NEGATIVE MOOD REGULATION EXPECTANCIES, FIBROMYALGIA, CHILDHOOD
TRAUMA, AND DEPRESSION

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A Thesis

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ABSTRACT

Fibromyalgia (FM) is a chronic pain condition that affects 2% to 4% of the population. Many patients with FM report a history of depression and child abuse. Childhood abuse affects both physical and mental health in adulthood. Negative mood regulation expectancies (NMRE) are one's belief that one can alleviate his or her negative moods (Catanzaro & Mearns, 1990). People with higher NMRE experience fewer mental and physical symptoms in adulthood following childhood maltreatment. My study investigated how NMRE, depression, childhood trauma, and FM were related. The study expected to find that more severe child abuse would be associated with lower NMR Scale scores, more depression, and more FM symptoms. NMRE was also expected to mediate the relationships of child abuse with both depression and FM symptoms. Questionnaires were completed by 164 participants with an FM diagnosis (n = 34) or a history of child abuse (n = 130). Participants were sampled from online support groups for FM and child abuse. More severe child abuse was associated with greater depression, but it was unrelated to NMRE and FM symptoms. Higher NMRE were associated with lower depression, but they had no association with FM symptoms. This study did not support past research suggesting that NMRE may influence health symptoms. Limitations include that the current study had few participants and many incomplete responses to the questionnaires. Future research should include non-self-report measures and should collect questionnaire data at multiple sessions to better understand causality among the variables.

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CHAPTER 1

INTRODUCTION

Fibromyalgia (FM) is a chronic pain condition that includes widespread muscle pain, heightened pain sensitivity at specific locations, disturbed sleep, fatigue, diminished cognition and concentration, and psychological disturbances, such as depression and anxiety (Lee, 2010; Van Houdenhove, & Egle, 2004). FM affects two to four percent of the population (Schweinhardt, Sauro, & Bushnell, 2008). It is diagnosed most frequently in non-Hispanic white women, and it affects women six times more frequently than men (Smith, Papp, Tooley, Montague, Robinson, & Cosper; 2010; Van Houdenhove & Egle, 2004). To be diagnosed with FM, one must experience fatigue, cognitive symptoms, and widespread pain in at least seven specified areas for a minimum duration of three months (Lee, 2010; Wolfe et al., 2010).

Although FM has identifiable symptoms and specific diagnostic criteria, its exact causes remain unknown. In the past, some researchers suggested that FM was just a psychological disorder because of the lack of evidence for a physiological cause (Goldberg, 1994). In addition, many patients with FM experience comorbidity with psychological diagnoses: 25% of FM patients currently experience depression, and 70% have experienced depression at some point in their lives. Research has begun to explore physiological origins of the disorder. The current view is that FM has psychological symptoms rather than being somatic manifestations of psychological concerns (Schweinhardt et al., 2008).

In recent years, research has explored physiological systems suspected of causing FM: the nervous system, hypothalamus-adrenal-pituitary (HPA) axis, and the inflammatory responses (Lee, 2010; Okifuji & Turk, 2002; Schweinhardt et al., 2008). Research has primarily examined the body's stress response systems as both a cause and exacerbater of FM and its symptoms (Smith et al., 2010). Because of this, FM is often referred to as a stress-related disorder. Researchers have also found physical differences in brains of FM patients compared to those of healthy individuals. Schweinhardt et al. (2008) found that, similar to other stress-related disorders like chronic fatigue and post-traumatic stress disorder (PTSD), FM patients had a decrease in gray matter of perihippocampal gyris. According to Smith et al. (2010), one possible explanation for this finding is that early exposure to trauma and stressors produces dysregulation of the stress response system that lasts a lifetime and increases sensitivity to stressors later. Research has suggested that increased stress in childhood leads to long-term elevated glucocorticoid levels, which can alter the hippocampus structure, resulting in gray matter deterioration (Schweinhardt et al., 2008). Although research points to a link between FM and stress, the nature of this relationship remains unclear (Lee, 2010).

Fibromyalgia and Trauma History

Lee (2010) reported that 40% to 60% of individuals with FM, compared to 22% in the general public, report a past history of childhood abuse. Studies have also shown that the prevalence of child abuse is higher for FM patients than for patients with other chronic pain disorders (Weissbecker, Floyd, Dedert, Salmon, & Sephton, 2006). The high prevalence of childhood abuse among FM patients has encouraged many researchers to explore the connection between past childhood abuse and the acquisition of FM (Lee, 2010; Smith et al.,

2010). Van Houdenhove and Egle (2004) suggest that early childhood abuse may lead to hyperactivation of the stress response system throughout the individual's lifetime. A hyperactive stress system insufficiently inhibits the HPA axis and makes the individual more likely to suffer from both stress-related disorders and a lowered pain threshold.

