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Investigating new process-focused treatments for posttraumatic stress disorder : attentional bias modification and mindfulness-based cognitive therapy

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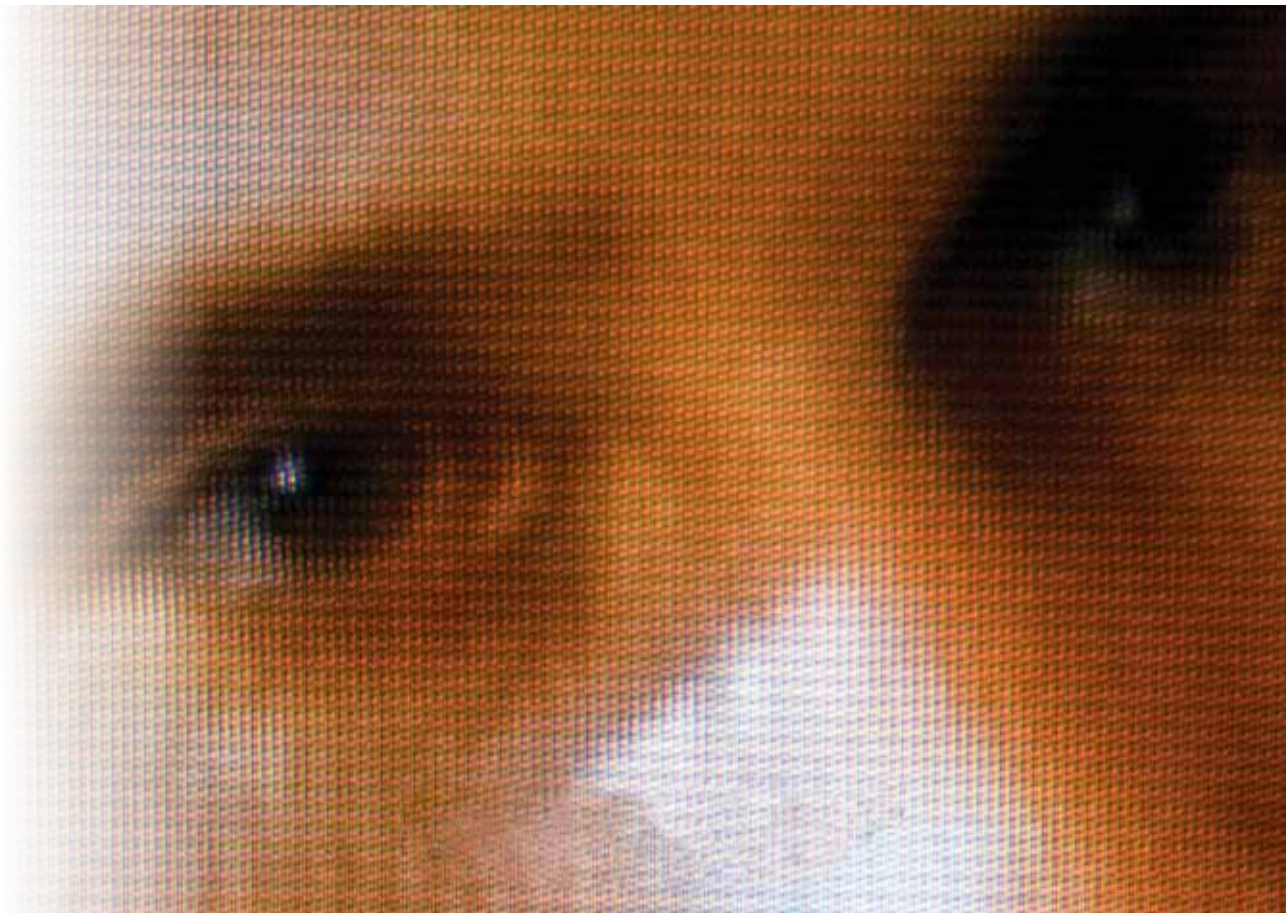
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Relationships between mindfulness skills, anxiety sensitivity and cognitive reactivity in posttraumatic stress disorder

M. Schoorl, L. Van Mil-Klinkenberg & W. Van Der Does (2013).
Mindfulness, under revision



Abstract

Mindfulness interventions are effective in patients with recurrent depression. They might also be helpful in posttraumatic stress disorder (PTSD), since mindfulness skills have been associated with low levels of symptoms in trauma-exposed students and combat veterans. Anxiety sensitivity (AS) and cognitive reactivity (CR) are hypothesized to mediate the effects of mindfulness interventions and are also related to PTSD. To investigate the associations among mindfulness skills and anxiety and depression sensitivity and symptom severity in a clinical sample of patients with PTSD.

