Perseverative cognition : the impact of worry on health

Verkuil, B.

Chapter 5

Pretreatment of worry enhances the effects of stress management therapy: a randomized clinical trial

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Manuscript under review

Abstract

In this randomized trial it was tested whether a two-week worry postponement and disengagement intervention (WPD) reduces work stress symptoms and whether it enhances stress management therapy (SMT). WPD effectiveness was investigated in sixty-two outpatients, suffering from adjustment and unspecified somatoform disorders, awaiting SMT provided at a mental health center. Twenty-two patients received WPD two weeks before the onset of SMT. Immediate and additive effects of WPD were compared to "worry registration-only" (N = 15) or to "waiting list control" (N = 25). Although short term effects on somatoform, anxiety and depressive symptoms were not significant, WPD added to SMT effectiveness. Decreases in nighttime worry and work stress symptoms after SMT and at follow-up were substantially more pronounced in the WPD condition. Compared to waiting list, WPD tended to induce decreases in pathological worry during SMT. In conclusion, a brief worry intervention that can be administered by psychologists and occupational physicians may be effective in reducing work stress and may enhance the effects of subsequent SMTs.

Introduction

It has been known for a long time that stressful work situations are associated with huge personal suffering and place a high economical burden on society due to absenteeism, loss of productivity and the use of health care systems (for reviews see: Van Der Doef & Maes, 1999; Michie & Williams, 2003). As has already been proposed by early stress-researchers (Selye, 1951) stress can only affect our health when it is sustained for too long. Prolonged stress responses, and not or not so much acute stress responses are the crucial link between stressors and later mental (McEwen, 2003; Thayer & Lane, 2000) as well as somatic problems (Selye, 1951; Ursin & Eriksen, 2004; Linden, Earle, Gerin, & Christenfeld, 1997; Brosschot, Gerin, & Thayer, 2006). In recent years, worrying about the stressful situations has been proposed to be one of the central pathological mechanisms between the experience of stressful situations and poor mental and somatic health (Brosschot et al., 2006; Watkins, 2008).

According to the perseverative cognition hypothesis (Brosschot et al., 2006), worrying about (work) stressors prolongs the total amount of time that these stressors adversely affect physiological and emotional functioning. Several studies provide evidence for this hypothesis. For example, ambulatory studies have shown that worrying about work stress is related to heightened cortisol levels (Schlotz, Hellhammer, Schulz, & Stone, 2004) and with heightened heart rate (Pieper, Brosschot, van der Leeden & Thayer, 2007). In addition, people who keep on worrying about their work after the workday have more difficulties 'unwinding' and suffer from more emotional and somatoform symptoms (Geurts & Sonnentag, 2006; Sonnentag, Binnewies, & Mojza, 2008) than those who do not. Moreover, prospective studies have provided evidence that the tendency to worry about things and the inability to 'unwind' or disengage after work is associated with cardiovascular morbidity (van Amelsvoort, Kant, Bultmann, & Swaen, 2003; Kubzansky et al., 1997) and even mortality (Kivimaki et al., 2006).

Accordingly, when trying to reduce the negative effects of stressful work situations on psychological and somatic health, interventions seem needed that are able to reduce worry about work in order to minimize the total 'wear and tear' (cf McEwen, 2003) that these situations can have. This focus on preventing prolonged stress responses is in line with Guidance on work related stress by the European Commission which states that: "*Stress is inevitable. What is not inevitable is prolonged, recurrent and/or intense distress*" (p. 79, Levi, 2000). In the present study we tested the effectiveness of a short and easy to administer guided self help intervention aimed at reducing the total time spent worrying in people suffering from work related stress. This intervention might specifically be suited to be administered by occupational physicians and general practitioners, who are the first points of contact for people suffering from work stress and typically have limited time to

manage work stress complaints. This intervention, called 'worry postponement and disengagement' is a so-called 'stimulus control intervention', and requires people to reschedule their day and nighttime worry episodes to a specific moment of the day during which worrying is allowed. This intervention is part of the cognitive behavioral treatment for people suffering from generalized anxiety disorder, of which chronic worry is the main feature, and has previously been found to be effective in reducing worry and its associated tension (Borkovec et al, 1983) and somatoform symptoms (Jellesma, Verkuil, & Brosschot, 2009; Brosschot & Van Der Doef, 2006) in relatively healthy subjects. However, it remains unclear whether this simple intervention is also effective in reducing worry and somatic and emotional complaints in people suffering from work stress.

This study was designed to test the short term effects of this worry intervention on the duration and frequency of worry episodes in people suffering from work stress, diagnosed according to the DSM-IV with adjustment disorder or undifferentiated somatoform disorder. We tested whether the intervention is effective in reducing work stress–related somatoform, anxiety and depressive symptoms which have been shown to be caused by worry (Watkins, 2008). Moreover, we also tested if and to what extent this short intervention - aimed as it is at a crucial prolongator of work stress, i.e. worry - adds to a typical cognitive behavioral based stress management therapy (SMT) of people suffering from work stress. The tendency to worry has been suggested to be an important mediator of the treatment effects of CBT and mindfulness meditation and a reduction of worry might be a prerequisite for CBT to be fully effective. However, empirical evidence is still scarce and previous studies have found mixed results for the mediating role of worry in the context of CBT in general as well as for work stress (Jain et al., 2007; Ciesla & Roberts, 2002). If the worry intervention appears to have positive effects in this study, either on itself or by boosting subsequent SMT, or both, it might offer general practitioners, occupational physicians and psychotherapists an alternative brief and easy-to-use intervention, or at least an enhancer of their standard treatment. In addition, it could make clear that interventions aimed at crucial mediators of CBT, such as worrying or biased attention - which can also be retrained (e.g., Hazen, Vasey, & Schmidt, 2009) enhances the effects of standard, more intensive, CBT.

