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RESEARCH ARTICLE

WILEY

The efficacy of a single imaginal exposure-writing assignment in reducing posttraumatic stress and depressive symptoms: A pilot study

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Abstract

Objective: This online study examined the effects of a single imaginal exposure-writing assignment on posttraumatic stress (PTS) and comorbid depressive symptoms.

Method: Forty-six participants with PTS were allocated to either a single imaginal exposure-writing assignment, a nontrauma writing assignment, or to a nonwriting control condition, and were reassessed 2 and 5 weeks after baseline. Of the 49 participants, 36 were female, with an average age of 23. Participation was conducted through Qualtrics. Effects were assessed with the Posttraumatic Diagnostic Scale (PDS) and the Beck Depression Inventory-II (BDI-II).

Results: PTS and depressive symptoms decreased over time regardless of the study condition.

Conclusions: We found no support for the efficacy of a single imaginal exposure-writing assignment in reducing PTS or comorbid depressive symptoms. Suggestions are given for future studies that attempt to identify a minimal dose of imaginal exposure writing for PTS.

KEYWORDS

imaginal exposure, pilot study, posttraumatic stress, writing assignment

1 | INTRODUCTION

In the past two decades, writing therapies have received growing empirical support as an effective treatment of posttraumatic stress (PTS; e.g., Lange et al., 2003; van Emmerik, Kamphuis & Emmelkamp, 2008; Van Emmerik,

Reijntjes & Kamphuis, 2013). Particularly when administered through the Internet, writing therapy may be ideal for persons who live in remote areas or prefer to preserve their anonymity. A large part of the available evidence pertains to comprehensive writing therapies consisting of different writing assignments that focus on imaginal exposure to traumatic memories, cognitive restructuring and coping, and social sharing and closure (van Emmerik & Kamphuis, 2015). One randomized clinical trial found that the efficacy of this comprehensive therapeutic writing model is comparable to trauma-focused cognitive behavioral therapy (van Emmerik et al., 2008).

Though the evidence for these comprehensive writing therapies for PTS is growing, much less is known about the extent to which the different types of writing assignments of which these therapies typically exist, contribute to their overall efficacy. Relatedly, little is known about the effects of writing therapies that exist of one single type of writing assignment, such as cognitive restructuring or social sharing. One exception is writing interventions that focus exclusively on imaginal exposure, which is a core element of most writing therapies and trauma-focused cognitive behavioral therapies for PTS. Specifically, written exposure therapy (WET) was effective in reducing PTSD in motor-vehicle accident survivors (Sloan, Marx, Bovin, Feinstein, & Gallagher, 2012) and proved noninferior to cognitive processing therapy in a mixed veteran and nonveteran sample with PTSD (Sloan, Marx, Lee, & Resick, 2018).

Of note, WET was effective in reducing PTSD despite the fact that it is considerably briefer and less intensive than the imaginal exposure component of the comprehensive writing therapies that were reviewed by van Emmerik and Kamphuis (2015). Specifically, the latter writing therapies typically include at least six 45-min imaginal exposure-writing assignments that are to be completed at home and require two online or extensive face-to-face feedback sessions by a clinician. In contrast, WET only includes five 30-min writing sessions preceded by brief feedback and guidance on participants' adherence to the writing instructions at the beginning of each session and no home assignments between sessions.

The positive findings by Sloan et al. (2012), (2018) raise the question if even briefer (and potentially more cost-effective) imaginal exposure-writing interventions can reduce PTS or PTSD, and if there is a minimum to the length of these interventions to be effective. Interestingly, positive effects have been obtained in healthy undergraduate psychology students with writing interventions as brief as 4 min, and have been explained by the possibility that thinking and processing of traumatic events may continue after writing, and by the possibility that briefer assignments may help participants to stay focused on their topic (Burton & King, 2008). The current pilot study, therefore, evaluated the effect of a single imaginal exposure-writing assignment on PTS and comorbid depressive symptoms. Specifically, we tested the hypothesis that a single 45-min imaginal exposure trauma writing assignment (TW condition) reduces PTS and depressive symptoms compared to a 45-min nontrauma writing assignment (NTW condition) and to a nonwriting control (NWC) condition.