Outpatients with PTSD (N = 101), in treatment at a specialized center, filled out questionnaires. Mindfulness skills, particularly the facet non-judgment or acceptance, correlated negatively with sensitivity measures and with symptom severity. The relationship between mindfulness facet non-judgment and CR and AS remained statistically significant when controlling for PTSD and depression symptoms.

In conclusion, clinicians who attempt to increase mindfulness skills in patients with PTSD may be advised to pay particular attention to the aspect of non-judgment. It is also recommended to measure anxiety and depression sensitivity when evaluating effects of MBCT in patients with PTSD.

Introduction

Effective treatments for posttraumatic stress disorder (PTSD) include pharmacotherapy (antidepressants, AD) and cognitive-behavioral therapy (CBT) (Foa, Keane, & Friedman, 2004). There is, however, ample room for improvement of treatment. Twenty-five to 45% of patients treated for PTSD continue to meet the criteria at the end of exposure treatment (CBT) (Van Minnen & Hageraars, 2002). Furthermore, CBT carries a risk of exacerbation that is estimated at 10% (Schottenbauer, Glass, Arnkoff, Tendick, & Hafter Gray, 2008) and in a recent meta-analysis an average dropout rate of 18% was reported (Imel, Laska, Jakupcak, & Simpson, 2013).

Mindfulness-based cognitive therapy (MBCT), designed for patients with recurrent depressive episodes, may be an option to improve treatment efficacy in PTSD. MBCT is a prophylactic treatment that aims to reduce relapse risk by increasing the awareness of negative thinking patterns and by promoting an accepting instead of an avoiding attitude towards one's own thoughts (Teasdale, Segal, & Williams, 1995). The protocol includes attentional control exercises and training in mindfulness, integrated with components of cognitive therapy (Segal, Williams, & Teasdale, 2002). Meta-analyses have shown that MBCT protects against depressive relapse in patients with recurrent depression (Piet & Hougaard, 2011; Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011) and has positive effects on anxiety symptoms in patients with panic disorder, generalized anxiety disorder and bipolar disorder in remission (Chiesa & Serreti, 2011). Mindfulness Based Stress Reduction (MBSR; on which MBCT is based, Kabat-Zinn, 1982) was recently studied in an open trial with 27 adult survivors of child abuse, 15 of whom were diagnosed with PTSD (Kimbrough, Magyari, Langenberg, Chesney, & Berman, 2010). MBSR led to a 31% reduction of PTSD symptoms, significant reductions of anxiety and depression and an increase of mindfulness skills. We reported positive experiences with MBCT for chronic PTSD in a pilot study (Schoorl & Van Der Does, 2013).

A rationale for exploring MBCT in PTSD lies in the relationship between mindfulness skills and posttraumatic symptoms. In a population of trauma-exposed students without axis I diagnoses, the mindfulness facet non-judgment predicted PTSD symptoms above and beyond the number of experienced events and negative affectivity (Vujanovic, Youngwirth, Johnson, & Zvolensky, 2009). In another study in trauma-exposed students, mindful non-judgment predicted variance in PTSD-avoidance symptom severity beyond other measures of experiential avoidance (Thompson & Waltz, 2010). In a cross-sectional study with three groups of 15 veterans (with/without combat exposure and PTSD), higher scores on non-judgment were again associated with lower severity of PTSD (Wahbeh, Lu, & Oken, 2011). The first aim of the present study was to further investigate the relationship between mindfulness skills and PTSD symptom severity in a larger clinical sample of patients with PTSD of various (also non-combat-related) origins.