In short, we tested the following hypotheses: the worry postponement and disengagement intervention will: (1) Be effective in reducing the total time spent worrying; (2) Be effective in decreasing somatoform, anxiety and depression symptoms; (3) Add to the effects of a regular CBT-based SMT on somatoform, anxiety and depression. Finally (4), we expect these latter two effects to be mediated by a reduction in worry.

Method

Subjects

The study took place at PsyQ Business, a psycho medical institution in The Hague, a division of one of the largest organizations for mental health care in the Netherlands. The institution is specialized in the treatment of psychopathology that is due to or affects stress at work. In general, patients are referred to this institution by their general practitioners or occupational physicians in order to follow stress management therapy (SMT). During a first interview with a clinical psychologist, patients are initially screened according to DSM-IV criteria for psychological disorders and a team of clinical psychologists thereafter proposes a subsequent treatment program. Patients were asked to participate in the present study when (1) they were referred to the SMT, based on a DSM-IV axis I diagnosis of either adjustment disorder, unspecified somatoform disorder (burnout), or severe work problems (axis IV) and (2) when they had to wait at least two weeks before starting with this SMT in order to be able to implement the pretreatment intervention. In these patients, we were interested in finding strong effects, that is, d >.80 (Cohen, 1988). To find such an effect we needed 63 patients. Excluded from the SMT, and therefore this study, were participants with substance abuse as the primary axis I diagnosis, serious medical conditions, organic psychiatric disorders, severe suicidality or a history of schizophrenia. All participants gave written informed consent before entering the study. No financial incentives were given and treatment costs were covered by mandatory insurance for mental health or by the employers of the participants. The study was approved by the Medical Ethical Committee of PsyQ.

Procedure

Participants who were willing to participate were invited at the institution for the first baseline measurement. During this session participants provided informed consent and completed the symptom questionnaires. Thereafter, participants were randomly allocated to one of three conditions: the Worry Postponement and Disengagement intervention (WPD) or to one of the two control conditions, that is, the Registering of Worry (WR) or a waitlist control condition, Treatment As Usual (TAU). Randomization was performed by the researchers in separate blocks (each consisting of 2 – 6 participants) by opening blinded envelopes in which the conditions were concealed in advance. Participants in the WPD and WR conditions then received the appropriate intervention. Two weeks after this baseline measurement, the SMT started.

Instruments

As the worry intervention has been previously shown to reduce somatoform symptoms, the primary outcome in this study was the total number of somatoform symptoms, assessed with 27 items of the Dutch version of the Subjective Health Complaints questionnaire (SHC; Eriksen, Ihlebaek, & Ursin, 1999; the original version contains 29 items, but two items measuring anxiety and depression were removed before analysis). Secondary outcome measures were Dutch version of the State Trait Anxiety Inventory - Trait version (van der Ploeg, Defares, & Spielberger, 1980), measuring anxiety symptoms, and the Dutch version of the Beck Depression Inventory – Second version (BDI-II; van der Does, 2002), measuring symptoms of depression. Participants were asked to complete the outcome questionnaires before the start of the SMT (2 weeks after the baseline assessment), at the end of the SMT (14 weeks after the baseline assessment) and after a follow-up period of three months (26 weeks after the baseline assessment). In addition, to test whether changes in worry mediated the direct effects of the worry pretreatment on the outcomes we asked participants in the WPD and WR conditions to keep a log of the frequency and duration of their worry episodes (Verkuil, Brosschot, & Thayer, 2007) and to return these before the start of the SMT. Furthermore, they were asked to report to what extent the worry intervention (worry postponement or worry registration only) had been helpful in reducing worries on a ten-point scale. To be able to test whether the pretreatment of worry also reduced the level of pathological worry during the subsequent SMT and whether this mediated the treatment effect on the outcomes we also administered the Penn State Worry Questionnaire (PSWQ) at baseline and at the end of the SMT. Questionnaires were sent to the participants via mail and could be returned using prepaid envelopes.

Worry intervention conditions

Worry postponement and disengagement (WPD)

Participants in this condition were provided with information on the functions of worry during a meeting that lasted approximately 30 - 45 minutes. More specifically, it was explained to them that worry can be regarded as a thwarted problem solving strategy and that worrisome problem solving while one is supposed to do other things (e.g., job demands) is likely to be unsuccessful. Participants also received a booklet containing the information and exercise described below. The intervention consisted of two parts. The first part concerned managing worry episodes that occurred during daily life. They were asked to deal with these naturally occurring worry episodes by: (a) becoming aware of

the fact that they were worrying by keeping a log of their worries, and by (b) disengaging from their worries and postponing them to a moment later that day, a so called worry half-an-hour. The postponement of worry episodes was based on the protocol developed by Borkovec et al. for the treatment of pathological worrying (Borkovec, Wilkinson, Folensbee, & Lerman, 1983; Brosschot & Van Der Doef, 2006) and forms part of the manual for stress counseling available to occupational physicians (van der Klink & van Dijk, 2003), but is believed to be seldom used by them. The second part of the intervention concerned the worry half-an-hour. During this period participants were instructed to deal with the registered problems that they had been worrying about during the day by (a) deciding whether the problems concerned issues that they could influence or control themselves, or whether the problems concerned issues (temporarily) out of their control. To help guiding this decision, they were asked to write down several problem solving steps (i.e., a problem description, the kind of solutions that they had already tried out, possible alternative solutions and, finally, their decision to either try to solve the problem or disengage from it). Guided writing about worry problems has previously been shown to be effective in reducing anxiety symptoms (Bowman, Scogin, Floyd, Patton, & Gist, 1997). If the problems could be managed (b), they were encouraged to plan when to implement the solution and to subsequently put this into practice. If they decided that a solution could not be implemented and that they had to disengage from the worry topic (c), they were instructed to practice with an exercise in (temporarily) disengaging from the worry problems, which is based on a worry reduction protocol developed by Korrelboom (Competitive Memory Training; Korrelboom, Van der Gaag, Hendriks, Huijbrechts, & Beretty, 2008). For this exercise participants had to recall moments in their lives during which they had realized that they had disengaged from a previously worrisome problem. They then practiced with thinking about the current worrisome problem while simultaneously recalling the disengagement experience from memory. More details on the whole WPD intervention can be provided by the authors on request. After one week, participants were called to remind them about the registration of worry and to inquire about whether they had any trouble with putting the worry intervention into practice. No interventions were given during the calls, which lasted a maximum of five minutes.