2 | METHOD

2.1 | Participants

Participants were recruited using information leaflets that were distributed in the main buildings of the University of Amsterdam and through a website on which students can sign up to participate in research. Eligibility criteria included (a) sufficient fluency in Dutch to complete the study procedures, (b) clinically elevated PTS symptoms ($PDS \geq 18$), (c) absence of psychotic symptoms ($SDPS < 5$), and (d) absence of current suicidal ideation (SRL and BDI-II suicidality item). Of the 197 initial applicants, 112 met these eligibility criteria and were randomized across the three study conditions. Of these, 18 then declined participation and 45 could not be reached anymore, resulting in 49 participants that actually received their study allocation. Importantly, the proportion of participants that left the study at this stage did not significantly differ between the study conditions, $\chi^2(2) = 0.121, p = .942$. Two participants in the NTW condition did not complete the follow-up and one participant in the TW condition was excluded because he submitted two versions of his writing assignment due to technical problems, resulting in a final sample

of 46 participants that were included in the data analysis (see Figure 1). This exceeds the number of 36 participants (12 per condition) that would be needed to have adequate ($1-\beta = .80$) power to detect significant ($\alpha = .05$) within-between interactions of medium ($f = 0.25$) magnitude using the present study design. Participants who completed the study received course credit points or financial remuneration with a maximum of €17.50.

