



## The match–mismatch model of emotion processing styles and emotion regulation strategies in fibromyalgia

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### ABSTRACT

**Objective:** Individuals differ in their style of processing emotions (e.g., experiencing affects intensely or being alexithymic) and their strategy of regulating emotions (e.g., expressing or reappraising). A match–mismatch model of emotion processing styles and emotion regulation strategies is proposed and tested. This model specifies that for people high on affect intensity, emotion expression is more adaptive than reappraisal, whereas for alexithymic people, reappraisal is more adaptive than expression. The present study tested this model in 403 women with fibromyalgia (mean age  $46.5 \pm 12.3$  years).

**Methods:** In a cross-sectional design, we assessed affect intensity (Berkeley Expressivity Questionnaire), alexithymia (Toronto Alexithymia Scale-20), cognitive reappraisal (Emotion Regulation Questionnaire), and emotion expression (Emotional Approach Coping Scales), as well as the impact of fibromyalgia (Fibromyalgia Impact Questionnaire).

**Results:** Multiple regression analyses with interaction terms indicated that among people high on affect intensity, emotion expression – but not cognitive reappraisal – was associated with less fibromyalgia impact. No support was found for the hypothesis that among alexithymic people, cognitive reappraisal would be more adaptive than emotion expression.

**Conclusion:** Findings suggest that for women with fibromyalgia who experience their emotions intensely, an emotional disclosure or expression intervention may be beneficial. This hypothesis requires verification in experimental studies.

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### Introduction

Fibromyalgia is a chronic pain disorder of unknown etiology which is difficult to treat [1]. Negative emotions are commonly experienced in fibromyalgia and may amplify pain [2–4]. This implies that how people with fibromyalgia process and regulate their emotions may be relevant for their pain and adjustment.

*Emotion processing styles* refer to relatively automatic appraisals of events, which determine the type and strength of emotional experiences [5]. Two emotion processing styles are affect intensity and alexithymia. Affect intensity refers to the strength with which emotions are experienced [5,6], and alexithymia encompasses difficulty identifying and describing emotions [7,8]. *Emotion regulation strategies* refer to the intentional behaviors and thoughts by which people influence or control when and how specific emotions are experienced and expressed [9]. Two

common emotion regulation strategies are emotion expression and cognitive reappraisal. Emotion expression is the disclosure or sharing – either verbally or written – of inner feelings [10]. Cognitive reappraisal involves cognitively reconstruing or reinterpreting a potentially emotion-eliciting situation in a way that changes its emotional impact [9].

Another study and our own previous study showed that, compared to women without fibromyalgia, those with fibromyalgia have, on average, different emotion processing styles and emotion regulation strategies: women with fibromyalgia report greater emotional intensity, alexithymic difficulty identifying feelings, and emotion suppression, and lower emotion expression, but no difference in the use of cognitive reappraisal [11,12]. Furthermore, our paper provided a first indication of the need to examine interactions between emotion variables because we found that affect intensity was correlated with more pain and fatigue only in women with deficient emotion processing skills [12]. We used this finding as the starting point in developing the conceptual model that is being tested in the present paper. While emotion regulation strategies such as cognitive reappraisal and emotion expression can be directly therapeutically targeted, it is harder to change emotion processing styles such as

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alexithymia and affect intensity. To derive recommendations for tailoring cognitive therapy and emotion expression to the predominant emotion processing style of the patient, it is important to know which specific emotion regulation strategies best fit specific emotion processing styles (match) and which processing styles and regulation strategies are a poor combination (mismatch). Previous empirical and review papers have provided potential explanations of contradictory findings with regard to the health effects of alexithymia and affect intensity, but these ideas have not been tested. Combining these suggestions with responses to emotional disclosure interventions [e.g., 13] and laboratory studies of emotion [e.g., 14], we propose a match–mismatch model of emotion processing style with emotion regulation strategy (Fig. 1). The proposed model suggests that a person's adjustment depends on the combination of one's automatic emotion processing style and one's use of intentional emotion regulation strategies.

Among people who experience and report heightened affect intensity, a strategy of emotion expression is expected to be beneficial, because the expression of strong emotions will reduce emotional intensity by mechanisms of habituation and, possibly, gaining insight [15–18]. In contrast, cognitive strategies are expected to maintain emotional intensity due to their external focus, which may cause prolonged rumination and worrying, leading to recurrence of unprocessed emotions and physiological hyperreactivity [19,20]. Thus, we hypothesize that for patients who are high on affect intensity, emotion expression (match) leads to better adjustment than cognitive reappraisal (mismatch).