Worry registration (WR)

To control for the possible beneficial effects of getting extra attention and of the effects of becoming aware of worry episodes (step 1 as described above), participants in the worry registration condition were asked to keep a log of their worries, based upon the rationale that worry is a habit and that when one wants to change ones behavior, becoming aware of its manifestation is the first step to take. After one week, the participants were also called to remind them about the registration of

worry and to inquire about whether participants had any trouble with putting the worry registration into practice.

Treatment as usual (TAU)

To control for effects of time, a third group of participants were told that they had been randomized to wait for the start of the stress management therapy. They did not receive any extra treatment or attention during this period.

Stress management therapy (SMT)

After two weeks, participants started with the stress management group therapy. Each group consisted of about eight people. The therapy consisted of 12 weekly sessions taking two hours each. The therapy groups were led by two out of four experienced clinical psychologists that were blind to the pre-SMT conditions that the participants were allocated to. The therapy consisted of a combination of psycho-education and cognitive behavioral psychotherapy. In their review of work stress interventions, Van der Klink et al. found that such cognitive behavioral SMTs had a moderate effect on symptoms of anxiety and depression, with a mean effect size of Cohen's d = .55 (Van der Klink, Blonk, Schene, & Van Dijk, 2001), whereas effects on somatoform symptoms are mixed (e.g., Eriksen et al., 2002). During the first phase of the therapy participants worked at reducing their complaints by restoring their energy-imbalance, mostly by actively planning relaxing activities and by monitoring of their energy levels. Subsequent phases of the therapy focused on promoting assertiveness skills and practicing cognitive therapy to teach participants how to identify and correct dysfunctional beliefs. During the course of the study, therapists were allowed to provide cognitive interventions aimed to reduce worrying, such as by using cognitive restructuring techniques or by using the Socratic dialogue. However, they were instructed not to provide interventions aimed at the temporal dynamics of worrying, especially not the worry registration or postponement and disengagement interventions. This was done in order to keep the most important manipulation of the pre-SMT worry intervention as pure as possible while at the same time allowing typical and potentially probable effective ingredients of the therapy to remain intact and to keep this group therapy as standard as possible. A protocol of the SMT can be provided by the authors on request.

Statistical analysis

Multilevel growth curve models were used to analyze differences between the pretreatment conditions in the development of the outcome measures over time (Singer & Willett, 2003). Multilevel analysis (MLA) is especially suitable to analyze repeated measures data because it

accounts for the dependencies of the different measurements (level 1) that are nested within individuals (level 2). Another advantage is that multilevel growth curve analysis allows for individual time curves to be estimated on all available data from each individual and can handle unbalanced datasets that contain irregularly spaced measurement intervals. Analyses were performed on the intention to treat sample. Missing values on the questionnaires were imputed using the algorithm provided by Van Ginkel & Van der Ark (2005).

At the first level, the effect of time was examined. When analyzing the worry diary data, time reflected the 14 days of the worry registration period. When analyzing the treatment outcome measures, time reflected the four time points (expressed in number of weeks since start of the experiment) at which the outcome measures were administered, coded as 0 (baseline), 2 (end of experimental phase / start of SMT-treatment), 14 (end of SMT) and 26 (follow up). The second level of measurement was the individual level, as the time series were nested within the different individuals. To test the hypotheses, multilevel regression models were estimated for all outcome measures, allowing for individual variation in regression intercepts and, when it improved the fit of the model as assessed with -2 log likelihood tests, individual variation in regression slopes. In the present study two a priori contrasts tested the following null hypotheses: (1) no difference between Worry Postponement and Disengagement (WPD) and Treatment As Usual (TAU), (2) no difference between WPD and Worry registration (WR). Significant interactions were explored further with t-tests and correlation analyses. Additionally, between condition effect sizes were calculated (Cohen, 1988) as well as the percentages of participants that showed clinically significant and reliable changes (Jacobson & Truax, 1991). Due to our unequivocal expectations we used one-tailed significance tests. The mediation hypothesis was examined using the guidelines provided by Baron and Kenny (1986). Significance of mediation effects were tested with Sobel tests.

Results

Sample characteristics and drop-out

Sixty-three patients decided to participate in the study (for descriptive statistics see Table 1). Several participants did not return their questionnaires at the follow up measurements: ten at T2, twelve others at T3 and two others at T4 (see Figure 1). In addition, one participant in the WR condition stopped with the SMT because another treatment was indicated (marital counseling). Chi square tests showed that there were no significant differences between the conditions in the total number of participants that left the study at T1 ($\chi^2(2) = .39$, $p = .82$), T2 ($\chi^2(2) = 1.33$, $p = .52$) or T3 ($\chi^2(2) = .27$, $p = .88$). There were no significant baseline differences between the treatment groups in scores on the SHC, STAI, BDI-II or PSWQ. There were also no significant differences between the conditions in

DSM-IV diagnoses, the number of attended treatment sessions and the subjective rating to what extent the therapy was rated as helpful. Descriptive statistics of the questionnaires are provided in Table 2. To give an impression of the severity of somatoform complaints in this sample: In normative samples symptoms are seldom scored by more than 50% (e.g., Eriksen et al., 1999), while in the current sample the following six symptoms were reported by more than half of the participants,: fatigue (91.9%), sleeping difficulties (74.2%), lower back pain (64.5%), headache (66.1%), shoulder pain (54.8%) and neck pain (53.2%). Scores on the STAI-T, BDI-II and PSWQ were similar to levels observed in clinically anxious and dysphoric outpatients (Startup & Erickson, 2006; Dozois, Dobson, & Ahnberg, 1998).

