CHRONIC PAIN, ANGER, AMBIVALENCE OVER EMOTIONAL EXPRESSION & INTRUSIVE THOUGHTS

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ABSTRACT

There is growing research interest in studying the role of ambivalence over emotional expression (AEE) and anger in adjustment to symptoms of chronic pain. The present research involved studying the mediating effect of AEE between anger and chronic pain in a target sample of patients with FM, and the interaction between intrusive thoughts and AEE in predicting pain. Participants completed standardized measures of AEE, pain, and anger. The variables age, duration of FM, depression, and pain disability were controlled for their effects on the outcome variable of pain magnitude. The present thesis had statistical analyses based on 21 female participants with FM with a mean age of 52.62 with an average of 12.77 years of diagnosis with FM. Correlation analyses showed that there were significantly positive correlations between: anger and pain, AEE and anger, AEE and pain. However, there was no significant correlation between intrusive thoughts and pain or intrusive thoughts and AEE. Baron and Kenny's model of mediational analysis (1986) and Olkin and Finn's test of mediation (1986) were used to test the relationship between AEE, anger, and pain. Olkin and Finn's test of mediation revealed that AEE mediated the relationship anger and pain. However, there was no significant interaction between intrusive thoughts and AEE in predicting pain. Another finding suggests that with the present data, AEE and depression were significant predictors in determining pain. The objective of the present research was to suggest anger management as an adjunctive treatment to help patients manage symptoms of FM.

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CHAPTER 1

INTRODUCTION

Background

The International Association for the Study of Pain (2000) defines pain as "an unpleasant sensory and emotional experience that is associated with actual or potential tissue damage or described in such terms" (p. 22). There are several aspects that define pain and its effects. These include pain severity, pain chronicity and pain experience. Pain severity involves pain-related interference with activities (disability) and pain-intensity. Pain-intensity and pain-disability measures have been shown to be highly inter-correlated (Bergstrom, Jensen, & Bodin, 1998). This shows that these concepts can be used as a unitary construct of pain-severity (Kerns, Turk, & Rudy, 1985). Disability is a major indicator of the pain severity condition and several tools have been developed to assess pain-related disability. Some of the frequently used tools for assessing pain-disability are the Pain Disability Index (Pollard, 1984), and the Roland and Morris Disability Questionnaire (Haefeli & Elfering, 2006). These tools assess the degree to which one perceives being disabled by pain in different areas of daily living like home, social, occupational, and self-care.

Pain experience also includes pain intensity and pain affect. Pain experience is subjective due it's intensity and affect. Pain intensity describes how much pain a patient is in; whereas pain affect describes the degree of emotional arousal or changes in action

readiness (ease with which an action is initiated) caused by the sensory experience of the pain (Korff, Jensen, & Spine, 2000). Pain experience has been shown to change within a time-period, for example, over a span of three months. Some studies have mentioned that it is more valuable to ask patients to rate their 'usual' pain over a past short period of time, for example, one week (Bolton, 1999). Some of the widely used pain measures include the McGill Pain Questionnaire (Melzack, 1975) which asks patients to rate change in their 'present pain' in terms of word descriptors like continuous, rhythmic, or brief.

Pain chronicity is defined in terms of duration that includes acute or short-lived and chronic or long-lasting. Acute pain is due to tissue damage resulting from injury or surgery. It serves a useful purpose by avoiding further injury by limiting one's activity. Chronic pain, on the other hand, is not associated with tissue damage. It does not serve a useful purpose. Instead, it limits activity in a non-productive manner by reducing action-readiness (ease with which an action is initiated). There are three types of chronic pain conditions nociceptive, neuropathic, and psychogenic (Maisto, Mark, Galizio, & Connors, 2013). Nociceptive pain is believed to be caused by the ongoing activation of pain receptors in either the surface or deep tissues of the body. It is caused by damage to body tissues and usually described as a sharp, aching or throbbing pain. There are two types of nociceptive pain- somatic and visceral. The somatic pain is caused by injury to skin, muscles, bone, joint and connective tissues while visceral pain is caused by direct stimulation of afferent nerves due to tumor infiltration of the soft tissues or viscera. Another kind of pain is neuropathic pain which is caused by cancer tumor pressing on a nerve or group of nerves while psychogenic pain caused by a psychological disorder that

includes physical complications like fatigue and muscle aches. One form of nociceptive pain is fibromyalgia.

Fibromyalgia

Fibromyalgia (FM) is a chronic pain condition characterized by widespread musculoskeletal pain often accompanied by fatigue, headaches, sleep disturbance, and mood problems (Wolfe, Clauw, & Fitzcharles, 2010). The overall prevalence of FM in the general population is about 2-4% in the Americas and Europe, and affects about five million Americans with a female-to- male ratio of about 7 to 9:1 (Chen & Brown, 2015; McNally et al., 2006). The prevalence of FM is greater among first-degree relatives, suggesting that there is a genetic predisposition to this disease (Chen & Brown). People with FM are 2- 7 times more likely to have one or more of the following comorbid conditions: depression, anxiety, headache, irritable bowel syndrome, chronic fatigue, and/or rheumatoid arthritis (Weir et al., 2006). Estimates of average yearly direct medical costs per FM patient are about US$ 6000-7000 per person (Chen & Brown). FM has been associated with lower levels of health-related quality-of-life and more work productivity loss compared to individuals without a musculoskeletal pain condition (McDonald, DiBonaventura, & Ullman, 2011). Working age women with FM who reported hospitalization for occupational musculoskeletal disorders were almost ten times less likely to return to work and more than four times less likely to retain work at one year post hospitalization compared to individuals without FM (Howard et al., 2010).