A second aim of this study was to investigate the association of two aspects of sensitivity for anxiety and depression with mindfulness skills and symptoms. Anxiety sensitivity (AS) is strongly related to PTSD severity, both cross-sectionally and reciprocally over time (Marshall, Miles, & Stewart, 2010; Naragon-Gainey, 2010). In a large community sample, the interaction between AS and mindfulness was found to predict anxious arousal symptoms and agoraphobic cognitions (Vujanovic, Zvolensky, Bernstein, Feldner, & McLeish, 2007). Results of an experimental study furthermore demonstrated that trait mindfulness predicted anxious responding to a laboratory stressor, above and beyond anxiety sensitivity and anxious symptoms (Arch & Craske, 2010).

High cognitive reactivity (CR) is the tendency to react with depressogenic thinking patterns to stress or a mild state of dysphoria (Lau, Segal, & Williams, 2004) and has been found to predict depressive relapse (Segal et al., 2005). CR was found to relate negatively to mindfulness in a student population, even after controlling for history of major depression and current depressive symptoms (Raes, Dewulf, Van Heeringen, & Williams, 2009). In a non-randomized, waiting list-controlled study, an increase in mindfulness mediated the change in CR after MBCT, supporting the view that changes in mindfulness can affect the first reactions to a low mood. Since the comorbidity with major depression in PTSD is estimated as high as 77% (Friedman, Keane, & Resick, 2007), we decided to include measures of both anxiety and depression sensitivity in our study.

In summary, the aim of the present study was to investigate the relationships among mindfulness skills, anxiety sensitivity, cognitive reactivity and symptom severity in a large clinical sample of PTSD patients. We expected to find positive correlations among AS, CR and depressive and posttraumatic symptoms, and negative correlations among mindfulness skills, AS and CR, also after statistically controlling for symptom severity.

Methods

Participants

Participants were outpatients of a specialized treatment center for PTSD. Patients who were unable to fill in the questionnaires for language reasons were excluded.

Measures

Exposure to trauma

Lifetime trauma exposure was assessed using the Life Events Checklist (LEC), the first part of the Clinician Administered PTSD Scale (CAPS) (Blake et al., 1990) (Dutch translation Hovens, Luinge, & van Minnen, 2005). The LEC consist of 17 potentially traumatic events (including a category 'other stressful event or experience') and patients were asked to indicate to which of the events they had been exposed.

Symptoms

The Self-Rating Inventory for Posttraumatic Stress Disorder (SRIP) (Hovens, Bramsen, & Van Der Ploeg, 2000) is a 22-item self-report questionnaire based on DSM-IV criteria. The SRIP has three subscales (re-experiencing, hyperarousal, avoidance) and a total score that ranges from 22-88. Internal consistency ranges from $r = 0.76$ to $r = 0.94$ for the four scales and the SRIP correlates highly (around $r = 0.80$) with other self-report questionnaires for PTSD, for instance the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) (Hovens, Bramsen, & Van Der Ploeg, 2002).

The Beck Depression Inventory – 2nd edition (BDI-II) (Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depressive symptoms. The Dutch translation was used (Van Der Does, 2002a).

Anxiety and Depression Sensitivity

AS was measured with the 16-item Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gurksky, & McNally, 1986; Dutch translation by Arrindell & Albersnagel, 1987) and CR with the Leiden Index of Depression Sensitivity - Revised (LEIDS-R) (Van Der Does, 2002b). Adequate reliability is reported for the LEIDS-R and internal consistencies of the subscales ranged from .64 to .84 (Williams, Van der Does, Barnhofer, Crane, & Segal, 2008).