Table 1. *Descriptive statistics*

	TAU (N = 25)		*WR (N = 15)*		*WDP (N = 22)*				
	M	*SD*	*M*	*SD*	*M*	*SD*	χ^2 *(df)*	*F (df)*	*p*
Female %	60		40		59.1		1.76 (2)		.414
Marital status, %							3.87 (6)		.695
Married	36.00		21.43		42.86				
Living together	48.00		14.29		19.05				
Divorced	4.00		0.00		4.76				
Unmarried	12.00		64.29		33.33				
Education, %							.60 (6)		.996
Secondary school	8.33		13.33		14.29				
Lower education	54.17		53.33		47.62				
Higher education	29.17		26.67		28.57				
University	8.33		6.67		9.52				
DSM-IV axis I classification (%)									
Adjustment disorder	40.0		73.3		54.4				
Undifferentiated somatoform disorder	12.0		6.7		9.1				
Depressive episode	12.0		-		-				
Anxiety disorder	-		-		4.5				
None reported[a]	12.0		20.0		31.8				
Antidepressant medication at baseline, %	12.00		6.67		22.72		2.07 (2)		.356
Age, years	45.00	8.31	39.80	8.02	40.91	7.54		2.504 (2)	.090
Number of cigarettes p/w	4.32	7.20	5.70	9.02	3.70	7.59		0.296 (2)	.745
Alcoholic beverages p/w	3.48	6.31	6.64	6.50	4.68	7.05		1.022 (2)	.366
Total hours of exercise p/w	1.96	2.32	1.87	2.80	2.50	3.36		.296 (2)	.745

Note: [a] Not all participants had received an axis I diagnosis, and some diagnoses at the start of the stress management therapy were not reported in the patients files. These patients had for example been successfully treated for a DSM-IV axis I diagnosis in a previous treatment but still suffered from work stress symptoms and participated in the SMT due to severe

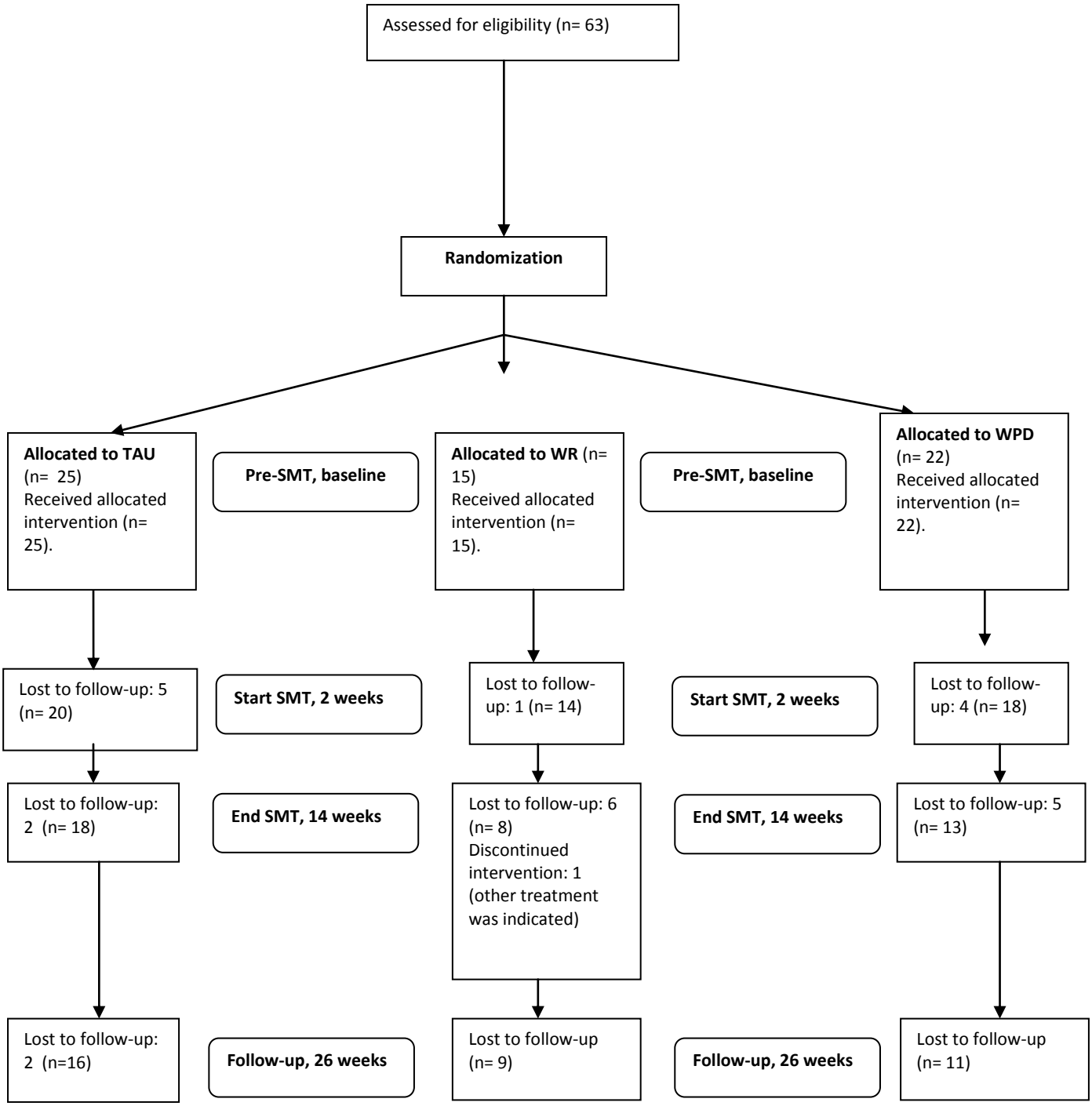
work problems (reported on axis IV); WPD = worry postponement and disengagement intervention; TAU = treatment as usual; WR = worry registration

Table 2. *Primary and secondary outcome variables means and standard deviations at baseline and follow-ups*.