With the prevalence rate and cost that FM places on society, it is important to explore interventions that might help individuals manage their symptoms. The most prescribed treatment of FM is pharmacotherapy. Medications assigned to patients with

FM include non-steroidal anti-inflammatory drug (NSAIDS) such as acetaminophen and tramadol, and anti-depressant medications such as duloxetine to relieve muscle ache and pain experienced with anxiety and depression (Maisto et al., 2013). Even with the side-effects that are typically associated with these medications (for example, hallucinations, high blood pressure, increase or decrease in body weight and seizures; Benyamin et al., 2008), little attention is paid to alternative treatments like anger management. Although a great amount of attention has been given to depression and anxiety in chronic pain (Rainville et al., 2005), a growing number of studies show that anger, and how it is regulated, may be particularly important in chronic pain (Lumley et al., 2010).

<p style="text-align:center;">Anger and Pain</p>

Research suggests that the manner in which anger is regulated, inhibited, or expressed is a reliable determinant of chronic pain severity (Burnset al., 2008). Anger is known to amplify pain to a greater degree than anxiety and depression (Burns, 2006). A growing literature has shown that constructive anger expression may be helpful to those with chronic pain (Graham, Lobel, Glass, & Lokshima, 2008). However, there are cultural norms associated with expressions of emotions. There is a norm of suppressing negative emotions (e.g., anger) and concealing private thoughts to maintain harmony with others (Chen & Chung, 1994).

Pennebaker (1985) had proposed that a lack of emotional expression combined with the desire to express will lead to obsessive thoughts related to inhibited feelings. This has been further explained by the cognitive mechanism of intrusive thoughts (Lu et al., 2015). If an individual talks about a stressful event and the relevant emotions associated with it, this provides an opportunity to re-evaluate the stressors, and modify

the preexisting schemas by either assimilating (changing the meaning of the stressful event to make it consistent with the preexisting schemas) or accommodating (modifying the schemas to adjust them to the appraised meaning of the stressful event). This new conceptualization thus helps the individual to restore feelings of security by resolving intrusive thoughts related to the stressful event. On the other hand, being ambivalent about expressing emotions regarding the stressful event, a person does not become aware of the source of one's distress, which then impedes the cognitive process of assimilation (e.g., pain is due to feelings of anger toward spouse/health care provider) or accommodation (e.g., pain is due to anger therefore I need to communicate to my spouse or health care provider about lack of services), which prevents the individual from resolving intrusive thoughts related to the stressful events. Emmons and King (1990) were the first researchers to define and measure "ambivalence over emotional expression" as suppressing of emotions or expressing the emotions and later regretting such an expression.

Chronic pain patients direct their angry feelings toward certain targets more often than others (Okifuji et al., 1999). The majority of patients with chronic low back pain reported that they felt angry with themselves and their health care providers (Okifuji et al.). This interferes with their pain management efforts by disrupting their relationships with health-care providers (Greenwood, Thurston, & Keefe, 2003). Likewise, their relationship with significant others also gets affected. Anger in chronic pain is associated with less social support and increased interpersonal conflict (Fitzgerald et al., 2003). This is because persistent pain interferes with activities that define one's role-identity related to spouse, parent, and worker. This leads to discrepancy between one's ideal and real self,

leading to frustration, and feelings of low self-efficacy (Trost et al., 2012). Goal frustration, external attribution for negative outcomes (i.e., blame), and perceived injustice (defined as an appraisal of pain-severity, and irreparability of pain-related loss, blame, and unfairness) are some of the sources or cognitive dimensions of anger in chronic pain conditions (Trost, Vangronsveld, Linton, Quartana, & Sullivan, 2012). These further explain the deleterious effects of anger on social, clinical, and functional outcomes for individuals with chronic pain (Greenwood et al.).

According to the frustration-aggression models, anger arises when personally significant goals are obstructed through external factors (Berkowitz, 2010). Goal frustration in chronic pain is seen as failure to achieve complete pain relief. For individuals with chronic pain, anger emerges from frustration due to pain interference with activities of a role that is important to an individual as a parent, spouse, or worker. This frustration is because individuals feel that achieving one's valued goals or performing duties and responsibilities related to one's role is contingent on pain relief. This is often accompanied by emotional distress and depression among chronic pain patients due to the absence of pain relief (Morley et al., 2005). Also, efforts at complete pain relief are likely to be associated with repeated failures (Trost et al., 2012). Thus, people with chronic pain may become trapped in a cycle of "misdirected problem solving" characterized by continued perseverance for pain relief and frustration due to absence of pain relief (Carver & Scheier, 1998). This influences the individual's attribution of success and failure of outcomes related to significant events.

