

# The Role of Mindfulness in a Fear-Avoidance Model of Chronic Pain

## Introduction

Mindfulness refers to a non-judgemental purposeful awareness of present-moment experience. This study investigated how mindfulness relates to one of the dominant psychological theories of chronic pain – the fear-avoidance model (Vlaeyen & Linton, 2000). Despite findings more than 20 years ago that mindfulness training can effectively treat chronic pain (Kabat-Zinn, 1982), there is still a paucity of research on mindfulness and pain. We expected high levels of mindfulness to be negatively associated with key variables in this cognitive-behavioural model. This is the first study to investigate how mindfulness fits into the fear-avoidance model.



Figure 1. The fear-avoidance model of chronic pain. (Vlaeyen & Linton, 2000).

The fear-avoidance model is a cognitive-behavioural account of the transition from acute to chronic pain where the way patients appraise or attend to their pain is a major determinant of their future pain experience. Mindfulness holds particular promise in helping to understand and treat chronic pain within this model. This is because mindfulness' focus on non-elaborative, non-conceptual attention precludes the ruminative thought patterns inherent in pain catastrophising, a central feature of the fear-avoidance cycle.

Key hypotheses:

- Mindfulness will negatively correlate with major variables in the fear-avoidance model.
- Mindfulness will uniquely predict pain catastrophising when other variables are controlled.
- Mindfulness will mediate the relationship between pain intensity and pain catastrophising.
- The facets of mindfulness most strongly related to pain catastrophising will be non-reactive awareness and non-judgemental awareness.

## Method

Participants were 104 outpatients seeking treatment in August 2007 at the Sir Charles Gairdner Hospital Department of Pain Management, a multidisciplinary pain clinic. A cross-sectional design was used to examine the correlations between mindfulness and major variables in the fear-avoidance model – pain intensity, pain catastrophising, pain-related fear, pain hypervigilance, and functional disability. Participants completed a battery of well-validated self-report measures of mindfulness and various aspects of pain:

- Mindful Attention Awareness Scale (MAAS)
- Five-Factor Mindfulness Questionnaire (FFMQ)
- Brief Pain Inventory (BPI)
- Positive and Negative Affect Schedule–Short Form (I-PANAS-SF)
- Pain Catastrophising Scale (PCS)
- Tampa Scale for Kinesiophobia (TSK)
- Pain Vigilance and Awareness Questionnaire (PVAQ)

The majority of participants were women (68.3%) and ages ranged from 26 to 94 years ( $M = 54.5$ ,  $SD = 16.1$ ). Musculoskeletal pain conditions predominated in the sample (79.8%), with the lower back being the most common site of pain (48.1%). The duration of pain ranged from 3 to 648 months ( $M = 125.7$ ,  $SD = 121.2$ ).

## Results

As expected, mindfulness formed negative correlations of medium strength (Cohen, 1988) with each of the pain variables measured (see Table 1). These were significant at a conservative Bonferroni corrected alpha level ( $p < .0043$ ), with the exception of pain intensity ( $p < .05$ ). Using the FFMQ, the combined facets of mindfulness accounted for 41% of the variance in pain catastrophising.

Table 1  
Intercorrelations Among Mindfulness and Major Variables in the Fear-Avoidance Model of Chronic Pain ( $N = 104$ )

Variable	1.	2.	3.	4.	5.	6.
1. Mindfulness	–					
2. Negative affect	-.50**	–				
3. Pain intensity	-.22*	.26**	–			
4. Functional disability	-.30**	.36**	.63**	–		
5. Pain catastrophising	-.49**	.53**	.28**	.46**	–	
6. Pain-related fear	-.46**	.48**	.32**	.44**	.69**	–
7. Pain hypervigilance	-.30**	.35**	.23*	.37**	.66**	.63**

\*  $p < .05$  (one-tail). \*\*  $p < .004$  (one-tail); this is the Bonferroni-corrected individual alpha level required to maintain experimentwise alpha at  $p < .05$ .