Mindfulness skills

The Extended version of the Kentucky Inventory of Mindfulness Skills (KIMS-E) (Raes et al., 2009) is a 46-item self-report measure of five aspects of mindfulness: Observing (observe), Describing (describe), Act with Awareness (act), Accept without Judgment (non-judgment) and Non-Reactivity to Inner Experience (non-reactivity). Items are rated on a six-point scale (never or very rarely true till very often or always true). The KIMS-E consists of the original KIMS (Baer & Smith, 2004, De Keyser, Raes, Leijssen, Leysen, & Dewulf, 2008) and all seven items of Non-reactivity to Inner Experience scale from the Five Factor Mindfulness Questionnaire (FFMQ, Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) The original KIMS has shown good reliability and validity (Baer & Smith, 2004). The values of the four factors from the original KIMS were comparable to the Dutch four factor KIMS (Dekeyser et al., 2008) and the value of the Non-reactivity to Inner Experience factor from the KIMS-E ($\alpha = 0.76$) was comparable to the alpha coefficient obtained for the original Non-reactivity to Inner Experience factor from the Five Factor Mindfulness Questionnaire ($\alpha = 0.75$) (Baer et al., 2006).

Procedure

All patients who were in treatment in the month of June and July in 2010 were given an envelope containing a booklet with the questionnaires by their therapists. They were asked to fill these out in private and return these to their therapists or the reception at the next visit. Participation was not registered and no reminders were

sent. The envelope also contained a written explanation of the purpose of the study and of the fact that participation was voluntary and anonymously. Patients received no financial reimbursement for their participation.

Data screening

Preliminary analyses were performed to check the normality of the distributions, linearity and homoscedasticity. Missing values were replaced with the mean value of other items of the particular subscale for that patient with a maximum of one missing value per five items.

Results

Participants

Three hundred and fifty envelopes were handed out to patients and 101 (29.5%) questionnaires were returned. Of the 101 patients (85 female, mean age 41.3 years), most (62.2%) had a low or middle level of education. Almost all patients had experienced multiple traumatic events (96.9%). Participants reported to have experienced an average of approximately seven potentially traumatic events (range 1-15, $SD = 3.3$). The events most often mentioned were physical violence, sexual violence, other non-consensual or unpleasant sexual experiences, the sudden unexpected death of a loved one and 'other stressful event or experience'.

The questionnaire data revealed high levels of symptoms in all domains. Participants' average score on the SRIP was in the high range and 60 participants (59%) scored above the cut off score for PTSD of 52. The average score on the BDI-II also indicated severe symptom levels. Seventy-seven patients (72.3%) scored above the cut-off score for moderately severe depression. Demographics and mean questionnaire scores are shown in table 1.

Data screening

The distributions of all variables were consistent with the assumptions for multivariate analysis. One person had too many missing items on the SRIP subscales avoidance, hyperarousal and total, and one person on the KIMS-E subscale non-reactivity, therefore scores for these (sub)scales were not calculated. Three patients did not indicate which type of traumatic event(s) they had experienced.

Reliability of the KIMS-E

The internal consistencies of the KIMS-E subscales in the present sample were as follows: observe ($\alpha = .83$), describe ($\alpha = .88$), act ($\alpha = .78$), non-judgment ($\alpha = .87$)

and non-reactivity ($\alpha = .79$). Norms for the KIMS or the KIMS-E are not yet available. We compared the results on four of the five KIMS-E subscales with KIMS subscale scores of a large student sample ($N = 215$, Baer & Smith, 2004, sample 2), and a large heterogeneous patient sample ($N = 234$, Baum et al., 2009). On the subscale observe, average scores of the patients in our sample fell between the scores of the patient and the student sample; present sample $M = 36.1$ ($SD = 7.1$), patients $M = 34.5$ ($SD = 7.8$), students $M = 38.6$ ($SD = 7.8$). When comparing scores of the samples on the subscale describe, a similar pattern was observed. However, present scores

Table 1. Demographic and clinical characteristics of the sample

Sex (N, % women)	85 (84.5)
Age (mean, <i>SD</i> , range)	41.3 (10.7), 20-60
Traumatic events (N, %)	
Physical violence	75 (74.3)
Sexual violence	67 (66.4)
Other non-consensual sexual exp	73 (72.3)
Sudden death loved one	62 (61.4)
Other	53 (52.5)
Symptoms (mean, <i>SD</i>)	
SRIP Reexperiencing	14.7 (4.1)
SRIP Avoidance	22.2 (6.2)
SRIP Hyperarousal	17.8 (4.9)
SRIP Total	54.6 (14.4)
BDI II	27.2 (12.8)
Reactivity (mean, <i>SD</i>)	
ASI	37.3 (11.9)
LEIDS-R	62.1 (19.5)
Mindfulness skills (mean, <i>SD</i>)	
Observe	36.2 (7.1)
Describe	23.5 (5.5)
Act with awareness	25.3 (5.5)
Non-judgment	25.4 (6.4)
Non-reactivity	17.3 (4.1)
KIMS-E Total	127.4 (18.9)