In a 2010 study, Smith et al. predicted that, among patients with FM, perceived stress would mediate between trauma and health and also predicted that abuse in adulthood would mediate between child abuse and perceived stress and health. Women with FM reported three times as many instances of trauma and childhood abuse, and they also reported higher levels of perceived stress compared to healthy controls. According to predictions, there was a positive correlation between traumatic events and health in participants with FM. Researchers also found that perceived stress mediated between traumatic events and both mental and physical health.

Stress has been identified as a contributing factor to both acquisition of FM and aggravation of its symptoms. Okifuji and Turk (2002) posited that patients with FM have a poorly regulated stress response due to alterations in their autonomic nervous system (ANS) and HPA axis. Weissbecker et al. (2006) suggested that childhood trauma can lead to long-standing changes in endocrine activity. In patients with FM, this phenomenon is most notably seen in the disruption of the diurnal cortisol system and increased cortisol upon awakening, indicating a higher stress response.

Studies have tested different models to assess the relationship between childhood abuse, stress, and FM. Van Houdenhove and Egle (2004) examined a biopsychosocial model: hyperactivation of the HPA axis, poor affect regulation due to problematic attachment during childhood, and somatic-focused attention due to comorbid depression and anxiety that often

accompany FM. Early childhood trauma has been associated with higher basal cortisol levels, indicating a heightened stress-response system that makes an individual more likely to be stressed and to experience a stress-related disorder in adulthood. Trauma may lead to attachment problems, which could decrease the ability to regulate affect and increase susceptibility to pain by altering the baseline of the stress response and nociceptive systems, which are responsible for processing pain stimuli. Individuals who have comorbid anxiety and depression can experience hypervigilance, sleep disturbances, negative affectivity, catastrophizing, and increased pain (Van Houdenhove & Egle, 2004).

Once stressors terminate, the body must shift from prolonged hyperactiviation, over responding, to hypofunctioning, under responding (Smith et al, 2010). Many patients begin symptoms following the termination of long-term stressors, suggesting that the stress response system has a difficult time transitioning to hypofunctioning and then responding adequately to new stresses and pain-processing. Smith et al.'s cross-sectional study found that adult abuse mediated the relationships of childhood abuse with perceived stress and mental and physical health. The researchers also found that perceived stress mediated the relationships of childhood abuse with adult abuse and adult mental and physical health. Although no clear pathway is suggested by this model, it does support past research indicating that initial traumas can cause a cascading impact on stress response dysregulation, causing hypersensitivity to daily stress and pain. It is clear that there is a connection between a history of childhood abuse and an FM diagnosis, but we still need more information to understand the factors leading to a diagnosis of FM and those that protect people from deteriorated health.

Childhood Abuse

A survey from 2005-2006 revealed that over three million children have experienced child abuse in the United States (Min, Minnes, Kim, & Singer, 2013). Shi (2013) further detailed that 21% of the population reported childhood sexual abuse, and 11% to 21% of the population experienced physical abuse as a child. Emotional abuse, which often goes underreported due to its inconsistent operational definition, has been found in 35% of the world's population (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2012). As previously mentioned, studies have found that early childhood trauma can affect later health and psychology by disrupting the stress response system (Lee, 2010; Smith et al., 2010; Teicher, Andersen, Polcari, Anderson, Navalata, & Kim, 2003). Given the high prevalence of abuse, it is important to understand more about how child abuse has a long-term effect on physical and mental health.

Impact from Each Type of Abuse

Experiencing child abuse is a significant risk factor for later problems in adulthood (Cloitre, Stovall-McClough, Zorbas, & Charuvastra, 2008; Min et al., 2013; Sachs-Ericsson, Medley, Kendall-Tackett, & Taylor, 2011). However, different subtypes and severity of abuse have varying impacts (Cloitre et al., 2008; McElroy & Hevey, 2014). Researchers have found that many women who have been victims of childhood physical abuse experience higher stress levels and often respond with fewer problem-focused coping strategies (e.g., problem solving and advice seeking) and more emotion-focused coping (e.g., self-blame and rumination), which are risk factors for future mental and physical health concerns (Springer, 2009.) Hager and Runtz's (2012) research revealed that childhood sexual abuse was unrelated to health variables in adulthood, but they did find that more severe physical and

psychological maltreatment in childhood was related to greater physical problems as an adult. These researchers proposed that perceived stress and using avoidant coping strategies are the mechanism by which childhood maltreatment affects adult health. Perhaps, emotion-focused coping strategies enhance stress and cause further impairment in health and daily functioning.

Briere and Elliott (2003) found that childhood sexual abuse results in elevated trauma symptoms, depression, panic disorder, phobias, and suicidal ideation and attempts later in life. Some factors that could amplify the impact of sexual abuse include the following: later age of abuse occurrence, higher number of incidents of abuse, multiple perpetrators, higher levels of emotional upheaval around the time of the abuse, and penetration as part of the abuse. Shi (2013) explained that, although the impact of emotional abuse may be difficult to see compared to physical scars, it has a long-term debilitating impact on the ability to cope due to negative self-concept and self-worth. Horwitz, Widom, McLaughlin, and White (2001) found that neglect was positively correlated with dysthymia, a long-term, low-grade depressive disorder, in adults 20 years post-abuse.