		Time in weeks											
		Baseline			Start therapy (2 weeks)			Follow up (14 weeks)			Follow up (26 weeks)		
		N	M	SD	N	M	SD	N	M	SD	N	M	SD
SHC	TAU	25	9.04	4.36	19	8.53	3.84	18	8.44	4.95	16	8.88	5.11
	WR	15	8.20	4.26	14	8.14	4.02	8	6.50	4.31	9	6.78	5.74
	WPD	22	9.14	4.06	18	8.39	3.96	13	7.15	5.52	13	6.62	4.70
STAI-T	TAU	25	52.56	10.15	20	50.10	10.60	18	43.78	10.03	16	42.19	8.78
	WR	15	54.53	8.98	14	54.21	10.39	8	42.50	9.29	9	43.56	10.14
	WPD	22	52.91	9.53	18	50.89	9.63	13	38.92	9.87	13	40.62	13.12
BDI-II	TAU	24	18.42	9.23	20	17.05	9.66	18	9.89	8.13	16	11.69	7.12
	WR	15	21.67	9.32	14	22.29	10.61	8	11.25	7.36	9	10.89	7.99
	WPD	22	18.82	8.17	18	17.17	10.18	13	8.54	7.53	11	6.82	7.15
PSWQ	TAU	25	53.04	11.47				18	45.83	11.27			
	WR	15	59.33	11.49				8	49.75	12.13			
	WPD	22	56.04	9.11				13	42.85	8.42			

Note: SHC = Subjective Health Complaints; BDI-II = Beck Depression Inventory, Second Edition; STAI = State Trait Anxiety Inventory-Trait version; PSWQ = Penn State Worry Questionnaire; TAU = treatment as usual; WR = worry registration; WPD = worry postponement and disengagement intervention;.

Figure 1. Overview of the study



Effects of worry pretreatment on state and trait worry

Visual inspection of the worry data suggested that these could best be described by quadratic trends, which proved to be significant when tested in a baseline growth curve model. Table 3 shows the results of the MLA on the worry data for WPD and WR conditions (NB. the waitlist control group (TAU) did not yield worry data). In both groups daytime worry duration and worry frequency decreased. Although worry duration seemed to drop more in the WPD condition, there were no significant differences between the two conditions in total daytime worry duration and worry frequency, nor any interactions with the time variables. However, an overall decrease in nighttime worry was apparent and the linear and quadratic time curves for the nighttime worry data were different for the two conditions. For WPD, worry duration and frequency decreased during the first week of the intervention period, while increasing again during the second week. The reverse pattern was apparent for the registration group. T-tests showed less frequent nighttime worry episodes ($t(435) = 2.392$, p = .009; M = 1.32 episodes per night, SD = 1.67) and shorter worry nighttime duration ($t(433) = 2.671$, p = .004; M = 19.66 minutes per night, SD = 42.14) in WPD compared to WR (M = 2.04 episodes, SD = 5.51 and M = 22.24 minutes, SD = 27.91 respectively). The difference between WPD (M = 5.31, SD = 1.38) and WR (M = 4.42, SD = 2.35) in self reported deceases in worry, although in the expected direction, was not significant ($t(23) = 1.167$, $p = .128$).

Pathological worry (PSWQ) was measured at baseline and after the SMT. MLA showed that there was a significant decrease in PSWQ scores before and after SMT for all patients (B = -13.80, p < .0001, 95 % CI: -20.64 - -6.90). The difference between the decreases in PSWQ scores between WPD and TAU was marginally significant (B = 7.063, $p = .063$, 95 % CI = -2.064 – 16.191), whereas the difference between WPD and WR was not significant (B = 5.019, $p = .184$, 95 % CI = -6.113 – 16.152).

Table 3. *The effect of condition (worry registration versus worry postponement and disengagement) on worry duration and – frequency during the pre-SMT period.*

Variables	*Time*		*Condition*	*Time x Condition*	
	B(SE)		B(SE)	B(SE)	
	linear	quadratic		linear	quadratic
Daytime worry duration	-.1766 (.0605)*	.0122 (.0043)*	.0696 (.4280)	.0392 (.0925)	-.0038 (.0065)
Daytime worry frequency	-.0668 (.0329)*	.0047 (.0023)*	.0586 (.2279)	-.0039 (.0504)	.0001 (.0034)
Nighttime worry duration	-.1414 (.0740)$^{p = .057}$	.0112 (.0053)*	-.1963 (.5220)	.3346 (.1149)*	-.0251 (.0083)*
Nighttime worry frequency	-.0601 (.0299)*	.0045 (.0022)*	-.0309 (.2031)	.1005 (.0464)*	-.0078 (.0034)*

* = $p < .05$, two-tailed

Effects of worry interventions on somatoform, anxiety and depressive symptoms

First, the time course of the somatoform, anxiety and depressive symptoms during the whole study was estimated using multilevel models. Concerning the number of somatoform symptoms (SHC), the MLA random intercept model showed that there was a significant decrease for all participants (B = -.129, $p < .0001$, 95 % CI = -.198 – - .062) in SHC from baseline to follow-up three months after the SMT. The preplanned contrasts showed that the linear decrease in symptoms from baseline to follow-up after the SMT differed significantly between WPD and TAU (B = .099, $p = .017$, 95 % CI = .008 – .190), whereas there was a trend for WPD to be more effective than WR (B = .067, $p = .109$, 95 % CI = -.039 – .173). See also Figure 2 for a graphic representation of the predicted model.