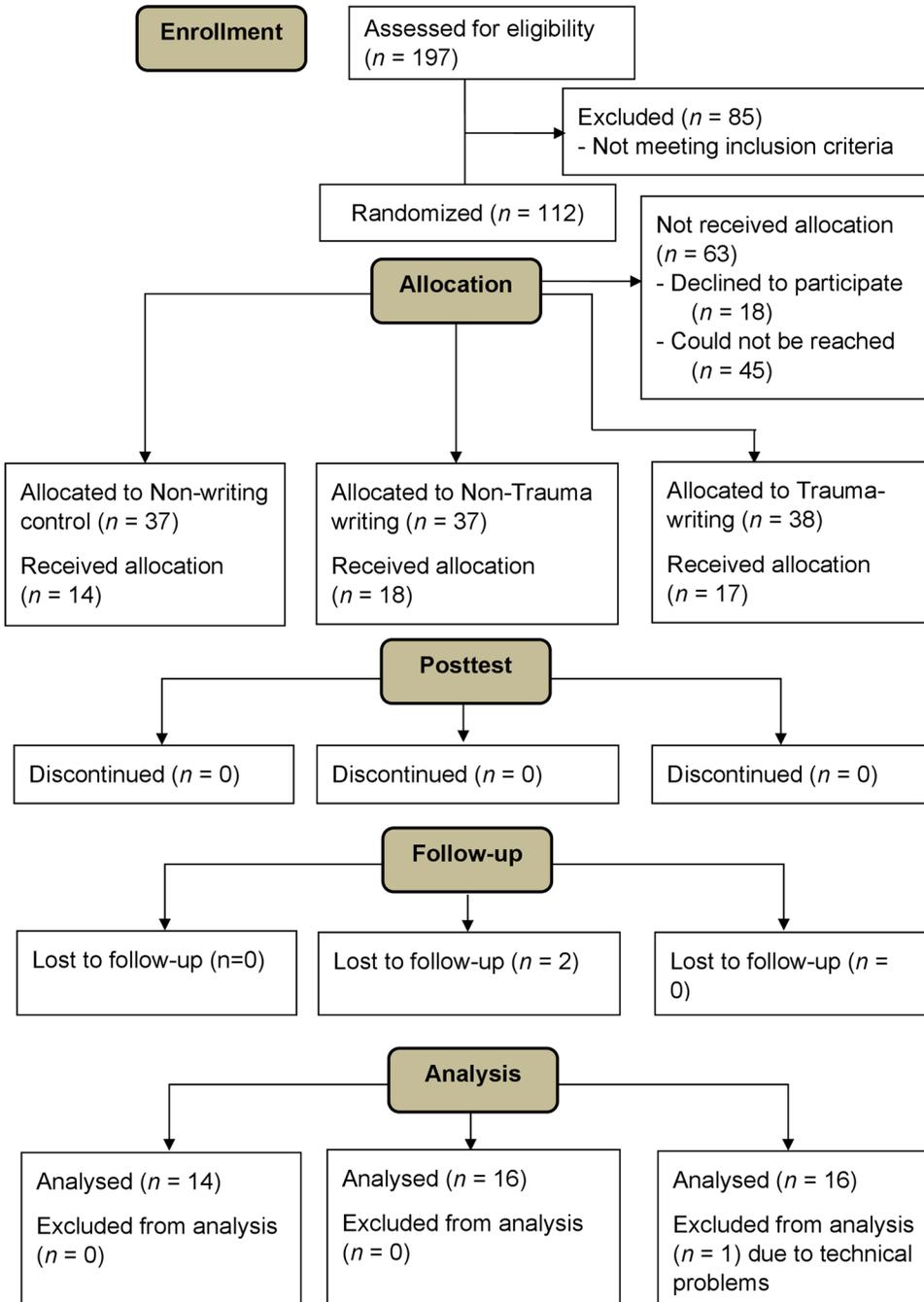


FIGURE 1 Participant flow throughout the study [Color figure can be viewed at wileyonlinelibrary.com]

One-way analysis of variance (ANOVA) demonstrated that the three conditions were equivalent at pretest regarding our outcome variables (see Table 1; lowest $p = .654$) and age ($M = 23.33$, $SD = 5.16$), $F(2,45) = 0.953$, $p = .393$. A χ^2 test demonstrated equivalence regarding sex (73.9% female), $\chi^2(2) = 1.13$, $p = .569$.

3 | MEASURES

3.1 | Posttraumatic stress

Posttraumatic stress was assessed with the third part of the Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). This self-report scale includes 17 items that correspond with the *DSM-IV-TR* PTSD symptom criteria, which are rated on a 4-point Likert scale (0 = *not at all* to 3 = *very much*). The total score ranges between 0 and 51, with higher scores indicating more severe posttraumatic stress. Internal consistency in the current sample was good, with a Cronbach's α of .826. Potential participants were excluded if their PDS score was below 18, a cutoff score yielding perfect sensitivity and adequate specificity (Wohlfarth, Van den Brink, Winkel, & Ter Smitten, 2003).

3.2 | Depressive symptoms

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), a 21-item self-report scale, was used to measure depressive symptoms. Each item describes a depressive symptom and is rated on a 4-point Likert scale (0 = *minimal* to 3 = *severe*). The total score ranges between 0 and 63, with higher scores indicating more severe depression. Internal consistency in the current sample was acceptable, with a Cronbach's α of .765.

3.3 | Psychotic symptoms

The Screening Device for Psychotic Disorder (SDPD; Lange, Schrieken, Blankers, van de Ven, & Slot, 2000) was used to screen for psychotic symptoms. It contains seven items that are rated on a 5-point Likert scale (1 = *not at all* to 5 = *very often*). The total score ranges between 7 and 35, with higher scores indicating a greater risk of psychotic symptoms. Internal consistency in the current sample was acceptable, with a Cronbach's α of .769. Participants were excluded if their SDPD score was 5 or higher (Lange et al., 2000).