McElroy and Hevey (2014) explained that some individuals are more resilient in response to negative childhood experiences. Resilience is defined as having positive outcomes even in the face of adverse situations (Jonzon & Lindblad, 2006). Some factors that foster resilience are social support and using task-oriented coping strategies. Among sexual abuse victims, higher self-esteem also acted as a protective factor, being associated with fewer health and psychological symptoms in later life. Parents' support and their responses to the abuse can mediate children's adjustment. Parents who overreact to a child's trauma can lead children to overreact to internal stress cues (Cloitre et al., 2008).

Childhood Abuse's Impact in the Older Adult Population

Few studies have examined the impact of childhood trauma among older adults. It has been commonly accepted that, as noted with younger populations, childhood abuse is correlated with poorer physical and mental health in later adulthood (McElroy & Hevey, 2014).

Research has suggested that the lasting impact of childhood abuse may be due to the subsequent coping methods victims use, rather than the abuse itself (Coffey, Leitenberg, Henning, Turner, & Bennett, 1996; Springer, 2009). Not all coping strategies are equally efficacious. Wright, Crawford, and Del Castillo (2009) found that individuals who experienced emotional abuse were more likely to have self-sacrificial schemas— focusing on others at the expense of one's own needs— and defective schemas— feeling inadequate— as a result of the abuse. These schemas are often associated with internalized negative self-beliefs and use of avoidant coping strategies. Although it might be adaptive during times of abuse to respond with avoidant and disengaging coping methods, these responses become maladaptive in adulthood during times of non-abuse, leading to higher levels of psychological distress. Researchers suggest that using solution focused strategies results in more positive emotional outcomes (Coffey et al., 1996; Mearns, 1991).

Self-efficacy (SE), part of Bandura's social cognitive theory, is the belief in one's ability to engage in responses to stressful life events (Bandura, 1986). Sachs-Ericsson et al. (2011) found that older individuals who experienced childhood trauma had lower global SE than older individuals without a history of childhood trauma. They also posited that SE mediated between childhood abuse and current health problems by affecting the amount of effort one exerts to control one's health, acting as a protective factor against life stressors.

This model suggests that one's beliefs about personal control are important determinants of childhood trauma's impact later in life.

A concept similar to SE is Rotter's (1954) construct expectancy. SE is the level of confidence that one can emit a particular response. Expectancy includes both this subjective capacity to act in a certain way and the belief about the likelihood that a given behavior will result in a certain outcome. Expectancies combine with reinforcement values, the desirability of outcomes, to determine behavior. People will exert the most effort when they are confident their behavior will result in something they like (Rotter, 1954). In terms of coping, those who believe their efforts will have little impact are likely to exert less effort in coping and are thus likely to cope inadequately. However, those with high expectancies believe coping will be effective and will consequently use more active methods of coping, investing greater effort and experiencing more success (Catanzaro & Mearns, 1990).

Kirsch (1985) theorized about a particular class of expectancies called response expectancies, which are anticipations of non-volitional, automatic reactions, such as emotional reactions, sexual arousal, and pain. While expectancies for coping influence outcomes indirectly— mediated by behavior— response expectancies affect outcomes directly, solely due to the belief that one has the capacity to cope. Response expectancies' effect is independent of any actual coping behavior's being emitted. One well known example of response expectancy is the placebo effect. Research has shown that people experience an alleviation of physiological and psychological symptoms when provided a non-active drug, simply because they believe the drug will help. The belief itself causes the improvement (Kirsch, 1985).

Negative Mood Regulation Expectancies

When faced with a stressful situation, one may respond to it with different comping styles to elevate one's mood (Catanzaro & Greenwood, 1994). Affective expectancies, which are anticipated feelings about an upcoming situation, are consistent and strong predictors of experiencing those moods (Klaaren, Hodges, & Wilson, 1994). Negative mood regulation expectancies (NMRE) are defined as one's "expectancy that some behavior or cognition will alleviate a negative mood state" (Catanzaro & Mearns, 1990, p. 546). In other words, NMRE represent how strongly a person believes that his or her actions will improve one's negative mood. Catanzaro and Mearns created the NMR Scale to measure NMRE. The stem "When I'm upset, I believe that..." is followed by statements such as, "I can do something to feel better," "I can find some humor in the situation and feel better," and "I can find a way to relax" (Catanzaro & Mearns, 1990).

NMRE have often been examined in undergraduates. Catanzaro (1996) set out to determine if NMRE would affect examination performance. Catanzaro measured NMRE at the beginning of the semester and emotional distress at the end of the course, immediately before an exam. Catanzaro concluded that NMRE acted as an emotional buffer, moderating the relationship between anxiety and test performance. Those with low NMRE and more anxiety had the lowest scores on the examination. Among those with high NMRE, more anxiety actually enhanced performance.