Emotion-oriented strategies, such as emotion expression, require the ability to acknowledge and process emotions – an ability that is deficient in people with alexithymia [e.g., 21]. Eliciting emotions in alexithymic individuals may, therefore, result in an increase in confusion and physiological stress, which has been shown experimentally in a study of women with fibromyalgia in an interview context [22]. Consistent with this, alexithymia is typically associated with poorer outcomes of interventions that encourage emotional disclosure and processing [23,24], but with better outcomes of interventions that are externally focused and use cognitive and behavioral techniques [25–27]. This suggests that among people with alexithymia, cognitive reappraisal (match) is associated with better adjustment than emotion expression (mismatch).

Models of adjustment in fibromyalgia commonly focus on cognitions and behavior. Yet, the observation that emotions may amplify pain [2,3] suggests that emotion processing and regulation are also

important. The aim of this study was to examine whether specific combinations of emotion processing styles and emotion regulation strategies are associated with better adjustment to fibromyalgia. We hypothesized that the combination of a high affect intensity processing style with an emotion expression strategy is associated with better adjustment (lower impact of fibromyalgia) than the combination of high affect intensity with cognitive reappraisal. Similarly, we hypothesized that the combination of alexithymia with cognitive reappraisal is associated with better adjustment than the combination of alexithymia with emotion expression. If these hypotheses are verified, it suggests that emotion regulation interventions should be tailored to the emotion processing style of the patient.

## Methods

### Participants

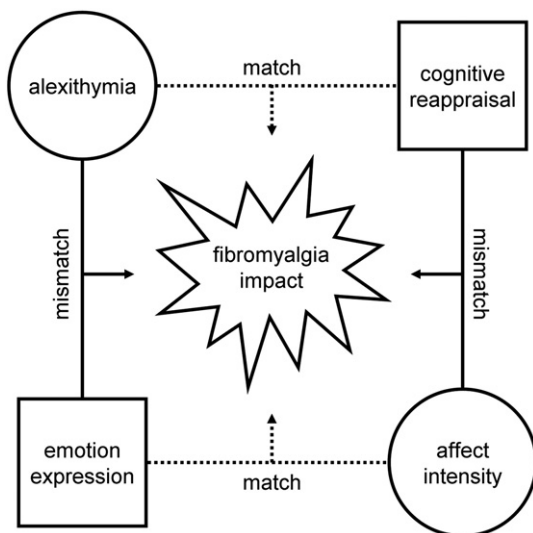
The data to test the match–mismatch model of emotion processing and regulation were derived from a descriptive study on emotions and emotion regulation on a sample of 403 adult women with fibromyalgia [12]. All patients were classified with fibromyalgia according to the 1990 ACR criteria [28] at any of three hospitals in Utrecht and Almere, The Netherlands. To be able to generalize findings to the population of women with fibromyalgia, male sex was the only exclusion criterion. Participants had a mean age of 46.5 ( $SD=12.3$ ) years, a mean duration since diagnosis of 3.5 ( $SD=4.4$ ) years, and a mean duration since onset of symptoms of 10.9 ( $SD=8.6$ ) years. Seventy-five percent of the participants had a spouse or partner, 11% were single, another 11% divorced, and 3% widowed. Education level was primary school or lower vocational secondary education for 6% of the participants (low), intermediate general secondary education or intermediate vocational education for 77% (middle), and higher vocational or university education for 17% (high).

### Measures

Patients completed commonly used, well-validated questionnaires of emotion processing styles, emotion regulation strategies, and fibromyalgia impact. Patients were asked to indicate the way they process and regulate emotions in general. The impact of fibromyalgia was reported for the past week.

**Emotion processing styles.** Affect intensity, the strength of emotional experiencing, was assessed with the impulse strength scale of the Berkeley Expressivity Questionnaire [29] (e.g., “I experience my emotions very strongly.”). The six items are rated from 1 (*strongly disagree*) to 7 (*strongly agree*) and averaged. In the current study, Cronbach's  $\alpha$  was .74.

The affective aspects of alexithymia were assessed with the Toronto Alexithymia Scale-20 [7]. The difficulty identifying feelings scale (7 items) measures the inability to distinguish among specific emotions and between emotions and the bodily sensations of emotional arousal (e.g., “I am often confused about what emotion I am feeling.”). The difficulty describing feelings scale (5 items) measures the inability to verbalize one's emotions to other people (e.g., “It is difficult for me to find the right words for my feelings.”). Items are rated from 1 (*strongly disagree*) to 5 (*strongly agree*) and summed. We did not include the third TAS-20 scale, externally-oriented thinking, in this study because previous research has raised concerns about its reliability and its lack of relationship with the correlates of the two affective components of alexithymia; this has also been found in the Dutch translation of the scale [30,31]. The two affect scales (difficulty identifying and describing feelings) were pooled in a single affective alexithymia scale. Cronbach's  $\alpha$  of this scale was .82.



**Fig. 1.** The match–mismatch model of emotion processing styles and emotion regulation strategies. The solid lines represent a negative association with fibromyalgia impact, the dashed lines represent a positive association with fibromyalgia impact.

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