Attribution theory suggests that individuals are motivated to understand the cause of events in their day-to-day lives (Pennebaker, 1997). Anger emerges when self-relevant

negative outcomes are attributed to external rather than internal factors (Neumann, 2000). Thus, for individuals with chronic pain, anger emerges from degree of blame that individuals with pain attribute to negative events in their lives (McParland, 2008). This externalization of blame leads the individual to experience lack of behavioral control over negative outcomes, leading to feelings of distress and helplessness (Winkel & Denkers, 1994). This also leads the individual with chronic pain to develop a sense of lack of effort or diffusion of responsibility for one's own treatment progress to others such as treatment provider, insurance carrier, or spouse, thus decreasing active participation in one's own treatment efforts (Eccleston et al., 1997). Anger and blame together lead the individuals to question "why me" or "whose fault is it?" which is termed as perceived injustice defined as blame, magnitude of loss, and irreparability of loss (Sullivan et al., 2008)

As noted earlier, perceived injustice in a chronic pain context has been defined as an appraisal of severity and irreparability of pain-related loss, blame, and unfairness. Chronic pain patients often perceive themselves as victims of injustice. Higher perceived injustice has been associated with a lack of adherence to treatment, less improvement on measures of physical function, and lower probability of work return (Sullivan et al., 2008). Research indicates that anger is the pre-dominant emotional response to perceived injustice (Miller, 2001). Research evidence also shows that perceived injustice, state anger, and anger inhibition are significantly positively correlated with pain intensity (Scott et al., 2013).

Thus, the themes of cognitive dimensions of anger that include blame and goal frustration and perceptions of injustice impede one's engagement in treatment, and disrupt therapeutic relations with treatment providers and others in one's social

environment (Trost et al., 2012). These themes also lead to feelings of entitlement or belief that one deserves to be given certain privileges, and among chronic pain individuals may lead to hostile interactions with spouses and other family members (Cano et al., 2009). Ruminating over injustice, blame, and goal frustration may lead the individual to make efforts in achieving temporary pain relief. This often leads to distress and helplessness due to failed efforts to achieve pain-relief (Eccleston, Williams, & Rogers, 1997). Therefore, targeting anger in treatment interventions may reduce the impact of these themes on pain severity.

Two anger regulation strategies, anger expression (anger-out), and anger inhibition (anger-in), have been shown to be influenced by physiological arousal and pain. The positive relationship between anger-out and pain severity can be explained by the opioid dysfunction hypothesis. According to the opioid dysfunction hypothesis, impaired endogenous opioid functioning in anterior cingulate cortex (brain region for affective pain processing) simultaneously leads to elevated pain sensitivity and reduced ability to modulate anger when it is experienced, leading to more overt expression of anger (Bruehl, Chung, & Burns, 2006). Thus, the positive relationship between the trait anger-out and pain sensitivity are proposed to be mediated by impairments in opioid inhibitory systems modulating both pain and emotional regulation (Bruehl et al.). Anger inhibition represents the suppression or non-expression of anger (Spielberger et al., 1995). This is common among individuals with FM, and has been associated with more intense pain than expressed anger (Quartana & Burns, 2007; Sayar et al., 2004). The relationship between suppression of anger and pain has been explained by an unconscious monitoring process, which is defined as a process of searching mental content related to

failure to suppress unwanted thoughts. This process suggests that the suppression of anger may temporarily reduce anger-related feelings and behavior accessible to conscious awareness; however, in the long run it may actually increase the cognitive accessibility of anger as the monitoring process works to find more instances of failure to avoid anger-related content. This leads to awareness of failed efforts in achieving temporary pain relief, resulting in appraisals of pain with heightened feelings of irritation and annoyance (Burns et al., 2011).

Anger management that includes constructive anger expression has been shown to promote improvement in perceived control over pain and depressed mood (Graham et al., 2008). The constructive anger expression involves goal-directed expression of anger that includes communicating how one feels or changing the situations that precipitate one's anger. One of the ways of constructive anger expression is written emotional disclosure (Pennebaker, 1997). The writing paradigm demonstrates that when individuals are given the opportunity to disclose deeply personal aspects of their lives, they readily do so. Writing or talking about emotional experiences relative to writing about superficial control topics has been found to have beneficial influences on immune functioning (Pennebaker, 1997).The factor that is involved in the therapeutic effects of written emotional disclosure is meaning-making, defined as an understanding about and insight into the causes and implications of anger-provoking situations. In the context of chronic pain, meaning-making involves the degree to which an individual has insight and understanding related to pain and anger (Graham et al., 2008). Thus, the written emotional disclosure helps individuals with chronic pain express their angry feelings in a

goal-directed manner which has resulted in greater improvement from baseline in pain severity, perceived control over pain, and depressed mood (Graham et al.).

<u>Ambivalence over Emotional Expression, Intrusive Thoughts and Anger</u>

As noted earlier, it is not only the lack of emotional expression that is problematic but it is the combination of lack of emotional expression and desire to express emotion, which is an unhealthy combination (Peenebaker, 2012). Pennebaker (1997) coined the term "active inhibition" to refer to the process of willfully preventing oneself from a desired action. This in turn leads to obsessive thoughts about the inhibited action. According to Pennebaker, active inhibition leads to chronic autonomic arousal which is associated with development of psychosomatic diseases. Pennebaker's focus on an individual's desire to express emotion is an important goal in determining the potentially negative quality of certain styles of emotional regulation. Emmons and King (1990) concluded that when these goals are in conflict with social norms or an individual fears the consequences of an emotional expression, they may experience the detrimental effects of psychosomatic reaction, whether they are expressive or inexpressive. Hence, Emmons and King (1990) came up with the term 'ambivalence over emotional expression' or AEE to study ambivalence as a mediator between emotional styles and psychological and physical well-being.

Carson and colleagues (2007) studied the role of AEE in adjustment to chronic low back pain. AEE has been defined as the tendency to be conflicted about expressing one's emotions, potentially including both negative emotions (e.g., anger) and positive emotions (e.g., affection). They proposed that individuals who score high on AEE measures may have difficulty with expressing emotions when they want to or refrain

from emotional expression when they want to, or express emotions but later regret it (Carson et al., 2007). Individuals with chronic pain often face challenges that may elicit anger that make them ambivalent about expressing themselves. For example, patients who are unable to get an adequate explanation for the cause of their pain may feel angry and frustrated but reluctant to express these feelings due to fear of negative consequences, for example abandonment by treatment providers.