Concerning the levels of anxiety (STAI-T), the MLA random intercept model showed a significant overall decrease in anxiety (B = -.589, $p < .0001$, 95 % CI = -.789 – -.410). In addition, the linear time trend differed significantly between the WPD condition and TAU (B = .203, $p = .048$, 95 % CI = -.037 – .444), whereas the difference between WPD and WR was not significant (B = .105, $p = .229$, 95 % CI = -.176 – .386). The same pattern was found for depressive symptoms. A random intercept - random slope MLA model showed a significant overall decrease in depressive symptoms (BDI-II; B = -.495, $p < .0001$, 95 % CI = -.675 – -.314), Furthermore, the difference between WPD and TAU was marginally significant (B = .195, $p = .054$, 95 % CI = -.044 – .434) whereas the difference between WPD and WR was not significant (B = .032, $p = .409$, 95 % CI = -.245 – .309).

Table 4. *Multilevel models predicting changes in somatoform, depressive and anxiety symptoms*.

Variables	*Time*	*Condition (main effects)*		*Time x condition contrasts*		*Cohen's d*		*Cohen's d*		*Cohen's d*	
		WPD vs TAU	WPD vs WR	WPD vs TAU	WPD vs WR						
	B(SE)	B(SE)	B(SE)	B(SE)	B(SE)	2 weeks (pre-treatment)		3 months (post treatment)		follow up 3 months	
						WPD vs TAU	WPD vs WR	WPD vs TAU	WPD vs WR	WPD vs TAU	WPD vs WR
SHC	-.129 (.034)*	.071 (1.164)	-.669 (1.324)	.099 (.046)*	.067 (.054) p = .109	.13	.40	.54	.47	.65	.59
STAI-T	-.589 (.091)*	.441 (2.576)	2.800 (2.928)	.204 (.122)*	.105 (.142) p = .229	.22	.43	.95	.43	.42	.36
BDI-II	-.495 (.090)*	.070 (2.612)	3.745 (2.979)	.195 (.119) p = .054	.032 (.138) p = .409	.21	.38	.64	.26	.62	.19

Note: * p < .05, one-tailed. WP = worry postponement pretreatment; TAU = treatment as usual; WR = worry registration; SHC = Subjective Health Complaints; BDI-II = Beck Depression Inventory, Second Edition; STAI-T = State Trait Anxiety Inventory.- Trait version

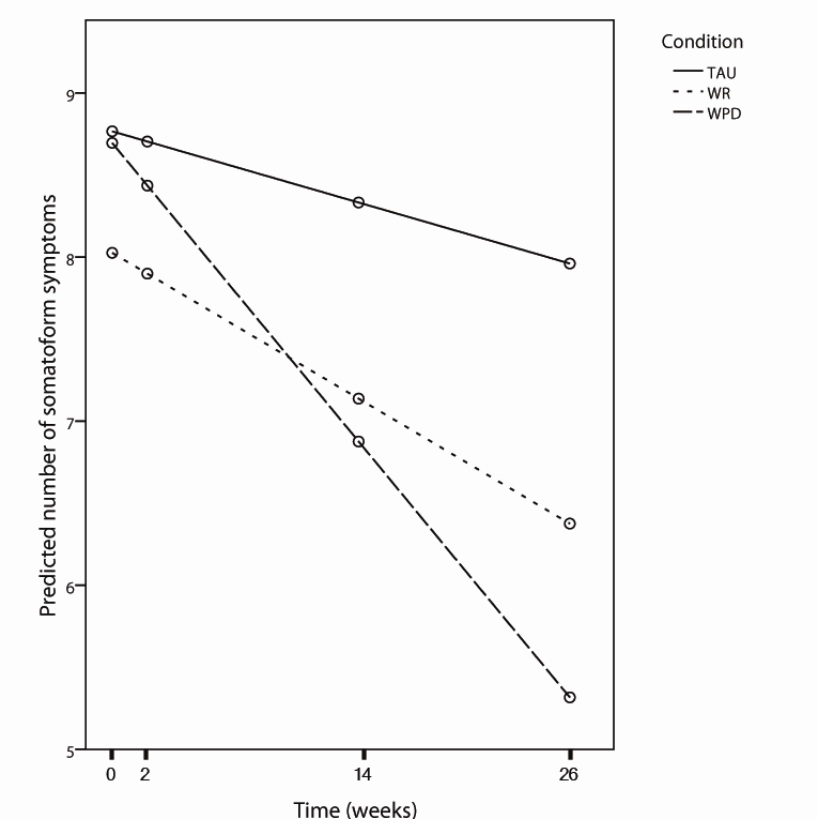


Figure 2. Effects of the worry postponement and disengagement intervention (WPD) versus worry registration (WR) and treatment as usual (TAU) on somatoform symptoms.

Direct effects of worry postponement and disengagement

To examine whether these differences between the time course in symptoms between WPD and TAU were present during the two weeks before SMT, follow-up tests were conducted on data from participants in these two conditions. Concerning the number of SHC, paired t-tests showed that there was a significant decline in SHC during the two weeks of the worry pretreatment period in the WPD condition ($t(17) = 3.12$, $p = .003$), whereas the decline was not significant in TAU ($t(18) = 1.05$, $p = .15$). However, an ANCOVA with SHC at baseline as a covariate and Condition as a between subjects factor did not yield any significant differences between the conditions in SHC at two weeks. Concerning the STAI-T, there was a trend towards a significant decline in anxiety symptoms during the two weeks of the worry pretreatment period in the WPD condition ($t(17) = 1.63$, $p = .06$), which was not apparent for TAU ($t(19) = 0.827$, $p = .209$). There were no significant differences between the conditions in STAI-T scores however. Finally, there was a trend towards a significant decline in BDI-II scores during the two weeks of the worry pretreatment period in the WPD condition ($t(17) = 1.460$, $p = .081$), which was not apparent for TAU ($t(18) = 0.635$, $p = .267$). There were no significant differences between the conditions in BDI-II scores.

