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Mindfulness Based Intervention for Needle Phobia: A Pilot Study of Dissociated Ego State Resolution

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This pilot study was designed to investigate the efficacy of a mindfulness based intervention for the treatment of needle phobia. The research question was whether one session of the dissociated ego state [DES] trauma release intervention would result in significant and durable release of needle phobia. It was hypothesized that the process tested in this study may reduce needle phobia by locating, identifying, and engaging with a dissociated aspect of the psyche developed from earlier trauma. Six participants who self reported fear of needles and resulting avoidance of medical assistance completed one 60-minute, individual session of a mindfulness based protocol for the release of specific phobia. After the DES intervention session, all participants but one reported reduced subjective units of distress while holding the needle against their skin: reduction of 61% post-test, 71% at 3-month follow-up, and 70% at 6-month follow up. Results at 6-month follow-up were statistically significant despite small sample size. Future investigations should involve larger sample sizes, populations drawn from various settings, more facilitators and a randomized, waitlist group.

Keywords: *needle phobia, specific phobia, anxiety disorder, mindfulness, dissociated ego state*

Specific phobia (SP)— the presence of fear that is disproportionate to the actual threat and that has a significant negative impact on daily living (APA, 2013)—is the second most common anxiety disorder in the United States, with a lifetime prevalence risk rate of 7.7–12.5% (Kessler et al., 1994, 2012; de Graaf et al., 2012.) Cross-nationally, lifetime SP prevalence is 7.4%, with women being twice as likely as men to report symptoms consistent with this condition (Wardenaar, 2017).

Given the chronic nature of specific phobia and the fact that 59.2% of patients report role impairment and interference with daily life, SP is a significant mental health concern (Depla et al., 2008). SP may indicate elevated risk of mental illness: lifetime co-morbidity of SP with other mental health disorders was observed in 60.5% of cases and preceded the onset of other disorders in 72.6% of cases (Magee et al., 1996). SP may co-occur with major depression, alcohol and other substance-use disorders, and personality disorders. If left untreated, specific phobias may increase the risk of developing mental disorders such as anxiety and depression, especially for women (Trumpf, 2010). Certain types of specific phobic situations or objects may trigger symptoms common to posttraumatic stress disorder (PTSD), including avoidance and the re-experiencing of past distressing events (De Jongh et al., 2006; Öosterink et al., 2009).

There are a variety of different specific phobia subtypes related to animals, natural environment, specific situations, and other criteria (APA, 2013). Among these is needle phobia (NP), a formal medical condition affecting approximately 3.5% of the world population (Bienvenu & Eaton, 1998; LeBeau et al., 2010.) and approximately 4% of people in the United States (Stinson, 2007). Because routine medical treatments and testing protocols often require the use of a hypodermic needle, elevated fear and anxiety toward needles may generalize over time—resulting in patients avoiding or refusing routine vaccinations, blood tests, and dental treatment with resultant exacerbation of health problems (Klienknecht, 1994). Additionally, fear of needles can result in avoidance

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of travel plans, education, career decisions, and pregnancy (McMurty et al., 2015), as well as contribute to negative experiences with needle procedures for caregivers and health professionals (Deacon & Abramowitz, 2006; Nir et al., 2003; Taddio et al., 2012).

The most common SP treatment is cognitive behavioral therapy (CBT), which typically uses systematic flooding or gradual exposure to the feared stimulus for desensitization and increased tolerance (Hofmann & Smits, 2008; Kaczkurkin & Foa, 2015). During *in vivo* exposure, the patient directly confronts the feared stimulus in a naturalistic setting. The stimulus is designed to activate the fear network, after which repeated, graduated exposure promotes extinction of fear through habituation and corrective learning.

Shortcomings of *in vivo* exposure therapy include high refusal rates, high drop-out rates, moderate success rates, and high rates of relapse (Wolitzky-Taylor et al., 2008). Up to 30% of clients refuse the treatment once the *in vivo* component is explained (Issakidis, & Andrews, 2004), and drop-out rates of up to 45% are common (Choy et al., 2007). Treatment efficacy studies have shown that successful fear reductions for anxiety are often not retained on follow up, resulting in relapse and loss of therapeutic gains in 19% to 62% of clients (Craske & Mystkowski, 2006; Vervliet et al., 2013).