AEE represents an emotional conflict that affects the experience of pain. Porter et al. (2005) proposed that AEE is a trait that may predispose patients to respond to symptoms in certain ways. They added that because of confusion over their emotions and conflict over whether to express them, patients high in AEE may focus instead on physical symptoms, which are easier to interpret and express. This focus on physical symptoms could lead to increased catastrophizing which is defined as the tendency to focus on and exaggerate the threat value of painful stimuli and negatively evaluate one's own ability to deal with pain (Keefe et al., 2003). Catastrophizing has been consistently linked with higher levels of pain and disability in patients with a variety of painful conditions, including GI cancer (Keefe et al., 2004). The role of intrusive thoughts has also been studied as a mediator between AEE and depression among patients with breast cancer (Lu et al., 2015).

Intrusive thoughts are defined as repetitive and unwanted thoughts about stressful events (Horowitz, 1975). These thoughts arise when information about stressful events cannot fully be assimilated or accommodated into an individual's preexisting schemas. Intrusive thoughts subside when an individual talks about stressful feelings; this gives them an opportunity to re-evaluate the stressors, and hopefully facilitates assimilation or

accommodation of the stress-related information. However, AEE leads to the maintenance of intrusive thoughts that in turn leads to depression, distress, and lack of control over pain (Quartana et al., 2005). Therefore, emotional expression provides the opportunity to process the event and the emotions associated with it, which reduces the detrimental effects of intrusive thoughts (Lu et al., 2015).

Carson et al (2007) proposed that psychological distress (either suppressing anger or regret after expressing it) could increase pain. Chronic pain patients are often faced with challenges that may elicit anger that they feel ambivalent about expressing due to fear of the consequences of such an expression. They also reported that chronic pain patients high in AEE reported higher levels of pain, and patients high in AEE report higher levels of anger. Therefore, their study concluded that there is a relation between AEE, and pain and anger in patients with chronic low back pain. Patients who reported greater conflict with regard to expressing emotions experienced higher pain and anger.

Current Study

The current study was a conceptual replication of the Carson et al. (2007) study and an expansion of the investigation of the relationship between pain, anger, AEE and intrusive thoughts in persons with FM. Hence, it was hypothesized that participants who report more anger will also report more pain, and that this positive relationship between pain and anger is due to mediating effects of AEE. It was also hypothesized that there would be an interaction between AEE and intrusive thoughts in predicting pain.

Participants completed measures related to conflict over emotional expression, anger expression, intensity of pain, and intrusive thoughts related to pain. These included Ambivalence over Emotional Expression (AEE) (King & Emmons, 1990), State-Trait

Anger Expression Inventory-I (STAXI-I) (Spielberger, 1988), McGill Pain Questionnaire (MPQ) (Melzack, 1975), and Intrusive Thoughts subscale of Impact of Event Scale-Revised (IES-R) (Horowitz, 2013). The measures on AEE, STAXI-I, and MPQ were used in the research design by Carson et al (2007). The intrusive thoughts subscale of IES-R has been used by Lu and colleagues (2015) to assess the current degree of impact experienced in response to a specific stressful event, which is chronic pain in the current study.

The AEE questionnaire (AEEQ) assesses aspects of cognitive ambivalence or conflicts pertaining to emotional expression. Pain was assessed using the McGill Pain Questionnaire (MPQ) (Melzack, 1975). The State-Trait Anger Expression Inventory-I (STAXI-I) is a self-report measure to assess an individual's anger (Spielberger, 1988). Intrusive thoughts were assessed using an 8-item intrusion subscale of the Impact of Event scale-Revised (IES-R) (Horowitz, 2013).

<u>Hypotheses</u>

1. Anger and pain would be positively associated.

2. AEE would be positively associated with anger.

3. AEE would be positively associated with pain.

4. AEE would mediate the relationship between anger and pain.

5. There would be a significant interaction between AEE and intrusive thoughts in predicting pain.

CHAPTER 2

METHOD

Participants were recruited from the Fibromyalgia and Chronic Pain Center, California State University, Fullerton. The present data is based on the responses from 21 female participants with FM who were contacted via email to request their participation in the current study. The current study received a research grant of $300 from the Associated Students Inc, CSUF which was used to provide a Starbucks gift card of $5 to the participants upon completion of the questionnaires. The participants completed informed consent prior to questionnaires. Individuals were included if they were capable of completing the study measures in English, and had physician's diagnosis of FM. The present research is based on responses from 21 participants.

<u>Measures</u>

<u>Demographic Information</u>

Demographic variables included questions on participants' age, ethnicity, duration of having been diagnosed with FM, current treatment that participants are taking to manage their symptoms, and whether they have clinical diagnosis of depression, anxiety or any other psychological problems. As can be seen from Table 1, 28.6% were Hispanic, 57% were White, while Asian, African-American and others constituted 4.8% each. The mean age was 52.61 (range = 19 to 76 years). Sixty-seven percent of participants said they are taking two or more treatments that included pain medicine, acupuncture,

counseling, and/or herbal remedies to help manage symptoms of FM while 14.3% of participants said they were taking pain medicines only. Eighty-one percent of the participants reported clinical diagnosis of depression, anxiety or other psychological problems. The average duration of diagnosis of FM was 12.8 years.