3.4 | Suicidal ideation

The Suicidal Risk List (SRL; Lange et al., 2005, adapted from Blaauw, Voort, & Kerkhof, 1999) was used to assess current feelings of desperateness and suicidal intentions, and the history (time and location) of previous suicide

TABLE 1 PDS and BDI-II scores in the TW, NTW, and NWC conditions at pretest, posttest, and follow-up

Variable	<i>n</i>	Pretest Mean	<i>SD</i>	Posttest Mean	<i>SD</i>	Follow-up Mean	<i>SD</i>
PDS							
TW	16	24.25	7.32	19.00	6.40	16.50	7.91
NTW	16	22.94	2.96	14.56	5.00	14.56	5.00
NWC	14	23.29	5.11	18.00	8.56	15.79	9.46
BDI-II							
TW	16	17.81	5.86	17.06	17.06	17.19	8.49
NTW	16	18.13	6.01	16.13	6.28	13.63	5.99
NWC	14	19.79	5.58	18.57	9.57	15.93	10.16

Abbreviations: BDI-II, Beck Depression Inventory-II; NTW, nontrauma writing; NWC, nonwriting control; PDS, Posttraumatic Diagnostic Scale; TW, trauma writing; *SD*, standard deviation.

attempts. It contains six items that are rated on a 2, 3, or 4-point Likert scale, for example, 1 (*no*), 2 (*yes/once*) or 3 (*more than once*). Internal consistency in the current sample was questionable, with a Cronbach's α of .687. Participants were excluded if they scored 2 on a 2-point Likert scale question.

3.5 | Procedures

All study procedures were fully standardized and conducted through a Qualtrics website which was specifically developed for the present study. Potential participants received an email including a description of the study's aim and procedures, a link to the website, and a personalized log-in code. Participants who provided informed consent were allocated to one of the study conditions in consecutive order (first participant to TW, second participant to NTW, third participant to NWC, etc). The allocation was completely automatized by the website, without any involvement of the research team. Upon allocation, screening measures (PDS, SRL, and SDPD) were administered and excluded participants received information about mental health care options outside the study, tailored to their scores on these measures. Included participants answered additional questions about demographic and trauma characteristics.

Next, 1 week after the pretest participants in the TW and NTW conditions received an email with a link to their writing assignment. Participants in the TW condition were instructed to describe their most traumatic experience in the first person and present tense, and to focus on their emotional and sensory experiences during the event. Participants in the NTW condition were asked to give a factual description of several neutral pictures in the first person and present tense (e.g., "I see a ..."). In both conditions, participants were instructed to write for 45 min, after which the assignment was automatically closed and saved. As only a few participants stopped writing before the allocated time period, time spent writing did not significantly differ between the TW ($M = 44.92$ min) and NTW ($M = 44.94$ min) conditions ($t = -0.198$, $df = 32$, $p = .844$). Furthermore, the number of words did not significantly differ between the TW ($M = 717.76$ words) and NTW ($M = 1036.06$ words) conditions ($t = -1.976$, $df = 32$, $p = .057$). Importantly, two independent blind raters correctly classified all writing assignments as belonging to the TW or NTW conditions. Finally, participants in all conditions received an email with the instruction to complete the PDS and BDI-II again two (posttest) and 5 weeks (follow-up) after the pretest. The NWC condition received no writing instructions during or after the waiting period. After completing the follow-up, participants received their course credit points or financial remuneration. The study procedures were approved by the institutional review board of the Faculty of Social and Behavioural Sciences of the University of Amsterdam.

3.6 | Data analysis

Analyses were conducted using IBM SPSS Statistics 20 for Windows (IBM Corp., 2016). To test the hypothesis that a single imaginal exposure TW assignment reduces PTS and depressive symptoms compared to a NTW assignment and to waiting-list, two 3×3 (time by condition) repeated-measures ANOVAs were conducted with the condition as the between-subject factor and time as the within-subject factor. All statistical tests were two-tailed with an α level of .05.

4 | RESULTS

4.1 | Changes in PDS and BDI-II scores

PDS and BDI-II scores for the three conditions at pretest, posttest, and follow-up are shown in Table 1. On the PDS, a significant main effect of time was observed ($F [2, 42] = 26.31$, $p < .001$), indicating a significant reduction of the PDS scores across the three conditions. Unexpectedly, no significant interaction effect was found between time and condition ($F [4, 86] = 1.17$, $p = .332$). Similarly, a significant main effect of time was observed on the BDI-II

($F [2, 42] = 4.91, p = .012$), but no significant interaction effect was found between time and condition ($F [4, 86] = 1.06, p = .383$). Hence, there were no significant differences between the conditions in the reductions of PDS and BDI-II scores over time. Table 2 shows between-group Cohen's d effect sizes at pretest, posttest, and follow-up.