In addition, exposure treatment typically requires multiple treatment sessions with highly trained therapists—thereby requiring substantial cost and investment of time—and obtains only moderate success. Meta-analyses have shown that a course of one to five sessions of exposure therapy yield positive results as compared with waitlist controls, placebo, and non-exposure treatments; more sessions improves outcomes and reduces the chance of relapse (Wolitzky-Taylor et al., 2008). Sourcing and maintaining some stimuli such as specific animals and insects may be challenging, and other *in vivo* experiences, such as weekly flights to habituate to air travel, may be cost- and time-prohibitive for many clients. For these reasons, alternative approaches are needed for those who are unwilling or unable to tolerate exposure treatment (Maples-Keller et al., 2017).

One alternative is virtual reality (VR) exposure which may reduce the inconvenience of *in vivo* exposure and provide the therapist greater control of the stimulus dose. VR treatment for specific phobias shows lower drop out and refusal rates, presumably because the stimuli is computer generated (Garcia-Palacios et al., 2007). Because stimulus is computer generated, the intervention can be done in an office and reduce the cost of sourcing the phobic target and time constraints of *in vivo* work. VR has shown similar efficacy rates as *in vivo* treatments (Maples-Keller et al., 2017; Opris et al.,2012). However, multiple sessions are still necessary and the cost of these along with VR equipment and software may remain prohibitive in many contexts.

Mindfulness-Based Interventions

The use of mindfulness has emerged as an alternate to CBT-based therapies for a variety of mental health challenges, and has been shown to have efficacy in specific phobia applications (e.g., Hooper et al., 2011). The development of Western therapeutic practices based on Buddhist mindfulness began in the late 1970s with the development of mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990). Mindfulness-based treatment approaches are considered to be *present-centered*, in that they encourage "paying attention on purpose, in the present moment" (Kabat-Zinn, 2003, p. 145), along with a stance of non-judgmental acceptance of thoughts and emotions as they occur.

Mindfulness-based cognitive therapy (MBCT) combines mindfulness with cognitive strategies (Segal, Williams, & Teasdale, 2002) and is used in the treatment of conditions such as anxiety, depression, and eating disorders. Both MBSR and MBCT are well-defined mindfulness based interventions (MBIs) that have been extensively researched for relief of mental and physical symptoms (Gotnik et al., 2015; Goldberg et al., 2018). Other treatment modalities such as dialectical behavior therapy (DBT; Linehan, 1993), and acceptance and commitment therapy (ACT; Hayes, & Strosahl, 2004) also have components that are labelled as mindfulness, though in these contexts the term often refers to cognitive strategies associated with mindful traits rather than a mindful state (Hartelius, 2015).

Mindfulness State Appears to Provide Regulated Access to a Dissociated Ego State

State mindfulness in a real-time therapeutic context may involve the cultivation of a safely embodied state of attention with connection to emotional and physical sensations in the present moment rather than a deep spiritual or meditative process (Hartelius & Goleman, 2016; Smith & Hartelius, 2020; van der Kolk, 2015). This attentional stance of yielding to discomfort, in contrast with avoiding strong sensations and triggers or becoming overwhelmed and pulled into the phobic impulse (Groves, 2016), appears to allow for greater access to fringe consciousness, which may in turn represent out-of-awareness aspects of experience (Norman, 2017).

A mindful attentional stance also appears to be useful in accessing aspects of self that are not discerned in everyday experience, such as dissociated ego states (DESs): discrete aspects of personality dissociated from present time and conscious cognitive processes as a consequence of trauma (Smith & Hartelius, 2020). A DES may be formed when a person is confronted with shock or overwhelm sufficient to cause the dissociation as a means of coping. The DES becomes fixated in the context of the trauma, and seems only minimally aware of subsequent life history or current events. When a triggering stimulus such as a hypodermic needle is presented to a person with needle phobia, the associated DES is activated and the person experiences a sense of being overcome by an unreasonable fear reaction that is unresponsive to soothing—reflecting a response to a historical trauma experience rather than to the present situation.

Anecdotal evidence has suggested that a mindful state could provide regulated access to a DES, offering an opportunity for deactivation of the dissociated aspect of self (Smith & Hartelius, 2020). The current small-sample pilot study sought to test whether a similar process might be effective in reducing SP in the form of needle phobia.

Study

The study presented here measured the outcome of a single-session mindfulness-based intervention with 6 adult participants self-reporting needle phobia that resulted in the avoidance of medical treatment. Individual intervention sessions lasted on average one hour for each participant, during which the practitioner facilitated a mild state of mindfulness in the participant and invited the participant into a process that engaged the DES in imaginal dialogue and resolution.