Additive effects of the worry postponement and disengagement on SMT effectiveness

To test the third hypothesis, that the WPD intervention would enhance the effects of the SMT on work stress symptoms, a second set of follow-up tests was conducted. Concerning the SHC, directly after the SMT, the number of somatoform symptoms was significantly lower compared to baseline in WPD ($t(12) = 2.086$, $p = .029$), whereas a trend was apparent in TAU ($t(17) = 1.383$, $p = .092$). At follow-up, the decrease in somatoform symptoms compared to baseline was significant for both conditions. ANCOVAs showed that at follow-up, but not directly after the SMT, participants in the WPD condition reported significantly less SHC than participants in TAU ($F(1,26) = 2.950$, $p = .049$). Concerning the STAI-T scores, in both conditions the level of anxiety symptoms directly after the SMT and at follow-up had significantly decreased below baseline levels (all ts > 2.5). Participants in the WPD condition reported lower levels of anxiety directly after the SMT ($F(1,28) = 3.894$, $p = .029$), but not at follow-up, when compared to participants in TAU. Concerning the BDI-II scores, in both conditions the level of depressive symptoms directly after the SMT and at follow-up had significantly decreased below baseline levels (all ts > 3.5). At follow-up but not directly after the SMT, participants in the WPD condition had significantly less depressive symptoms than participants in TAU ($F(1,23) = 2.964$, $p = .049$).

Effect sizes

Raw change scores in symptoms from baseline to the follow up measurements were used to calculate between group effect sizes (Table 4). Effect sizes of .20 indicate small effects, effect sizes of .50 indicate medium effects and effect sizes of .80 show large effects (Cohen, 1988). From Table 4 it can be derived that, while not all differences between the conditions were significant, most effect sizes were small to medium, and there was a large effect for the difference between WPD and TAU in the level of anxiety symptoms directly after the treatment.

The clinical significance of the results was determined by examining the percentage of participants that showed reliable reductions in the outcome variables that went below clinical cut-off points (Jacobson & Truax, 1991). Reliable change was calculated on the basis of the formula provided by Jacobson and Truax (1991) with Cronbach's alphas as the indices of questionnaire reliability. The numbers of participants that showed reliable changes below clinical cut-off points were compared between the conditions with exact chi-square tests. Cut-off points were determined as follows: STAI-T: 46 (Fisher & Durham, 1999); BDI-II: 12 (Dozois et al., 1998), PSWQ: 45 (Behar, Alcaine, Zuellig, & Borkovec, 2003). As there were no such data available for the total number of SHC, clinically significant reductions in SHC scores were determined by outcome scores that fell two standard deviations below baseline scores (i.e. a reduction of 8 complaints). Paired comparisons between the

number of clinically significant and reliably changed participants among the three conditions showed a significant difference between WPD and TAU in clinical change on the STAI scores directly following the SMT. Eight participants (62%) in the WPD condition showed a clinical change, compared to four (29%) in TAU ($\chi^2(1, N = 31)$ 4.918, $p = .032$). The difference between WPD and WR, in which two participants (25%) showed clinical change, was not significant, ($\chi^2(1, N = 21) = 2.651$, $p = .119$). No other differences between the conditions were apparent.

Overall, the percentages of participants realizing clinical and reliable change during the two week pre-SMT period were: 0% (SHC), 12.5% (STAI-T) and 3.1% (BDI-II). Directly after the SMT and at follow-up, the percentages of reliable changes were: 9.5% and 9.1% (SHC), 47% and 50% (STAI-T), 38% and 40% (BDI-II) and 33% (PSWQ measured only after SMT).

Mediating effects of momentary assessed and trait worry on treatment outcome

Our next hypotheses concerned whether changes in worry would mediate the effects of the WPD intervention on changes in anxiety, depressive and somatoform symptoms. As symptoms levels during the course of treatment did not significantly differ between WPD and WR conditions, it was therefore irrelevant to test whether changes in daily worry during the two intervention weeks mediated the differential effects of these worry intervention. Yet, correlation analysis within these conditions indicated that reductions in the number of nighttime worry episodes were associated with reductions in SHC ($r(28) = .35$, $p = .043$), whereas reductions in the duration of the nighttime worry episodes were associated with reductions in BDI-II ($r(24) = .37$, $p = .036$) and STAI ($r(24) = .36$, $p = .043$). When controlling for reductions in the other outcomes, however, these associations became non-significant, suggesting that reductions in daily worry had a relatively small independent contribution to reductions in work stress symptoms. In addition, self reported change in worry due to the worry interventions was associated with changes in SHC ($r(25) = .39$, $p = .027$) and BDI-II ($r(25) = .57$, $p = .001$). Thus, people who reported to have been worrying less during the 2 weeks before the SMT also reported lower levels of somatoform and depressive symptoms.

In addition, although differences between WPD and TAU in PSWQ scores after the SMT were only marginally significant (i.e. the first step of the mediation analysis according to Baron and Kenny (1986)), we decided to explore whether PSWQ-Change mediated the effects of the WPD condition on the outcomes. Although the effects of Time*PSWQ-Change on the outcomes were significant and slightly reduced P levels of the Time*Condition effects, Sobel tests showed no significant mediation effects.

Discussion

This study examined the effectiveness of a simple and easy to administer worry intervention, i.e. worry postponement and disengagement (WPD), in reducing worry and its associated symptoms of work stress. Thus, it was hypothesized that this worry intervention would not only reduce worry but also symptoms of work stress, theoretically because it would reduce the total load on mind and body produced by worrying. It was investigated whether the WPD intervention would be effective by itself at the short term (within two weeks), or whether it would enhance the effectiveness of a subsequent stress management therapy (SMT), or both. In addition, it was hypothesized that reductions in (pathological) worry would mediate reductions in work stress symptoms and the effects of the SMT on work stress symptoms. The results partially confirm our hypotheses.