Note: Other non-consensual sexual exp = Other non-consensual or unpleasant sexual experiences; Sudden death loved one = Sudden unexpected death of a loved one; Other = Other stressful event or experience; SRIP = Self-Rating Inventory for Posttraumatic Stress Disorder; BDI II = Beck Depression Inventory – 2nd edition; ASI = Anxiety Sensitivity Index; LEIDS-R = Leiden Index of Depression Sensitivity – Revised; Observe = KIMS-E subscale Observing; Describe = KIMS subscale Describing; Act with Awareness = KIMS-E subscale Act with Awareness; Non-judgment = KIMS-E Accept without Judgment; Non-reactivity = KIMS-E subscale Non-Reactivity to Inner Experience; KIMS-E = Kentucky Inventory of Mindfulness Skills –Extended Version

Table 2. Correlations between mindfulness skills, cognitive reactivity and anxiety sensitivity symptoms

Variable	ASI	LEIDS-R	Observe	Describe	Act	Non-judg	Non-react	KIMS-E Total
SRIP Reexp	.39**	.56**	-.16	-.34**	-.45**	-.42**	-.42**	-.57**
SRIP Avoid	.47**	.58**	-.17	-.41**	-.51**	-.46**	-.50**	-.63**
SRIP Hyper	.42**	.50**	-.12	-.42**	-.52**	-.36**	-.41**	-.58**
SRIP Total	.46**	.59**	-.15	-.42**	-.52**	-.45**	-.48**	-.64**
BDI II	.55**	.63**	-.17	-.51**	-.61**	-.49**	-.49**	-.69**

Table 3. Correlations and partial correlations between reactivity measures and mindfulness skills

Variable	LEIDS-R	Observe	Describe	Act	Non-judg	Non-react	KIMS-E Total
Correlations							
ASI	.52**	.02	-.26**	-.45**	-.46**	-.24*	-.40**
LEIDS-R		-.06	-.27**	-.45**	-.52**	-.38**	-.50**
Partial correlations							
ASI		.12	.02	-.19	-.27**	.04	-.08
LEIDS-R		.06	.01	-.21*	-.35**	-.15	-.19

Note 1: ASI = Anxiety Sensitivity Index; LEIDS-R = Leiden Index of Depression Sensitivity – Revised; Observe = KIMS-E subscale Observing; Describe = KIMS-E subscale Describing; Act = KIMS-E subscale Act with Awareness; Non-judg = KIMS-E subscale Accept without Judgment; Non-react = KIMS-E subscale Non-Reactivity to Inner Experience; KIMS-E = Kentucky Inventory of Mindfulness Skills – Extended Version

Note 2: partial correlations; controlled for posttraumatic and depressive symptoms

* $p < .01$

** $p < .05$

on this subscale resembled the scores of the patient sample more than the scores of the student sample; present sample $M = 23.5$ ($SD = 5.9$), patients $M = 22.4$ ($SD = 6.5$), students $M = 28.2$ ($SD = 5.5$). Scores of the present sample and the patient sample were comparable on both subscales act and non-judgment; act, present sample $M = 25.3$ ($SD = 6.4$), patients $M = 24.7$ ($SD = 6$), students $M = 29.2$ ($SD = 5.4$) and non-judgment, present sample $M = 25.3$ ($SD = 6.4$), patients $M = 25.3$ ($SD = 6.6$), students $M = 29.6$ ($SD = 6.5$). The KIMS-E was extended with the subscale non-reactivity, but Raes et al. (2009) report no mean scores for this subscale. However, scores on the KIMS-E Total scale were reported, showing a large difference ($>1 SD$) between the student sample and scores of the present sample; mean score respectively $M = 145.6$ ($SD = 14.2$) (Raes et al., 2009) and $M = 127.6$ ($SD = 18.9$).