Mearns (1991) conducted a three part study to examine depression following the breakup of a romantic relationship. In the first study, participants were college students who had experienced the breakup of a romantic relationship within the past year. This cross-sectional study found that NMR Scale scores correlated .31 with depression initially

following the breakup and .35 with current depression. The longitudinal second study looked at a subset of the participants from Study 1 at two weeks and one month later. Initial depression levels were positively correlated with avoidant coping strategies and later depression levels, while NMRE negatively correlated with those same variables. Individuals with higher NMRE were more likely to engage in active coping behaviors. The final study examined participants who had experienced a break-up in the six months since the initial study. There was a .65 test-retest correlation between NMR Scale scores over a six month period. In this longitudinal study, NMRE consistently negatively correlated with initial depression after the termination of a relationship and also current depression. Higher NMRE continued to predict lower depression levels when other predictor variables, including depression levels at the time of NMR Scale completion, were controlled for. This study demonstrated that NMRE are not merely a symptom of depression.

Few studies have explored negative mood regulation expectancies in older adult or chronically ill populations. Catanzaro, Horaney, and Creasey (1995) were interested in the high prevalence of depression among older individuals, which is attributed to some unique stressors—social decline due to death of close family and friends, change in life conditions due to discontinuing working, and decline of health associated with aging (Krause, 1987). Catanzaro et al. (1995) suggested that NMRE may be of special importance for older adults, because a sense of loss of control over physical concerns may increase needs for control over internal, emotional matters. Consistent with prior research, the authors found that higher NMRE were related to less avoidant coping and depressive symptoms and more active coping.

Living with and caring for individuals with chronic illnesses can be difficult, because there is a lack of control over the medical condition. A cross-sectional study by Brashares and Catanzaro (1994) examined the NMRE of female caregivers for patients with Alzheimer's disease. NMRE were negatively correlated with avoidant coping strategies and depressive symptoms but were unrelated to active coping. The researchers also found, surprisingly, that active coping was correlated with greater depressive symptoms. They suggested that perhaps these findings occurred because active attempts to problem solve and to cope with the illness would be futile when the stressor is uncontrollable. Thus, in coping with a chronic stressor, it may be especially important to regulate one's feelings, over which one does have control.

Another study examined NMRE and emotional distress in post-surgical patients with breast or cervical cancer (Sucală & Tătar, 2010). The researchers found that lower NMRE were correlated with higher pessimism, anxiety, and depressive symptoms. NMRE mediated the relationship between pessimism and emotional distress. Patients with greater pessimism had lower confidence in their ability to regulate their negative mood states, which led to higher levels of anxiety and depression.

Two studies evaluated the effectiveness of internet manualized CBT interventions in populations with chronic illnesses. Carpenter, Stoner, Mundt, and Stoelb (2012) implemented an online self-help CBT intervention for participants with chronic lower back pain. After participants completed a three week intervention, their NMR Scale scores improved, and participants maintained these gains three weeks following the end of the intervention. A second study examined the effectiveness of a 10 week, online CBT intervention for patients with breast cancer (Carpenter, Stoner, Schmitz, McGregor, & Doorenbos, 2014). The CBT

improved self-efficacy for coping with cancer and NMR Scale scores, and these results were maintained 10 weeks post-intervention.

In terms of childhood trauma, Madracki (2011) explored the relationships among childhood trauma, depression, and NMRE. She found that higher abuse was associated with more depression and lower NMR Scale scores. Emotional abuse was most strongly negatively correlated with NMRE. A path-model analysis revealed that NMRE partially mediated the relationships between abuse and depression, showing the strongest mediation effect for emotional abuse.

Tresno, Ito, and Mearns (2013) found that Japanese college students who engaged in self-injurious behaviors reported more depression and childhood trauma, especially neglect, and lower NMRE. Tresno et al. also found that NMRE moderated the relationship between childhood trauma and self-injuring behaviors, such that individuals with low NMRE and greater childhood maltreatment engaged in significantly more self-injurious behaviors; in contrast, individuals with high NMRE and high childhood trauma engaged in only modestly frequent self-injurious behaviors. These results are consistent with the literature suggesting that raising NMRE may be an important component of treating depression and the lasting negative effects of childhood trauma (Cloitre, Stovall-McClough, Miranda, & Chemtob, 2004; Tresno et al., 2013).

Cloitre et al. (2004) examined adults with PTSD due to child abuse in two phases: initial skills building, followed by imaginal exposure to the traumatic event. NMRE and a positive therapist-client relationship significantly predicted reductions in severity of PTSD symptoms during treatment. Decreased depression scores were preceded by improving negative mood regulation skills. PTSD symptoms mediated the relationship between trauma

and mood dysregulation, but NMRE also facilitated improvements in PTSD symptom alleviation. Thus, raising NMRE seems to be an essential part of therapy intended to reduce affective symptoms.

In contrast, Kulkarni, Pole, and Timko (2013) examined police officers with PTSD to determine if childhood trauma's impact on current distress was mediated by PTSD severity or difficulties with negative mood regulation. Consistent with the literature, they found that childhood victimization was correlated with lower NMRE; however, NMRE did not mediate the relationship between childhood trauma and severity of PTSD symptoms in adulthood. PTSD severity mediated the relationship between childhood trauma and mood dysregulation (Kulkarni et al., 2013).

