Attention Modification in Persons with Fibromyalgia: A Double Blind, Randomized Clinical Trial

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Introduction

- Contemporary models of chronic musculoskeletal pain emphasize critical roles for fear, anxiety, and avoidance as well as biases in attention in the development and maintenance of chronic pain and disability.
- Anxiety sensitivity, pain-related anxiety, and catastrophizing can all influence the pain experience and pain-related attentional biases.
- Indeed, attentional processes appear to play a central role in maladaptive pain experiences by facilitating heightened attention, vigilance, and catastrophizing.
- The dot-probe paradigm has demonstrated attentional biases in persons with chronic pain (Schoth et al., 2012).
- An adaptation of the paradigm – attention bias modification (AMP) – has reduced clinically-significant symptoms in patients with anxiety disorders (for review, Koster et al., 2009) and more recently in patients with acute and chronic pain (Sharpe et al., 2012).
- Pain itself does not cause attentional interference; instead, accompanying psychological factors produce interference that maintains or exacerbates pain.
- The present study was a randomized controlled trial designed to assess whether the AMP protocol would be effective for persons with fibromyalgia.

Methods

- Participants [*n*=17; 94% women; 38-60 years (M_{age}=51.2; *SD*=6.0)] met the American College of Rheumatology diagnostic criteria for fibromyalgia (i.e., a history of widespread pain lasting more than 3 months and the presence of tender points).
- Participants were randomly assigned to either the standard dot-probe condition (i.e., a control condition; ACC) or the modified dot-probe condition (i.e., the active condition; AMP) – see below for threat word list.
- Participants completed 15 minute sessions of either the ACC or the AMP protocols (depending on randomized condition) twice per week for four weeks and provided responses to several self-report measures.
  - *Anxiety Sensitivity Index-3* (ASI-3) is an 18-item measure assessing the tendency to fear symptoms of anxiety.
  - *Illness/Injury Sensitivity Index-Revised* (ISI-R) is a 9-item measure assessing fears of illness and injury.
  - *Pain Anxiety Symptoms Scale-20* (PASS-20) is a 20-item measure assessing pain-related anxiety.
  - *Fear of Pain Questionnaire-Short Form* (FPQ-SF) is a 20-item measure assessing pain-related fear.
  - *State-Trait Anxiety Inventory, Trait* (STAI-T) is a 20-item measure assessing general anxiety.
  - *The Visual Analogue Scale* (VAS) is a single item measure used to assess current pain severity with a 100 mm line representing a continuum between “no pain” and the “worst pain imaginable”.

Results

- Eligible participants who agreed to participate completed all sessions – an additional 65 people refused participation when they were told the intervention did not include pharmaceutical or surgical intervention.
  - *n*=9 in the AMP (Active) Group (100% Women; *M*=12.9 years in pain); *n*=8 in the Control Group (88% Women; *M*=10.6 years in pain)
- Independent and repeated measure *t*-tests were used to analyze group differences, to avoid Type II errors.
- There were no differences (see Table 1) between the control and AMP condition at intake on any measure, except the PASS-20 total score, which was higher in the control group (one-tailed p=.06, r^2=.18).
- AMP Condition – There were significant reductions from intake to post-treatment in scores on the ASI-3 and the FPQ-SF, but not on the ISI-R, the PASS-20, or the STAI-T (see Table 2); however, there was a near-significant trend on the VAS and substantial effects indicating a reduction in scores on the PASS-20 and on the VAS.
- Control Condition – There were no significant reductions from intake to post-treatment in scores on most measures (see Table 3); however, there was a reduction in total scores on the PASS-20 (p<.01, r^2=.82), making the final scores comparable to the initial scores from the AMP condition and a substantive reduction in STAI-T.

Discussion

- The current study was designed to explore the utility of AMP to reduce pain associated with fibromyalgia and to assess whether AMP would be effective for reducing individual difference variables (e.g., pain-related anxiety, pain-related fear, anxiety sensitivity, injury/illness sensitivity) associated with such chronic pain.
- Despite the small sample size, there was clear and substantive evidence of a difference in improvement between the control and the AMP condition.
- The control group reported almost no evidence of a statistically significant or robust reduction in self-reported current pain from pre- to post-treatment, except that PASS scores regressed towards the mean; in contrast, the AMP group reported several statistically significant and substantial reductions in pain-related variables and a substantial reduction in pain.
- There was also evidence of substantive clinically significant change in the AMP condition relative to the ACC, with 44% versus 17% showing clinically significant pre- to post-treatment reductions in current pain.
- The results support AMP as a potential treatment adjuvant for Fibromyalgia that is timely and cost effective; however, replication with larger sample sizes and evaluation of the protocol outside of the laboratory setting will be critical next steps for this research.

Table 1: Comparing AMP and Control Groups at Intake

	AMP *M*(*SD*)	Control *M*(*SD*)	*p*	r^2
VAS	6.44 (1.67)	6.00 (2.00)	.324	.017
ASI-3 Total	22.00 (18.23)	19.33 (16.22)	.389	.001
ISI-R Total	15.00 (14.72)	10.17 (7.91)	.239	.039
PASS-20 Total	**27.11 (16.89)**	**44.50 (22.74)**	**.056**	**.183**
FPQ-SF Total	42.00 (14.70)	38.83 (11.58)	.333	.015
STAI-T	44.44 (11.08)	42.83 (14.66)	.406	.005

Table 2: Comparing AMP at Intake and post-treatment

AMP	Intake *M*(*SD*)	Follow-up *M*(*SD*)	*p*	r^2
VAS	**6.44 (1.67)**	**5.22 (2.73)**	**.056**	**.286**
ASI-3 Total	**22.00 (18.23)**	**12.89 (9.23)**	**.028**	**.385**
ISI-R Total	15.00 (14.72)	13.00 (11.63)	.260	.055
PASS-20 Total	27.11 (16.89)	24.44 (15.68)	.127	.159
FPQ-SF Total	**42.00 (14.70)**	**36.11 (9.06)**	**.045**	**.319**
STAI-T	44.44 (11.08)	43.67 (11.69)	.381	.012

Table 3: Comparing Control at Intake and Post-treatment

Control	Intake *M*(*SD*)	Follow-up *M*(*SD*)	*p*	r^2
VAS	6.00 (2.00)	5.67 (1.37)	.288	.067
ASI-3 Total	19.33 (16.22)	16.00 (18.19)	.291	.065
ISI-R Total	10.17 (7.91)	9.83 (11.62)	.467	<.01
PASS-20 Total	**44.50 (22.74)**	**28.00 (29.87)**	**.003**	**.821**
FPQ-SF Total	38.83 (11.58)	39.33 (13.92)	.426	.008
STAI-T	42.83 (14.66)	40.17 (18.03)	.375	.159

Threat Word List – Idiosyncratic Selection Each Session

ACHE	FREEZING	SMARTING	CRAMPING	SPLITTING	AGONIZING
ACHING	HURTING	EXCRUCIATING	RADIATING	PIERCING	PINCHING
BEATING	STINGING	SORE	PAIN	SCALDING	TENDER
THROBBING	AGONY	TEARING	PAINFUL	BITING	SEARING
CRUSHING	POUNDING	SUFFER	SHOOTING	STABBING	BURNING

Notes: *M* – Mean; *SD* – Standard Deviation; VAS – Visual Analogue Scale; ASI-3 – Anxiety Sensitivity Index-3; ISI-R – Injury/Illness Sensitivity Index; PASS – Pain Anxiety Symptoms Scale; FPQ-SF – Fear of Pain Questionnaire-Short Form; STAI-T – Trait form of the State-Trait Anxiety Inventory

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