In contrast with traditional exposure interventions for SP, this process does not rely on naturalistic *in vivo* exposure. Instead, imaginal exposure to a needle is used to activate a state of mild arousal sufficient to allow engagement with the DES with minimal likelihood of dysregulation. The therapeutic goal is recovery of executive control over the dissociated cognitive functions of the DES, a process facilitated by the induction of a mindful attentional state. Once the DES is deactivated, impulses of stimulus avoidance and the associated fear is typically brought well within manageable tolerances or altogether absent.

Working with a specific phobia in this way reframes the fear response as a normal pathway designed for survival, rather than a personal defect—which may also reduce feelings of shame associated with the phobia. Because the process does not focus on the titrated reliving of past memories or traumas, client apprehension is reduced. While specific memories may be associated with the DES, noticing these from a mindful state enables the client to remain in present time, providing sufficient distance to minimize the risk of emotional flooding. Often curiosity is awakened into the nature of the DES, along with compassion for this younger aspect of self that experienced trauma and subsequently adopted a survival management role that has manifested as phobic response to a specific stimulus. This perspective is advanced to offer the client a substantive shift in attitude toward their phobia.

Because the therapeutic mechanism in this approach is not dependent on habituation to a stimulus, and therefore on the strength of the presented stimulus, imaginal exposure appears to be just as effective as *in vivo* exposure.

Participants

A sample of 6 participants (4F/2M) was recruited for the outpatient intervention for needle phobia using flyers and word of mouth. Inclusion criteria required participants to be aged 18–65 who

self-reported a fear of hypodermic needles resulting in avoidance of medical treatment. Applicants were excluded if they reported physician-diagnosed traumatic brain injury that resulted in ongoing cognitive impairment, a diagnosed psychotic illness or episode within the past five years, or substance abuse requiring medical or psychiatric treatment or intervention within the past 6 months. In order to ensure the accuracy of self-report measures, participants were excluded if they were not fluent in conversational English. Participants completed and signed informed consent forms and received a $50 gift card for participation in the initial intervention, and also for participation in follow-up sessions at 3 and 6 months post-treatment. The study was approved by the California Institute of Integral Studies Human Research and Review Committee as part of a doctoral dissertation project and was conducted under the supervision of a licensed psychiatrist.

Measures

The following five measures were administered pre- and post-intervention, and again at 3-month and 6-month follow up: The Multidimensional Blood/Injury Phobia Inventory (MBPI; Wenzel & Holt, 2003; van Overveld et al., 2011); Perceived Stress Scale (PSS; Cohen et al., 1983; Pbert et al., 1992); Dissociative Experiences Scale (DEScale; Bernstein & Putnam, 1986); Behavioral Avoidance Task (BAT; Hood & Anthony, 2012) Subjective Units of Distress Scale (SUDS; Wolpe, 1968; see also Kaplan et al., 1995; Tanner, 2012).

Procedures

The intervention consisted of a single session that began with administration of the five measures used in the study. The MBPI measured phobic responses to blood and needles, the PSS assessed whether changes in phobic response could be attributed to changes in levels of stress, and the DEScale evaluated the presence of dissociative disorders in participants, and the BAT/SUDS measures documented current phobic responses to a hypodermic needle and the associated distress.

For BAT/SUDS measures, each participant was told they would be exposed to a prop needle, then presented with a fake, stage syringe that approximated the appearance of a hypodermic needle. During research the prop was referred to as the "hypodermic needle." Each participant was then asked whether they were willing to perform the following behaviors :1) "Be in the same room as the hypodermic needle" 2) "Look at the hypodermic needle," 3) "Touch the hypodermic needle with a finger," 4) "Pick up the hypodermic needle," 5) "Hold the sharp tip of the hypodermic needle against the skin on your arm." Participants were asked to measure their SUDS after each behavioral step they performed.

Test administration was followed by a discussion of symptoms, brief life history, an explanation of procedures, and the mindfulness based specific phobia intervention that lasted between 30 and 60 minutes. During the intervention each participant was directed to (a) imagine a past or future scenario in which they had been or were to be treated with a hypodermic needle; (b) notice the activated body sensations; (c) engage with the activated sensations as if these represented a semi-autonomous aspect of self; and (d) respond to questions from the facilitator from the perspective of the DES, allowing facilitator and client to explore the role of this dissociated aspect of self. Once this process was completed the researcher (e) invited the DES to enter present time, (f) asked it to return any resources it may have been holding on behalf of the individual, (g) asked for any insights or coaching that might be helpful for the participant, and (h) invited to accept being released from its job of protecting the client from needles. The final step involved (i) revisiting the stimulus from step (a) by imagining a scenario involving treatment with a hypodermic needle, and noticing any shift in cognition or somatic arousal.