First of all, we found that the WPD intervention, but also the registering of worry episodes (WR), led to decreases in daytime and nighttime worry. Importantly, the WPD intervention was specifically associated with decreases in the frequency and duration of nighttime worry episodes. With regard to the work stress symptoms, the WPD intervention did not have significant short term effects, although these symptoms tended to deviate from baseline more strongly in the WPD condition. The most important and innovative finding from this study was that during the whole course of the study, participants who had received the WPD intervention showed the largest decreases in somatoform, anxiety, and - to a lesser extent - depressive symptoms. This was most apparent when the effects of WPD were compared to the effects of a waitlist control group who had received no intervention before the SMT, and thus only treatment as usual (TAU). Significant differences between the conditions were found in symptom levels directly after the SMT and at a follow-up of three months. Directly after the SMT, participants in the WPD condition reported less symptoms of anxiety compared to TAU, and at a three month follow-up measurement they also reported less somatoform and depressive symptoms. To our knowledge, this is the first study to show that a ‘pretreatment’ intervention directed at a crucial pathogenic process, in this case worry, enhances the effectiveness of a standard cognitive-behavioral therapy. This finding is even more important with respect to the somatoform effects, since previous studies showed no effects of SMT on somatoform symptoms (e.g., Eriksen et al., 2002; Tveito & Eriksen, 2009). Since these symptoms are associated with high health care costs and long term sickness absence, is it encouraging that adding a time-limited and simple worry intervention potentially can enhance the somatic effects of such a standard SMT.

Especially nighttime worries could be considered as a pathological feature of worry and were, as mentioned, reduced by the WPD intervention. Nighttime worries likely indicate difficulties in disengaging from work and other stressful events. As such, nighttime worries might play a crucial role in the link between stress / worries and well being, for example by interfering with physiological

recovery during sleep (Brosschot, van Dijk, & Thayer, 2007). Interestingly, reductions in nighttime worry were associated with reductions in work stress symptoms.

A point that requires some future attention is that the difference between the effects of WPD and mere registering of worries (WR) on symptoms was not significant. Although this is most likely due to our small sample size as the differences were in the expected direction, it leaves open the interesting possibility that the effects of WPD could be largely attributed to becoming more aware of one's worries. If this is the case, than this might indicate that an even more simple intervention than WPD could already be effective in enhancing SMT. Another point pertains to our mediation hypothesis. Contrary to our expectations, we did not find any mediating effects of pathological worry and the data did not permit us to test mediating effects of momentary assessed worry, because this variable was not available for participants in the TAU condition. As such, the precise temporal mechanisms underlying reductions in work stress symptoms during the course of the SMT remain indistinct. Follow-up studies are warranted that investigate this issue more thoroughly, for example by measuring worry and work stress symptoms more frequently during the course of treatment.

While the results of this study are encouraging and hopefully stimulate more research into the short term and additive effects of short and easy to administer interventions, there are some limitations. First, the time period for our follow-up measurement, three months after the SMT, was relatively short and it is not clear to what extent the results pertain to longer follow-up periods. With respect to its clinical relevance, one could argue that it is a weakness of this study that participants were not screened on psychopathology using structured clinical interviews like the Structured Clinical Interview for DSM Disorders (SCID). However, the most common DSM-IV classifications to diagnose clinical forms of work stress are 'adjustment disorder' and 'unspecified somatoform disorder', which remain controversial (Mayou, Kirmayer, Simon, Kroenke, & Sharpe, 2005). Moreover, the use of the present convenience sample adds to the generalizability of the results of the study for at least two reasons. First, the inclusion of this sample closely resembles usual clinical practice in which inclusion criteria are often less strict than in randomized controlled trials aimed at specific psychopathologies. Second, the sample represents a large part of the population that suffers from somatoform, anxiety and depressive stress symptoms which are known to be highly comorbid. With respect to the effects of the WPD intervention, an alternative explanation for its effects that cannot be ruled out is that these were partially due to attention. Participants in the WPD and WR conditions received more attention from psychologists before the start of the SMT, as they were called up after one week to check whether there were any problems with the worry registration. Future studies that compare the effectiveness of WPD to interventions not primarily focused on worrying are needed to test these

suggestions. Another limitation is that in testing the effects of WPD on worry, we focused merely on the frequency and duration of worries, but not on the content of worries. It would be interesting to examine whether WPD stimulates another way of thinking about problems. For example, a recent study showed that manipulating the concreteness of worrisome thinking causes changes in depressive symptoms (Watkins & Moberly, 2009). Although the present intervention is mainly aimed at limiting the total amount of wear and tear that worry episodes can have on the body (postponement and disengagement), we also asked participants to write down their worry problems, which might have enhanced a more concrete thinking style that reduced nighttime and pathological worrying. Finally, this study focused on outpatients suffering from work stress and it remains unclear to what extent these findings extend to other populations. For example, it remains unclear whether the findings extend to cognitive behavioral therapies for anxiety and mood disorders, and whether the additional effects of WPD are limited to subsequent *group* interventions. On a broader scale it might be interesting to test whether worry interventions are effective in preventing severe forms of work stress, for example in workers vulnerable for developing work stress (e.g. teachers, nurses). This is in line with recent calls for the promotion of self help strategies to reduce stress among the general population (Jorm & Griffiths, 2006).

Notwithstanding these limitations, this study is the first to show that a simple guided self help intervention helps reducing worry, especially nighttime worry and that it enhances the effects of a subsequent SMT on both mental and somatic symptoms of work stress. Since work stress symptoms form a major humanitarian and economic burden, and are also a vulnerability factor for the development of severe conditions such as cardiovascular disease and mental health problems, further testing of the effectiveness of simple interventions that aim to target mediators of psychological treatments is recommended.