Research has also studied if NMRE play a role in cognitive-behavioral therapy (CBT) for depression. Backenstress et al. (2006) found that NMRE mediated change in depressive symptoms; as therapy progressed, NMRE scores increased, which was associated with future decreases in depression.

In summary, NMRE have been found to correlate with depression in undergraduates, older adults, caregivers for patients with Alzheimer's, breast cancer patients, and individuals with chronic back pain, PTSD, and a history of childhood abuse. Research has also reported that NMRE increase the belief that an individual can not only improve one's negative mood state, but also the belief that one can manage one's pain levels (Carpenter et al., 2012). Since NMRE have been found to ameliorate the impact of child abuse on physical and mental health in adulthood, and research has begun to explore NMRE's ability to decrease pain in chronic pain populations, NMRE is an important area of study for individuals with fibromyalgia and a history of child abuse.

The Current Study

Although most researchers consider FM to be a stress-related disorder, FM's exact causes remain unknown (Smith et al., 2010). Research has indicated that increased stress levels in childhood may lead to life-long stress system alterations (Schweinhardt et al., 2008). With 40% to 60% of FM patients reporting a history of childhood trauma, many researchers have explored the relationships of trauma in childhood and acquisition of FM (Lee, 2010; Smith et al.). Experiencing childhood abuse has been shown to have myriad effects on psychological and physical health in adulthood (Cloitre et al., 2008).

The current study explored relationships among childhood trauma, NMRE, depression, and FM symptoms among two groups: individuals diagnosed with FM and those who had experienced childhood trauma. First, this study built on previous research by exploring NMRE as a possible link between childhood trauma and depressive and health symptoms in FM patients. Second, it built on previous research linking childhood abuse to depressive and health symptoms in adulthood (Lee, 2010; Smith et al., 2010; Teicher, Andersen, Polcari, Anderson, Navalata, & Kim, 2003). Finally, it expanded research exploring how the severity and type of childhood maltreatment affects NMRE and mental health (Madracki, 2011; Tresno et al., 2013). I tested the following hypotheses:

Hypothesis 1. More severe child abuse would be associated with lower NMR Scale scores, higher depression, and more FM symptoms.

Hypothesis 2. Higher NMRE would be associated with lower depression and less severe FM symptoms.

Hypothesis 3. Compared to the child abuse group, the FM group would report more FM symptoms and depression.

Hypothesis 4. NMRE would mediate the relationships of childhood abuse with both depression and FM symptoms.

CHAPTER 2

METHOD

Participants

Participants were sampled from two pools: adults diagnosed with Fibromyalgia and adults who experienced abuse as a child. If participants endorsed an FM diagnosis, they were placed in the FM group. If participants did not endorse an FM diagnosis, they were placed in the child abuse group. These individuals were recruited from online support groups focusing on individuals diagnosed with FM and support groups for adults who experienced childhood abuse. Participants with FM were also sampled from two organizations associated with California State University, Fullerton. There were 164 participants who completed the surveys: 22 men and 142 women. The mean participant age was 33.16 years, ranging from 18 to 58 years (SD = 13.08). All 34 participants who reported an FM diagnosis were women. The mean participant age in this group was 48.56 years, ranging from 19 to 72 (SD = 14.80). For the 130 participants without an FM diagnosis, there were 22 men and 108 women. The mean participant age in this group was 29.12 years (SD = 8.70).

Table 1

Participant Demographics

	FM Group	Child Abuse Group
Gender		
Male	83.1	0
Female	16.9	100
Age		
18-25	36.1	2.9
26-35	30.8	3.5
36-45	16.9	17.6
46-55	6.9	20.6
55-65	.8	14.7
66-76	0	17.6
Ethnicity		
White/Caucasian	84.6	84.2
Hispanic/Latino	5.4	2.9
Black/African American	.8	2.9
Asian	6.2	2.9
Other	3.1	2.9
Level of Education		
Some High School	3.8	2.9
High School Graduate	7.7	2.9
Some College	31.5	38.2
Trade School	1.5	5.9
College Graduate	32.3	17.6
Some Postgraduate	8.5	8.8
Postgraduate Degree	14.6	29.4
No education	.8	0

Note. The numbers represent percentage of participants in each category.

Measures

Negative Mood Regulation (NMR) Expectancies

The NMR Scale (Catanzaro & Mearns, 1990) is a 30-item measure that assesses one's

generalized expectancies that one will be able to alleviate one's negative mood state. The

items are rated by participants on a five-point Likert-type scale, ranging from *strongly*

disagree to *strongly agree*. Half of the items are reverse scored. The items are summed to get the total NMR Scale score. The NMR Scale's alpha coefficients ranged from .86 to .92, and test-retest reliability over a six month period was .65 (Mearns, 1991). In the current study, the alpha was .93.