5 | DISCUSSION

This study examined if a single imaginal exposure-writing assignment is effective in reducing PTS and depressive symptoms. Our findings indicated that this was not the case, that is, no significant between-group differences in the reductions of these symptoms over time were observed. Instead, participants showed improvements in PTS and depressive symptoms in all study conditions.

These findings may be explained in a number of ways. First, participants in all conditions completed a pretest that among other things, required disclosure of their traumatic experiences and PTS symptoms. This disclosure may have caused a positive pretest effect that overruled any differential effects of a single session of trauma-focused writing compared to nontrauma-focused writing or waiting (see e.g., McCambridge, Kypri, & Elbourne, 2014) for an interesting discussion of prandomization and postrandomization research participation effects). Second, we cannot rule out a number of general threats to internal validity that may underlie the observed main effects of time, such as statistical regression to the mean (participants were selected for elevated symptom scores) and history or maturation effects—although the latter two are not very likely, given the brevity of the trial.

A number of other explanations may specifically apply to the experimental procedures in the TW condition. First, most empirically supported writing therapies to date include multiple imaginal exposure-writing assignments that are completed over several weeks (e.g., Sloan et al., 2012, 2018; van Emmerik & Kamphuis, 2015). It may thus be that a single 45-min imaginal exposure-writing assignment is simply not enough and that larger doses of written imaginal exposure are needed to produce symptom reduction. The writing format of WET (five 30-min writing sessions preceded by feedback and guidance before each session; Sloan et al., 2012, 2018) currently seems to be the briefest empirically supported writing intervention for PTS that is available. Second, in contrast to all other outcome studies of writing therapy for PTS to date, participants in our study received no feedback or further instructions in response to their essays. Especially in the initial stages of writing therapy, however, such feedback may be important to correct failures to comply with writing instructions, avoidance, and other barriers to effective imaginal exposure, thereby increasing the efficacy of subsequent writing assignments. This is in line with a meta-analysis in which a brief series of short writing assignments (typically 3–5 writing sessions lasting 15–20 min each) on which participants normally received no feedback, yielded a statistically nonsignificant ($p > .05$) effect size for its efficacy in reducing PTS (Frattaroli, 2006).

A number of study limitations should be taken into account when interpreting our findings and designing further studies of our research questions. First, we investigated a sample of students who received course credit points or financial remuneration in return for their participation. Although we ensured that the pretest PTS levels of all participants exceeded a well-accepted clinical cutoff on the PDS, this may have biased our sample toward participants with low intrinsic motivation to engage themselves in the writing assignments. Future studies should

TABLE 2 Between-group Cohen's d effect sizes on the PDS at pretest, posttest, and follow-up

Comparison	Pretest	Posttest	Follow-up
TW vs. NTW	0.23	0.77	0.29
TW vs. NWC	0.15	0.13	0.08
NTW vs. NWC	-0.08	-0.49	-0.16

Abbreviations: NTW, nontrauma writing, NWC, nonwriting control; PDS, Posttraumatic Diagnostic Scale; TW, trauma writing.

therefore also include formal PTSD patient samples. Second, although the study allocation process was completely automatized by the website without any involvement of the research team, allocation occurred in consecutive rather than truly random order.

In sum, this study found no support for the efficacy of a single imaginal exposure-writing assignment in reducing PTS or comorbid depressive symptoms. We suggest that future studies take the above limitations into account and continue to explore the minimum and optimal dosages of written imaginal exposure interventions for PTS. Another potentially useful line of further research concerns the efficacy of writing instructions aimed at cognitive restructuring, coping, or social sharing, which are part of empirically supported writing therapies for PTSD (Van Emmerik & Kamphuis, 2015) but have not been systematically studied as stand-alone interventions in various dosages and combinations with written imaginal exposure.

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