Relationships between mindfulness skills and symptoms

With the exception of the KIMS-E subscale observe, all correlations between KIMS-E Total and subscales scores with PTSD symptom dimensions were negative, moderately high and statistically significant (see table 2). The correlations between KIMS-E dimensions and depressive symptoms (BDI-II) were also significant ($r = -0.66$, $p < .01$). Again, the subscale observe diverged from the pattern and did not correlate significantly with depressive symptoms.

Relationships between mindfulness and reactivity

Mindfulness skills had significant negative correlations with AS ($r = -.41$, $p < .01$) and CR ($r = -.49$, $p < .01$) (see table 3). All subscales of the KIMS-E had moderately high correlations with both sensitivity measures, except subscale observe. The highest correlations with both AS and CR were observed for non-judgment.

The partial correlation between total mindfulness skills and AS, controlling for PTSD severity and depression symptoms was not significant. But for the non-judgment subscale, this partial correlation was $r = -.27$ ($p = .008$). The partial correlation between total mindfulness skills and LEIDS-R, controlling for posttraumatic and depression symptoms was $r = -.16$ ($p = .06$) and for subscales act $r = -.21$ ($p = .04$) and non-judgment $r = -.35$ ($p < .001$) (see table 3).

Discussion

In this sample of outpatients with PTSD, we observed a negative association between mindfulness skills and AS. This relation remained significant for the mindfulness skill non-judgment after controlling for symptoms of PTSD and for depression. A similar pattern was observed for the association between CR and non-judgment. Our findings are in line with cross-sectional studies in non-clinical samples and combat veterans (Thompson & Waltz, 2010, Wahbeh et al., 2011, Vujanovic et al., 2009).

Theoretically, an attitude of acceptance or non-judgment is a key concept in the definition of mindfulness (Bishop et al., 2004). In addition, there is ample clinical and empirical evidence that patients with PTSD are typically highly judgmental of themselves, the outside world and their symptoms, up to the point of self-blame (Foa, Tolin, Ehlers, Clark, & Orsillo, 1999). An open attitude of non-judgment is the opposite of avoidance, which is a key mechanism in the development and maintenance of PTSD. Our results support the idea that acquiring a more accepting attitude towards inner thoughts, emotions and physical sensations but also towards the experienced traumatic event(s) might be helpful in reducing sensitivity and eventually in the development and maintenance of symptoms of PTSD and depression. Clinicians who would like to adapt an MBCT or MBSR protocol for use in PTSD may be advised to pay particular attention to modules focusing on acceptance and non-judgment (see also Wahbeh et al., 2011; Schoorl & Van Der Does, 2013).

We also found that the mindfulness skill observe did not correlate with any symptom or reactivity measure. This suggests that awareness itself may not contribute much to psychological wellbeing (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008). Clinicians are sometimes reluctant to apply exposure-based treatments for PTSD because patients may become even more aware of their memories and subsequently feel overwhelmed by their own anxious reactions (Van Minnen, Hendriks, & Olf, 2010). However, the correlations, although non-significant, were still in the direction of higher observational skills associated with lower symptom severity.

A limitation of this study is the reliance on self-report measures. An interview-based measure of mindfulness skills or anxiety sensitivity is not available, however. CR may also be measured using mood inductions and some researchers consider this the golden standard. However, mood inductions are fraught with methodological difficulties, including regular non-replications, which have not been reported yet for the LEIDS-R. Because of the cross-sectional design of this study, conclusions about the causality of the demonstrated relationships cannot be drawn.

In conclusion, the mindfulness skill non-judgment is inversely associated with AS, independently from posttraumatic symptoms. Increasing non-judgment or mindful acceptance might have a beneficial effect on PTSD by affecting an important underlying working mechanism of PTSD. We observed similar relationships between non-judgment and CR, extending earlier results of Raes et al. (2009) in students to a clinical sample of PTSD patients. Studies on the effect of MBCT on symptoms of PTSD and/or depression should include measures of AS and CR, to be able to further investigate the mediating role of mindfulness skills in reducing sensitivity for anxiety and depression.

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