Ambivalence over Emotional Expression Questionnaire (AEEQ)

The AEE questionnaire (AEEQ) is a 28-item questionnaire that assesses aspects of cognitive ambivalence or conflicts pertaining to emotional expression on a five-point Likert type ranging from 1 indicating that respondents never feel what the statements suggest, and 5 indicates that the respondents frequently feel that way. The items verbalize the desire to show a certain emotion like "I strive to keep a smile on my face in order to convince others I am happier than I really am." They also verbalize doubts regarding one's own ability to express emotions (e.g., "Often, I find that I am not able to tell others how much they really mean"), and the fear of negative consequences resulting from the expression of the emotion (e.g., "I worry that if I express negative emotions such as fear and anger, other people will not approve of me").

Items on the AEEQ are separated into two categories, *positive* and *entitlement*. Sixteen items represent *positive*. Items loaded on this factor measure love and affection, as well as fear of expression of emotions that might lead to vulnerability. For example, "I try to show people I love them although at times I am afraid that it may make me appear weak." This factor is termed as 'ambivalence over the expression of positive emotions' (King & Emmons, 1990, p. 866).

Twelve items are categorized into the second factor which measures 'ambivalence over expression of emotions of entitlement' (King & Emmons, 1990, p. 866). This

primarily includes items that reflect ambivalence towards expressing negative emotions. For example, "After I express anger at someone it bothers me for a long time." These items pertain not only to anger but to feelings of pride and jealousy, hence the term '*entitlement*' was used to encompass all of these emotions. The alpha reliability coefficient of the AEEQ was .89, and the test-retest correlation was .78 (King & Emmons, 1990). As a test for convergent validity, correlations between the scores on AEEQ and the Raulin Intense Ambivalence scale (to assess intense ambivalent feelings among individuals who are genetically predisposed to the development of schizophrenia) were significantly positive ($r = .35$, $p < .001$) (King & Emmons, 1999).

McGill Pain Questionnaire (MPQ)

Pain was assessed using the McGill Pain Questionnaire (MPQ) (Melzack, 1975). It is a self-report questionnaire that allows individuals to give their physician an accurate description of the longevity and intensity of pain that they experience. It consists of three major measures: a pain-rating index, the number of words chosen to describe pain, and a present pain intensity, based on a 1–5 intensity scale. The pain-rating index (PRI) is measured by a numerical grading of words describing sensory (e.g., flickering, pricking, stabbing), affective (e.g., dull, sore, sickening) and evaluative (e.g., mild, discomforting, horrible) aspects of pain. The present-pain intensity (PPI) involves the number-word combination chosen as the indicator of overall pain intensity at the time of administration of the questionnaire (e.g., mild, discomforting, distressing). Research has demonstrated test-retest reliability of 0.96 (literate) and 0.95 (illiterate) (Fisher et al., 2009), and it has been shown as a valid measure for the assessment of pain in people with chronic nonmalignant pain (Melzack et al., 2014).

State-Trait Anger Expression-I

The State-Trait Anger Expression Inventory-I (STAXI-I) is a self-report measure to assess an individual's anger (Spielberger, 1988). The test contains 44 items using 4-point Likert-type scales. The 10-item state anger scale measures the intensity of angry feelings that are momentary and potentially transitory at the time of the test administration. The 10-item trait anger scale assesses individual differences in angry feelings that have a more constant and dispositional nature (Azevedo et al., 2010). An anger-in scale has 6 items that measure how frequently angry feelings are suppressed or inhibited, and an anger-out scale has 11 items to measure how frequently the individual expressed anger toward other people or objects in the environment. Anger-control has 7 items that assess the frequency with which an individual attempts to control angry feelings by calming down while anger-control-out items assess attempts to control the outward expression of anger. The internal consistency using the Cronbach's alpha coefficient was 0.84 (Azevedo et al., 2010). The STAXI is significantly correlated with the Clinical Anger Scale (measures angry feelings toward self, others and future) at $r = 0.352$ ($p < 0.01$) (Snell et al., 1995). This demonstrates that STAXI-I has moderate construct validity.

Intrusive Thoughts Sub-scale of Impact of Event Scale-Revised (IES-R)

Intrusive thoughts was assessed using the eight-item intrusion sub-scale of the Impact of Event Scale-Revised (IES-R) (Horowitz, 2013). The IES-R is a 21-item self-report questionnaire that assesses the current degree of impact experienced in response to a specific stressful event, in the present proposal, it is the pain intensity due to FM that will be studied. The IES has three sub-scales- avoidance, intrusion, and hyperarousal. The

intrusion subscale assesses how distressing pain-related intrusive thoughts had been over the past one week; for example, " I thought about it when I didn't mean to." The items are rated using a 5-point frequency scale (0 = not at all, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). Horowitz and colleagues (2013) reported split-half reliability for the total scale to be .86, Cronbach's alpha for the intrusion subscale to be .78, and the test-retest reliability (1 week) for the intrusion subscale to be .89. The internal consistency reliability for the intrusion subscale was also reported to range from .86 to .89 (Lu et al., 2015).

Pain Disability Index (PDI)

The Pain Disability Index (PDI) (Pollard, 1984) was used to account for the influencing effects of pain disability in the resulting model which is the mediating effects of AEE in the relationship between anger and pain. PDI assesses the degree to which one perceives themselves to be disabled by pain in 7 different areas of daily living: home, social, recreational, occupational, sexual, self-care, and life support. PDI has high internal consistency of r = .86 (Tait, Chibnall & Krause, 1990).