Revised Fibromyalgia Impact Questionnaire (FIQR)

The FIQR is a self-report instrument used to assess FM patient functioning and symptoms over the past seven days (Bennett et al., 2009). Patients respond to the 21 items on an 11-point-scale, ranging from 0 = *not severe* to 10 = *very severe*. The items were summed to get the total FIQR score. For example, "Please rate your level of anxiety." This study referred to the FIQR as the Revised Health Impact Questionnaire (HIQR), and the word "Fibromyalgia" was replaced with "health symptoms" to allow people without an FM diagnosis to endorse FM symptoms. In the current study, the alpha was .94.

Depressive Symptoms Inventory (DSI)

The DSI (Kirsch, Mearns, & Catanzaro, 1990) is a 19-item measure of depression. The inventory, modified from the Health and Daily Living Form, assesses the frequency of depressive symptoms experienced over the past week. Participants endorse each symptom on a 5-point scale, from *never* to *constantly*. The items were summed to obtain a total DSI score. More depression equals higher DSI scores. The test shows good internal consistency, with a coefficient alpha of .92. Convergent validity with the Beck Depression Inventory is supported by correlations between .74 and .78 (Mearns, 1991). The alpha was .91 in the current study.

Computer Assisted Maltreatment Inventory (CAMI)

The CAMI is a retrospective self-report of childhood abuse that is taken online (Dilillo et al., 2010). The survey measures the type (physical, psychological, neglect, and sexual), severity, and duration of the abuse. The question format varies for each section of the survey. Screening questions are provided for the sections covering sexual and physical abuse. The following is an example: "Before you were 18, did either parent or any other adult caregiver ever discipline you by hitting or slapping you?" The participants may then respond to these questions with *yes* or *no*. If participants mark *no* to the screening questions, they may move on to the next section of the survey.

These screening questions are followed by a series of 5-point scale questions regarding frequency or severity of abuse. For example, one question asks the participant to respond to the statement: "He/she kicked me" with *never happened, 1-2 times, 3-5 times, 6-10 times,* and *more than 10 times* (Dilillo et al., 2010). Questions regarding how the participant was coerced into sexual activity, including being threatened or physically forced, end the sexual abuse section. The end of the physical abuse section asks a series of questions regarding injuries that may have occurred as a result of abuse. Participants report psychological abuse or neglect incidences on a 5-point scale ranging from *strongly disagree* to *strongly agree*.

Physical and sexual abuse were scored according to six indices of severity. For sexual abuse, the six severity indicators included relationship to perpetrator, frequency of abuse, nature of acts, duration of abuse, force or manipulation used by perpetrator, and number of perpetrators. Physical abuse included the following severity indicators: relationship to perpetrator, frequency of abuse, nature of acts, duration of abuse, level of injury or medical

attention required, and number of perpetrators. Severity indicators ranged from 1-3, with 3 signifying more severe abuse. For sexual abuse, the force or manipulation severity indicator ranged from 0 to 3 to allow for the possibility that no force was used by the perpetrator. Sexual abuse scores could range from 5 to 18, and physical abuse scores could range from 6 to 18. For these two sections, only the most severe response was used. For neglect and psychological abuse, the subscale totals were calculated by adding together the Likert-type responses. Neglect scores could range from 0 to 80, and psychological abuse scores could range from 0 to 96. To get the total child abuse score, the four subscale totals were summed.

The questionnaire avoids the use of the word "abuse" to reduce stigmatization and minimize stereotyped responding. High levels of each type of abuse are indicated by high scores on each subscale. Psychological abuse and neglect have coefficient alphas between .88 and .91, indicating good internal consistency. Test-retest reliability coefficients of .70 were found over a two to four week period (Dilillo et al., 2010).

Demographic Questionnaire

The demographic questionnaire asked questions regarding the participant's gender, age, ethnicity, level of education, relationships status, employment status, medical diagnoses, number of children in the home, and financial satisfaction.

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Procedure

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The current study received IRB approval for the research design as well as the material used to recruit participants. I recruited participants by posting a flyer on several online support groups, primarily the online forum Reddit, inviting participants to partake in academic research. Two California State University, Fullerton (CSUF) institutions— the Osher Lifelong Learning Institute (OLLI) and the Fibromyalgia & Chronic Pain Center

(FCPC)— also distributed the flyer via their online list serves to their members. All questionnaires were completed online through Qualtrics. The first form available to participants was a consent form that informed them of their rights. Participants took the surveys in the following order: NMR Scale, FIQR, DSI, CAMI, and finally the demographics questionnaire. On average, participants took 15-45 minutes to complete the study. Participants were not compensated for completing the surveys.