Hierarchical multiple regression analysis showed that mindfulness uniquely predicts pain catastrophising when all other variables are controlled, accounting for a further 6% of variance (see Table 2). The mindfulness facets non-judging of experience and non-reacting to experience uniquely predicted 3% and 1% of pain catastrophising respectively.

Table 2  
Hierarchical Multiple Regression Analysis Showing the Unique Contribution of Mindfulness to Explaining Pain Catastrophising After Background Characteristics and Other Variables in the Fear-Avoidance Model of Chronic Pain are Controlled ( $N = 104$ )

Predictor variables	$\beta$ (final)	$sr^2$	$\Delta R^2$	$R^2$
1. Age	-.11	.98	.13**	
Gender	-.06	.00		
Pain duration	-.12	.01		
2. Pain intensity (BPI-pain)	.09	.00	.15***	
3. Negative affect (I-PANAS-SF)	.09	.00	.14***	
4. Pain-related fear (TSK)	.19*	.01*	.14***	
5. Pain hypervigilance (PVAQ)	.35***	.07***	.08***	
6. Functional disability (BPI-interfere)	.01	.00	.01	
7. Total mindfulness (MAAS)	-.18	.01	.06**	
Observe experience (FFMQ-observe)	.07	.00		
Describe experience (FFMQ-describe)	-.01	.00		
Act with awareness (FFMQ-act)	.17	.01		
Non-judging of experience (FFMQ-nonjudge)	-.26**	.03**		
Non-reacting to experience (FFMQ-nonreact)	-.16**	.01**		.70***

Note. Variables relating to background characteristics were entered as a block in step 1, as were all mindfulness variables in step 7.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Finally, mindfulness was found to mediate fully between pain intensity and pain catastrophising (Sobel's  $Z = 2.08$ ,  $p < .05$ ).

## What is Mindfulness?

Mindfulness has been defined as “awareness that emerges by way of paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2002, p. 732). It is drawn from the Buddhist tradition where right mindfulness, or samma-sati, is part of the Noble Eightfold path towards the cessation of human suffering (Harvey, 1990). Mindfulness entered the mainstream of Western science in the 1980s with an attempt to use meditation principles to treat stress and pain (Kabat-Zinn, 1982). Mindfulness-based therapies have since been used to effectively treat a wide range of medical and psychological conditions. Recent efforts to operationalise mindfulness for research emphasise two main components:

- o Self-regulated, non-elaborative awareness of thoughts, feelings and sensations in the present moment;
- o An orientation of curiosity, openness and acceptance towards experience (Bishop et al., 2004).

## Conclusion

Mindfulness appears to play a strong, non-redundant role in the fear-avoidance model of chronic pain, accounting for 17–41% of the variance in key pain variables. This suggests mindfulness might be added to the model, most likely exerting an influence between pain intensity and pain catastrophising, considering the mediation effect (see Figure 2).

