimal level of therapist involvement. Maybe short weekly complementary telephone calls could have an additative effect. A step in that direction has been taken by Richards and Alvarenga (2002), who contacted the participants by telephone to monitor progress and answer any questions which may have arisen. Although more costly in the short term, the results might outweigh the disadvantages in the long run. However, in a recent randomized trial on treatment of headache, no differences were found between participants who received weekly telephone calls and those who did not in addition to the Internet-based self-help treatment (Andersson, Lundström, & Ström, 2003).

Even though the treatment credibility was lower for Internet-based self-help, and the treatment dosage was lower in the self-help group, it did not seem to influence the level of recovery as the proportion of participants reaching high end-state functioning was equal. Although unlikely, all improvement could have been due to psychological "placebo" or produced by a time-effect. While it is true that there was no waiting-list group control for the mere passage of time, earlier studies (e.g., Carlbring et al., 2001) have shown that there is only a negligible change in results from pre- to post-test (Cohen's $d = 0.05$). The result cannot fully be explained by a placebo effect either. According to Rapaport, Pollack, Wolkow, Mardekian, and Clary (2000), patients who respond to a placebo in PD treatment studies may show symptom relief but do not experience improvement in the quality of life. The present study showed a significant improvement in quality of life, suggesting that actual improvement was obtained.

Apart from possible cost-effectiveness, one of the justifications of Internet-based self-help therapy is the possibility of treating people who would not otherwise seek treatment. For example, those with severe agoraphobia who may not seek therapy due to fear of leaving their houses or travelling certain distances (Newman et al., 2003). By asking participants to come to a selection interview in which the SCID interview was conducted, self-selection bias for the treatment applications via Internet may have been induced. This may be an important flaw in view of the high proportion of PD patients not asking for professional help and may limit the generalizability to the intended population. Furthermore, the exclusion of participants if they were in imminent need of psychiatric treatment due to suicidality, may have resulted in low severity over-representation in the sample. However, the means on the pre-treatment measures are comparable to the norms of a PD population (Antony, 2001).

The present study is of course afflicted with a few additional caveats. First, the therapists had only minor to modest clinical experience of working with PD patients. This might have affected the outcome for the LIVE group, whereas the Internet treatment (e.g., responding via e-mail)

might be less susceptible to lack of extensive experience, given the time to check, and consult colleges. However, all therapists were given regular supervision from a licensed CBT-supervisor and 50% of the therapists had experience of working with PD patients both in clinical and in research settings. Second, the study was conducted by a research group closely affiliated with Internet research, and as researcher allegiance is known to influence outcome in psychotherapy research (Luborsky et al., 1999), we cannot exclude this possibility. Independent replication would therefore be welcome. Also, as the subject sample was selected from individuals who had expressed an interest in an Internet-administered self-help program for PD, it is possible that selection biases were operating to yield a more effective result for the IT treatment in comparison to LIVE treatment. Third, the statistical power was limited to secure differences between two treatments. Then again, the value of increasing power in order to establish an effect of small magnitude is of less practical interest. Overall, the data, including the between effect sizes, suggest difference between the two treatments were small.

There is a need for future studies to examine the effect of Internet-based self-help with minimal therapist contact via e-mail in primary care, and also in relation to and combination with best-practice psychotropic medication (e.g., SSRIs), although it is not obvious that combination treatments will yield superior outcomes (Barlow, Gorman, Shear, & Woods, 2000; Foa, Franklin, & Moser, 2002). Another interesting topic would be to transfer this research-based treatment into a clinical setting (Wade, Treat, & Stuart, 1998).

In sum, to our knowledge this was the first controlled study comparing traditional CBT with a self-help treatment program on the Internet for PD. The results from this experiment generally provide evidence for the continued use and development of Internet-based self-help programs for PD.

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