CHAPTER 3

RESULTS

Descriptive Statistics

The descriptive statistics are presented below in Table 1. NMRE scores ranged from 32 to 147 with a mean of 84.48 ($SD = 21.99$), which was lower than the mean of 107.1 in a study of patients with breast cancer (Stoner et al., 2014) and Madracki's (2011) mean of 100.97 for abuse survivors. Scores for depression ranged from 22 to 87 with a mean of 58.72 ($SD = 13.49$), which was higher than the mean of 45.98 reported by Madracki (2011). Scores on the FIQR ranged from 3 to 87 with a mean of 44.75 ($SD = 21.54$), which is lower than the mean of 59.7 among chronically ill participants (Bennett, et al., 2009). Sexual abuse scores ranged from 0 to 18 with a mean of 7.43 ($SD = 6.61$), which is slightly lower than the reported mean of 10.31 (Dilillo et al., 2010). Physical abuse scores ranged from 0 to 18 with a mean of 11.29 ($SD = 5.19$), which is slightly lower than the mean of 12.15 among undergraduate college students. Psychological abuse ranged from 0 to 74 with a mean of 42.94 ($SD = 13.91$), which is higher than the mean of 37.85 among undergraduate college students. Finally, scores on neglect ranged from 0 to 68 and had a mean of 42.79 among college students ($SD = 8.97$), which was higher than the reported mean of 27.52 among college students (Dilillo et al., 2010). Madracki's (2011) means for these abuse scales were 7.67, 24.89, 34.98, and 52.52, respectively.

Table 2

Descriptive Statistics for Scale Totals

	NMRE	Depression	FM	Sexual	Physical	Psychological	Neglect	CAMI
Mean	84.48	58.72	44.75	7.41	11.29	42.94	42.79	105.99
SD	21.99	13.49	21.54	6.61	5.19	13.91	8.97	19.60
Range	32-147	22-87	3-87	0-18	0-18	0-74	0-68	56-166

Note. NMRE = Negative Mood Regulation Expectancies, FM= Revised Fibromyalgia Impact Questionnaire, CAMI = Computer Assisted Maltreatment Inventory total.

Correlational Analyses

To test Hypotheses 1 and 2, I calculated correlations among the NMR Scale, DSI, FIQR, and the subscales of the CAMI. Table 2 displays the intercorrelations. Hypothesis 1 was partially supported. There was no significant correlation between child abuse and NMRE scores. Higher total child abuse scores were associated with higher depression. In addition, psychological abuse, $r(168) = .19$, $p < .01$ and sexual abuse, $r(167) = .17$, $p = .03$ had significant correlations with depressions. Neglect was the only type of abuse that had a significant correlation with FM symptoms, $r(85) = .22$, $p = .04$.

Hypothesis 2 was partially supported, because higher NMRE were associated with lower depression, $r(166) = -.50$, $p < .01$; however, NRME were not correlated with FM symptoms. Because of the mean age difference between the two participant groups, I reran the correlations, partialling out age. I determined that there were no differences associated with age. I also reran the correlations by group, having an FM diagnosis or not having an FM diagnosis, and found no substantial differences in correlations by group membership.

Table 3

Intercorrelations of Scales

	NMRE	Depression	FM	Sexual	Physical	Psychological	Neglect
NMRE	1.00						
Depression	-.50**	1.00					
FM	.06	.48**	1.00				
Sexual	-.02	.17*	.08	1.00			
Physical	-.04	.08	.06	.26**	1.00		
Psychological	-.14	.19*	.02	.19*	.46**	1.00	
Neglect	-.05	.12	.22*	-.02	.04	.23**	1.00
CAMI	-.15	.24**	.09	.52**	.66**	.82**	.33**

Note. The correlations were completed with a pairwise deletion, resulting in unequal n's ranging from 86 to 170. NMRE = Negative Mood Regulation Expectancies, FM= Revised Fibromyalgia Impact Questionnaire, CAMI = Computer Assisted Maltreatment Inventory Total.
*$p < .05$. **$p < .01$.

Multivariate Analysis of Variance (MANOVA)

For Hypothesis 3, a one-way MANOVA tested the effect of group membership (FM vs. childhood abuse) on FM symptoms and depression. I tested this model: Group (FM or child abuse) = depression & FM symptoms.

The one-way MANOVA produced a significant multivariate main effect for diagnosis, Wilks' $\lambda = .74$, $F (2, 83) = 14.91$, $p <. 001$. But Hypothesis 3 was only partially supported. There was a significant univariate main effect of diagnosis on FM symptoms, $F (1, 84) = 12.64$, $p = .05$, but not depression $F (1, 84) = 1.93$. The mean FM symptoms score was 59.08 (SD= 16.29) for those with an FM diagnosis and 40.48 (SD= 21.15) for those without an FM diagnosis. I also ran a one-way MANOVA to test the effect of group membership on CAMI subscales. I tested this model: Group (FM or child abuse) = sexual abuse, physical abuse, psychological abuse, and neglect. The one-way MANOVA produced a significant multivariate main effect for diagnosis, Wilks' $\lambda = .94$, $F(4, 162) = 2.55$, $p =. 04$.

There was a significant univariate main effect of diagnosis on psychological abuse, $F(1, 165)$ = 10.22, $p < .01$, but not any other type of abuse. The mean psychological abuse score was 37.74 for those with an FM diagnosis and 45.30 for those without an FM diagnosis.