Center for Epidemiologic Studies-Depression (CES-D)

The eight-item Center for Epidemiologic Studies-Depression (CES-D). It is a self-report screening test for depression. It includes items that ask about the participant's feelings of depression over the past one week, for example, "how often you felt depressed, over the past week" (Karim, Weisz, Bibi & Rehman, 2015, p. 34). The eight-item CES-D was found to correlate .93 with the full 20-item CES-D. High construct validity has been reported (r =.54) with Beck's Depression Inventory (Beck, 1997; Melchoir, Huba, Brown & Reback, 1993).

<u>Statistical Analysis</u>

Pearson correlation was computed to test the hypotheses: AEE (IV) would be positively associated with anger (DV); AEE (IV) would be positively associated with pain (DV), and anger (IV) would be positively associated with pain (DV); Pearson correlation was conducted to assess the relationship between Intrusive thoughts (IV), AEE and Pain (DVs), and covariates- scores on PDI and CES-D (IVs), and pain (DV). If the Pearson correlations between these variables were significant, then mediational analysis would be conducted to see whether AEE mediates the relation between anger and pain.

Hierarchical multiple regression analyses were conducted to test for mediation. According to the Baron and Kenny model of mediational analysis (1986) the following conditions are necessary to test for mediation: the predictor variable (IV i.e., anger) must be significantly correlated with criterion variable (DV i.e., pain) (Step 1); the predictor variable (IV i.e., anger) must be significantly correlated with criterion (DV i.e., AEE) (Step 2); the predictor variable (IV i.e., AEE) must be significantly correlated with criterion variable (DV i.e., pain) adjusting the scores on anger (Step 3). The mediator must be significantly correlated with criterion variable (DV which is pain); and the presence of the mediator reduces the effect of the IV (anger) on the DV (pain) to zero (complete mediation) (Step 4). Hierarchical multiple regression was performed to test the interaction between AEE and intrusive thoughts in predicting pain. In each of these steps, another model would be added in the regression analyses to account for the influencing effects of the covariates which were participants' age, duration of FM diagnosis, the scores on PDI and CES-D.

CHAPTER 3

RESULTS

The hypotheses were assessed using the statistical tests of Pearson correlation, multiple regression, and mediation analyses.

Pearson Product-Moment Correlation

Pearson's r assesses the degree of linear relationship between two variables. It ranges from -1.0 for a perfect negative correlation to 0 when there is no linear relationship between the variables to +1.0 when the correlation is perfectly positive. For the present analysis, scatterplots between the variables have been included to provide a graphical representation of the direction and magnitude of the correlation between the variables. A scatterplot of perfect correlation will be a straight line that slopes up to the right for positive correlation and down to the right for negative correlation.

Pearson product-moment correlations were conducted to determine the relationship between anger and pain, AEE and anger, and AEE and pain. Table 4 shows that there was a significant and strong positive correlation between pain and anger, $r(19) = .79, p < .001$. This confirms hypothesis 1 that anger and pain are positively associated. There was a significant and strong positive correlation between AEE and pain, $r(18) = .63, p = .003$. This confirms hypothesis 2 that AEE and pain were positively associated. Also, there was a significant and strong positive correlation between AEE and anger, $r(18) = .78, p < .001$. This confirms hypothesis 3 that AEE and anger would be

positively associated. The linear relationship between pain and anger, AEE and pain, and AEE and anger can also be observed in Figures 1 to 3, respectively. To test the mediating effects of AEE between anger and pain, Baron and Kenny model of mediational analysis (1986) was used.

<div align="center">Mediational Analysis</div>

The procedure for deciding whether a particular variable serves as a mediator is frequently viewed as a three-step process as outlined by Baron and Kenny (1986). The first step in determining whether AEE mediates the relationship between anger and pain is to test whether the anger/pain slope differs significantly from zero, that is, we need to know if a real relationship exists between the IV and DV (path c). According to Baron and Kenny (1986), the significance of the IV/DV relationship tells us that it is reasonable to check for a mediator of that relationship. Having found significance in Step 1, then we proceed to Step 2. In Step 2, we check for a significant relationship between the IV and mediator. The logic being that a variable cannot mediate the effect of the IV if it has no relationship with the IV. In step 2, we are testing the path labeled "a". The next step is assessing step 3 where we assess whether the mediator adds explained variance in the DV on top of what the IV explains. This can be measured by the square of the semi-partial correlation for mediator in a multiple regression predicting the DV from both mediator and IV; the partial slope of mediator will give us the value b'. On his website, Kenny added an explicit fourth step to mediational analysis to determine whether a significant mediator completely (no direct effect of the IV on the DV), or only partially mediates (there was the significant relationship only in the first three steps) the IV/DV relationship.

This gives us *c'*. We want *c'* to be non-significant because there should be no relationship between IV and DV when the mediator is removed from the equation.

Baron and Kenny model of mediational analysis (1986) was used to test hypothesis 4 that AEE mediates the relationship between anger and pain. For this purpose, hierarchical multiple regression was conducted to analyze pain from anger, accounting for the scores on AEE. As can be seen from Table 3, accounting for the scores on AEE, anger significantly predicted higher pain, $\Delta R^2 = .15$, $F(1, 17) = 5.5$, $p = .032$. Hence, this does not confirm hypothesis 4 which states that AEE mediates the relationship between anger and pain. However, while interpreting this result, it is important to keep in mind that Baron and Kenny (1986) procedures do not provide a full set of necessary conditions for strong inference of a causal effect of the independent variable on the dependent variable through the intervening variable (MacKinnon, et al., 2002). Moreover, with low sample size, the chances of Type-II error increases; that is, with a sample size as low as that presented in the current study, the chances of missing the effects of AEE (intervening variable) on anger and pain increases. Therefore, a more sensitive test of mediation analysis as outlined by Olkin and Finn (1995) was used to examine the intervening effects of AEE between anger and pain.