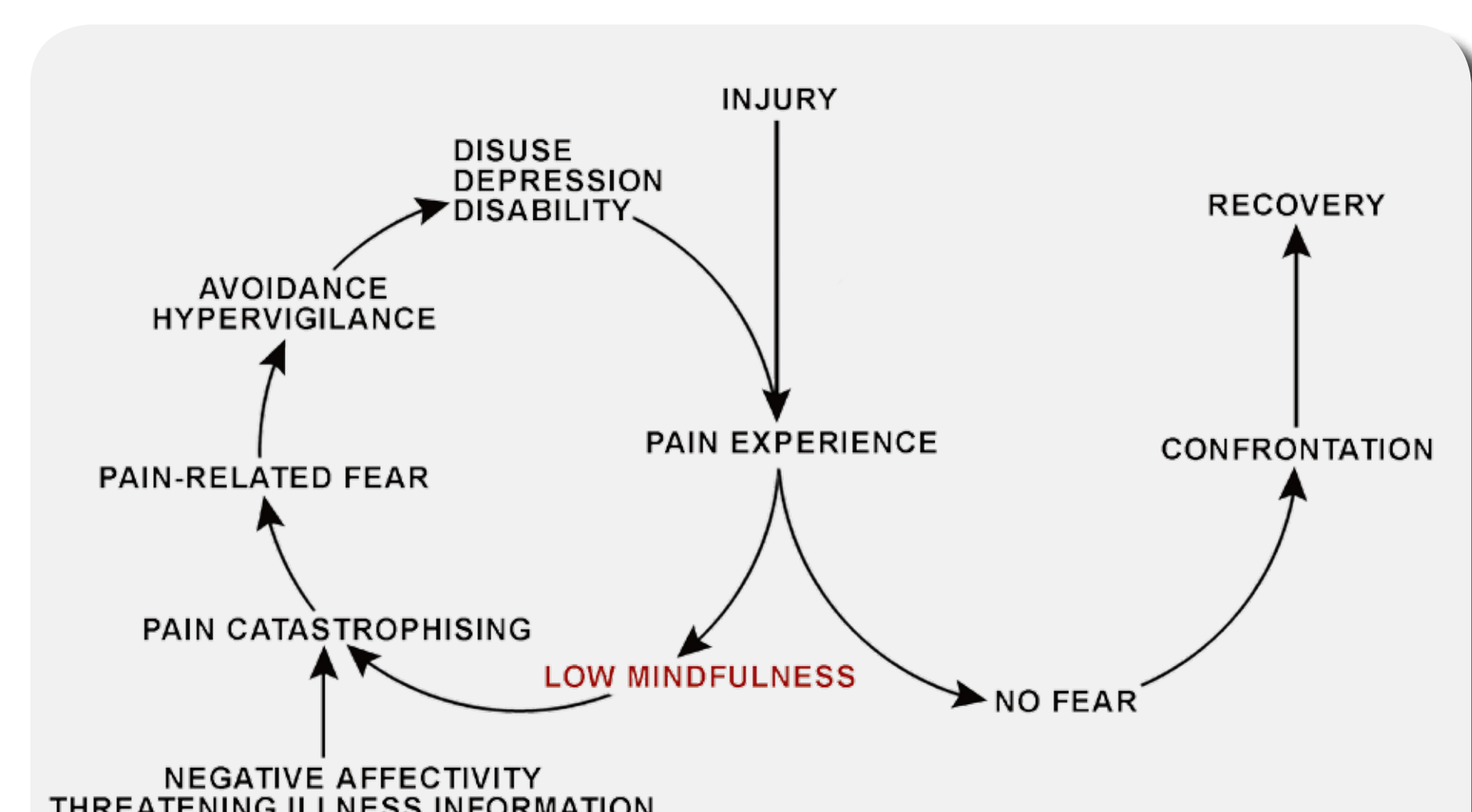


Figure 2. Updated version of the fear-avoidance model of chronic pain showing the role of mindfulness in mediating between pain experience and pain catastrophising.

The strong negative association between mindfulness and catastrophising shows that the metacognitive awareness and decentred, non-judgmental relationship to experience that is central to mindfulness might act as an antidote to chronic pain patients' tendency to negatively appraise and ruminate on their pain. Importantly, this is the first study suggesting empirical evidence for the link between mindfulness and pain catastrophising.

Clinical implications include:

- Mindfulness-based therapies might be incorporated into cognitive-behavioural interventions to yield Mindfulness-Based Cognitive Therapy for Chronic Pain.
- Mindfulness may be most effective when incorporated into screening and early intervention for chronic pain, given its expected role early in the fear-avoidance cycle. Mindfulness-based therapies could play a valuable role in reducing the enormous personal and economic costs associated with persistent pain and its concomitants.

## References

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