I could not test Hypothesis 4. Because there was no correlation between child abuse and NMRE, it was not possible for NMRE to mediate the relationships between childhood abuse and depressive or FM symptoms.

Missing Data

If a participant was missing less than 10 percent of the items for a measure, I prorated for missing data by substituting the mean SD for items on the scale. If participants were missing more than 10 percent of the items for a measure, their scores were dropped.

CHAPTER 4

DISCUSSION

The current study sought to investigate how having experienced abuse as a child affects physical and mental health in adulthood. I was specifically interested in investigating individuals with FM because of the high prevalence of child abuse within this population (Schweinhardt et al., 2010). I found a difference in psychological abuse by diagnosis: individuals without an FM diagnosis experienced more psychological abuse than those with an FM diagnosis. However, the amount of physical abuse, sexual abuse, and neglect did not differ between the groups. In addition, total child abuse was not related to greater FM symptoms; however, there was a significant correlation between neglect and FM symptoms.

I was surprised that more child abuse was not related to worse health symptoms, because research overwhelmingly shows that worsened health is one of the myriad of effects of child abuse (Lee, 2010; Smith et al., 2010; Teicher et al., 2003). It is unclear why my study's results did not match previous research. A recent study found that FM patients who experienced neglect reported more pain (Yeung, Davis, & Ciaramitaro, 2015). Neglect, more than other forms of abuse, was responsible for changes in cortisol production, which leads to greater pain reports in people with FM. Thus, my results are consistent with Yeung et al.'s. Further exploring how neglect may have a unique impact on pain symptoms in the FM population will be an important area of future research.

Since there is a high comorbidity of FM and depression, and stronger NMRE can improve health and depression symptoms, I felt it would be important to determine whether NMRE were related to symptoms of FM. If so, NMRE could be a potential target in the treatment of FM. I found, however, that NMRE were not related to lower FM symptoms. This finding was also surprising. I expected that individuals both with FM and without FM would report higher symptoms if they had lower NMRE, because past research indicated that NMRE is negatively correlated with health symptoms. My results are contrary to Carpenter et al. (2012), who found that participants with chronic lower back pain, who had improved, felt more able to control their back pain, although there was no significant change in actual pain. There is little research studying NMRE in chronically ill populations, so it will be important for more research to be done in this area to see how exactly NMRE and health symptoms are related. In addition, future research could include general health symptoms and FM symptoms to better understand how NMRE affect general health in comparison to this specific chronic condition.

The current results suggested that higher NMRE are related to lower depression. Past studies have had similar findings in varying population (Backenstrass et al., 2006; Cloitre et al., 2004; Madracki, 2011; Mearns, 1991). A study specifically examining the link between child abuse, NMRE, and psychological well-being found that, for those who have experienced child abuse, having higher NMRE was related to lower depression and fewer self-injurious behaviors (Tresno et al., 2013). Higher NMRE acted as a buffer to childhood maltreatment. NMRE seem to be a factor that increases resilience after one has experienced trauma. Many individuals who have experienced trauma tend to engage in maladaptive coping strategies (Hager & Runtz, 2012; Springer, 2009; Van Houdenhove & Egle, 2004).

Having higher NMRE may not only increase the likelihood of using more adaptive coping mechanisms, but also simply believing that one can alleviate distress related to abuse will in itself alleviate the negative mood.

I hoped to better understand how childhood trauma, NMRE, depression, and FM symptoms were related. Although my predictions were not all supported, I did learn that NMRE may relate to reduced depression in individuals with an FM diagnosis. Further studying the relationships between child abuse, NMRE, and FM symptoms will be an important area of study to better understand how to help individuals with FM improve depression symptoms and gain control over health symptoms.

Limitations

The current study had several limitations. First, the sample size was relatively small. With only 164 total participants, 34 of whom reported an FM diagnosis, the participants are likely not representative of the population of individuals endorsing a history of child abuse or an FM diagnosis. Second, because the participants were only studied at one time point, this cross-sectional study was unable to support any conclusions regarding causation among the variables. Although child abuse and depression were significantly correlated, I could not conclude that child abuse causes depression. A third limitation of this study is the prevalence of incomplete responses, in particular for the FIQR survey. The results may not be representative of true FM symptoms, since many participants did not completely fill out this survey. It would be helpful to know if there was a technical difficulty or if participants purposely did not answer certain questions. Finally, there are some concerns regarding social desirability in responses, because all of the surveys were self-reported measures. Perhaps

respondents endorsed different levels of child abuse, depression, health symptoms, and mood regulation because they wanted to appear "healthier" or "worse" to aid the researcher.

In the future, researchers should require complete responses before participants move on to the next survey to limit missing data. Researchers could recruit FM participants on a national scale to better represent the population. It would be beneficial to include behavioral, medical, or peer reports to corroborate the self-reported measures. An interesting study might not only measure NMRE in FM patients, but also provide a treatment condition targeting improving NMRE. It would be interesting in this longitudinal study to see how both NMRE and FM symptoms change with the course of treatment.

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