<u>Olkin and Finn Test of Mediation (1995)</u>

According to the Olkin and Finn approach (1995), the intervening effects of a mediator can be assessed with the significance test based on a standardized z difference. This is obtained through differences in coefficients between simple correlation (correlation between anger and pain) and partial correlation (correlation between anger and pain after adjusting for the effects of AEE), and then dividing it by the standard error.

This is then compared to the standard normal distribution to test for an intervening variable effect. The mediation test as outlined by Olkin and Finn (1995) was conducted through SAS to determine whether Ambivalence over Emotional Expression (AEE) mediates the relationship between anger and pain. AEE was a significant mediator ($p < .05$) for anger and pain with standardized z difference of 1.69. The result from Olkin and Finn test of mediation (1986) gives us the promising result that AEE might mediate the relationship between anger and pain.

<div align="center">Interaction Using Hierarchical Multiple Regression</div>

Hierarchical multiple regression was conducted to see whether there is a significant interaction between intrusive thoughts and AEE in predicting pain. The predictors were centered which is calculated by subtracting the mean from every score of the predictor variable. Centering is calculated to control multicollinearity between both the predictors. There could be multicollinearity issues between two variables when they are highly correlated ($>.90$ or more). This would be problematic because the predictor variables might contain redundant information and they are not all needed in the same analysis (Tabachnick & Fidell, 2014).

Hierarchical regression analysis was conducted to determine whether the interaction between AEE and intrusive thoughts predicts pain. As can be seen from Table 6, intrusive thoughts and AEE did not significantly predict pain, $R^2 = .12$, $F(2, 15) = 1.04$, $p = .38$. Moreover, the interaction between these two predictors also did not significantly predict pain, $\Delta R^2 = .010$, $F(1, 14) = .15$, $p = .70$. Hence, there was no significant interaction between intrusive thoughts and AEE in predicting pain among the present sample.

Simple regression was computed to see whether anger predicts pain. As can be seen from Table 8, anger significantly predicts pain, $R^2 = .79$, $F(1, 19) = 31.24$, $p < .001$. However, Table 7 shows that when accounting for the effects of the covariates depression, pain disability, age and duration of FM diagnosis, anger did not predict pain, $\Delta R^2 = .009$, $F(1, 11) = .32$, $p = .58$. With this result, it was necessary to see which variables would predict pain with highest variance explained. Hence, stepwise simultaneous multiple regression was conducted to predict pain from anger, AEE, intrusive thoughts, depression, pain disability, age and duration of FM diagnosis.

<div align="center">Stepwise Simultaneous Multiple Regression</div>

The reason for using stepwise simultaneous multiple regression is because if the variable with highest validity is significant, then a second variable may be added but only if it adds a statistically significant amount of explained variance to the first one (Cohen, 2013). Table 5 shows that as a model, depression and AEE significantly predicted pain $[\Delta R^2 = .13$, $F(2, 14) = 20.07$, $p < .001]$, with AEE predicting lower pain and depression predicting higher pain. However, this result seems counterintuitive as we would expect AEE predicting higher pain. Hence, this might show that depression acts as a suppressor variable.

<div align="center">Suppression Effect</div>

Depression acts as a suppression variable such that the variance in MPQ score reflects the difference in depression rather than the difference in ambivalence over emotional expression of the participants. That is, the increased magnitude of pain experienced by the participants makes them ambivalent over emotional expression due to the symptoms of depression. However, in the present sample, it is important to note that

81% of the participants had a clinical diagnosis of depression. Therefore, the influence of depression over AEE and pain cannot be disregarded when interpreting the mediating effects of AEE over anger and pain.

 Overall, the findings of the present study suggest that pain and anger, anger and AEE, and AEE and pain are significantly and strongly positively associated. With the present sample size, AEE did mediate the relationship between anger and pain with the Olkin and Finn test of mediation (1986), while the interaction between AEE and intrusive thoughts did not significantly predict pain. However, depression and AEE significantly predicted pain, with depression predicting more pain than AEE, suggesting a suppression effect of depression.

CHAPTER 4

DISCUSSION

The findings of the present study show a positive relationship between anger and pain, pain and AEE, and anger and AEE. AEE was also shown to mediate the relationship between anger and pain. This means that AEE is meaningfully related to pain and anger among patients with FM in way that interventions designed to reduce patients' ambivalence over emotional expression (e.g., psychological interventions that address emotional expression) could have both direct and indirect effects that reduce pain (Carson et al., 2007). These findings were consistent with the hypotheses. Through exploratory analysis, it was found that depression and AEE were significant predictors of pain, with depression predicting more pain and AEE showing a potential suppression effect due to depression. However, there was no significant interaction between intrusive thoughts and AEE in predicting pain. This is inconsistent with the hypothesis of the present study as it was posited that the interaction between AEE and intrusive thoughts would predict greater pain.