Immediately following the intervention, participants took the post-treatment assessment. Follow up assessments were conducted in person at 3 and 6 months post-treatment, using all five measures and requiring approximately 15 minutes per person to complete.

Results

Participants reported a mean 61% reduction in distress as reflected by SUDS scores from pre-test to post-test, bordering on significance at $p = .05$. At post-test, each of the 6 participants were able to place the stage needle directly against their skin

after the intervention with very low distress ratings, which they had been unable to do at pre-test. Results showed good durability by increasing to 71% at 3 months post-test and 70% at 6 months post-test. A one-way repeated measures ANOVA examined the SUDS scores at pre-test, immediately post-test, and at 3- and 6-month followups. Boxplot showed one outlier in the data, which did not contribute to the violation of normality as assessed by Shapiro-Wilk test ($p > .05$); Mauchly's test of sphericity showed no violation of assumptions of sphericity ($\chi^2(5) = 4.66$, $p > .05$). The analysis of variance was followed by the post-hoc comparisons with Bonferroni adjustment (SPSS Statistics, 2016). There were differences among the groups with respect to the SUDS scores, $F(3, 15) = 12.95$, $p < .05$, partial $\eta^2 = .72$. Post hoc analyses with a Bonferroni adjustment revealed that SUDS scores decreased from pre-intervention ($M = 6.8$, $SD = 2.32$) to the 6-month follow-up ($M = 2.05$, $SD = 2.27$), a mean decrease of 4.75 or 70 % (95% *CI* [8.48, 1.02], $p < .05$). This analysis confirms a substantial and statistically significant drop in distress from pre-test to post-test when interacting with the hypodermic needle (see Table 1).

Results for the BAT were not significant, in that most participants were not able to complete more behavioral steps post-test than pre-test. MBPI mean scores were lower post-intervention and at follow up, but the change was not statistically significant. There were no significant changes from pre-test to post-test on the DEScale or the PSS.

Discussion

The most important finding of this small pilot study was that the mindfulness based specific phobia intervention was effective in substantially reducing distress associated with needle phobia, and that this reduction was not only retained but enhanced at 3 and 6 months post-test. Reductions in reported distress were substantial, durable, and results were at or near statistical significance (Table 1).

These results are supported by unsolicited anecdotal reports from most participants at follow-up around the marked ease of medical or dental treatment after the intervention. One participant reported that he was able to travel because he could finally tolerate a yellow fever shot, another underwent dental work he had been avoiding, and a third reported no distress around an IV insertion during an emergency room visit. All participants noted a reduction in anxiety over the prospect of needing future medical care involving needles.

No significant changes were measured by the BAT, likely because the prop needle was not sufficiently realistic to deter participants from engaging with it in pre-test despite their distress. The reduction in MBPI scores was not statistically significant in the small sample size, but might reflect reliable improvement in a larger sample. Normal mean score and absence of change in the DEScale suggests that engagement with the DES was not related to a dissociative disorder; negative results from the PSS indicates that post-test and follow-up changes in levels of distress were likely not attributable to broader changes in perceived stress.

This pilot study was limited by small sample size, lack of a control group, a single facilitator, and termination of follow-up at six months. In addition to larger samples, a control group, multiple facilitators longer follow up, and tests with multiple specific phobias, future studies might be situated in a medical office or might use an instruction such as, "imagine you are in an doctor's office," which may more effectively approximate a treatment context for the testing environment. Omitting reference to the theatrical status of the needle may also better simulate a medical environment. The BAT could be expanded to include more challenging tasks, thereby potentially diversifying the range of responses.

Despite important limitations, this mindfulness based specific phobia intervention shows initial promise as a brief, non-dysregulating, cost-effective, and durable approach to treatment of needle phobia.

Table 1. Subjective units of distress scale: Pre-intervention to post-test follow-up

Topic	Pre-intervention	Post-intervention	3 mos. post-test	6 mos. post-test
Mean score	6.8	2.63	2.00	2.05
% reduction	–	61%	71%	70%
p-value		0.05	0.06	0.02

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Disclosure

One of the authors, Glenn Hartelius, is also Main Editor of this journal, and has been recused from the journal's review and decision process for this paper.

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