Research has shown that the underlying mechanism which is involved in the link between AEE and depression is intrusive thoughts (Lu et al., 2015). As mentioned before, these thoughts arise when information about a traumatic or stressful event is present (chronic pain in the present study). This prevents the new information (which is appraised meaning of the stressful event) being assimilated (taking new information to incorporate

it to existing schemes) or accommodate the new information (modifying the existing schemes according to the new information). That is, being ambivalent about expressing emotions takes away the opportunity for intrusive thoughts to become resolved (Gross, 2001). However, in the present study, the absence of a significant interaction between intrusive thoughts and AEE was found. This was inconsistent with the expectation of finding a significant interaction between intrusive thoughts and AEE in predicting pain. However, the non-significant interaction between the variables could be due to low sample size. Moreover, in the present study only one measure of intrusive thoughts was used, hence, future research might use more than one measure of the variable to better explore the potential interaction between AEE and intrusive thoughts.

The positive significant association between anger and pain found in the present study is consistent with the research findings. Anger expression has been related to pain and the way it influences individuals physiologically (Bruehl et al., 2014). People who tend to verbally or physically express anger and exhibit high pain sensitivity may be characterized by deficits in endogenous inhibitory mechanisms (Bruehl et al.). Hence, individuals with and without chronic pain conditions who are high in trait anger-expressiveness show evidence of deficient endogenous opioid function, thus, leaving them with elevated pain sensitivity (Bruehl et al., 2002). Secondly, a symptom-specific reactivity model (Flor, Turk, & Birbaumer, 1985) has been adapted for anger and chronic pain and purports that anger arousal may lead to increases in muscle tension near the site of injury and thereby increase pain (Burns, Bruehl, & Quartana, 2006).

In the present study, a composite score on STAXI-I was used, therefore it is important to consider how anger-in or anger inhibition influences an individual. That is,

the positive association between anger and pain would be incomplete without discussing the effects of anger inhibition on pain. Anger inhibition has been associated with pain and is explained by a thought-suppression model (Wegner, 1994). This model states that inhibiting anger amplifies and maintains anger, which in turn exerts delayed negative effects on responses to later events (Burns et al., 2008). Thus, inhibiting anger can worsen later pain perception because sustained thoughts of anger increase the perception of pain (Quartana & Burns, 2008). As noted earlier, it is not only the lack of emotional expression that is problematic but the combination of lack of emotional expression and desire to express emotion, which is an unhealthy combination (Peenebaker, 2012). This is important to take into consideration when understanding the positive association between anger and AEE, and the mediating effects of AEE found in the present study.

Pennebaker (1997) coined the term "active inhibition" and defined it as the process of willfully preventing oneself from a desired action. This in turn leads to obsessive thoughts about the inhibited action. According to Pennebaker, active inhibition leads to chronic autonomic arousal, which is associated with development of psychosomatic diseases. Emmons and King (1990) suggested that when the desire to commit an action is in conflict with social norms or one fears the consequences of an emotional expression, an individual may experience the detrimental effects of psychosomatic reaction, whether they are expressive or inexpressive. Hence, they gave the term 'ambivalence over emotional expression' or AEE to study ambivalence as a mediator between emotional styles and psychological and physical well-being.

Another purpose of the present study was to see whether anger predicted pain, and if anger predicted pain controlling for the effects of covariates which were the scores on

depression scale, pain disability, participants' age, and duration of FM diagnosis. As can

be seen in the results section, after controlling for covariates, anger no longer predicted

pain. Hence, it became imperative to test these predictors as a model through stepwise

simultaneous multiple regression. The results showed that depression and AEE

significantly predicted pain with depression predicting higher pain and AEE predicting

lower pain. Research literature reveals that higher levels of AEE are associated with

significantly higher levels of depressive symptoms in various populations including

college students, rheumatoid arthritis patients, and the general population (King &

Emmons, 1990; Lu, Man, You, & LeRoy, 2015). Duckro et al. (1995) examined how

anger suppression and anger expression are related to pain and depression and

investigated whether depression influenced the relationship of anger to pain in a sample

of 84 patients with chronic, post-traumatic headaches. They found that patients scoring

high on both anger expression and anger suppression experienced significantly higher

levels of pain-related disability. However, when the scores on depression were controlled

for, anger no longer significantly influenced pain. These findings suggest that the effects

of anger on pain-related disability may be mediated by depression.

<u>Implications</u>

The findings of this study are promising. In the present study, it was found that

anger and pain, and AEE and anger are significantly positively associated. AEE mediated

the relationship between anger and pain. Moreover, depression and AEE were significant

predictors of pain with depression predicting more pain and AEE predicting less pain.

The objective of the present study was to propose anger management as an adjunctive

treatment for chronic pain conditions. Anger management that includes constructive

anger expression has been shown to promote improvement in perceived control over pain and depressed mood (Graham et al., 2008). One of the ways of contributing to constructive anger expression is written emotional disclosure (Pennebaker, 1997). The factor that is involved in the therapeutic effects of written emotional disclosure is meaning-making, defined as an understanding about and insight into the causes and implications of anger-provoking situations. In the context of chronic pain, meaning-making involves the degree to which an individual has insight and understanding related to pain and anger (Graham et al., 2008).

Even though in the present study, the interaction between intrusive thoughts and AEE did not significantly predict pain, past research shows that intrusive thoughts play a role in developing or maintaining the effects of negative emotions. As mentioned earlier, intrusions may occur as a result of incomplete assimilation of trauma-related information into pre-existing schema or from incomplete accommodation of the pre-existing schema to the new information. Therefore, one way to resolve intrusive thoughts is through emotional expression that allows individuals to contemplate and evaluate the stressful events (which is chronic pain in the present study) (Pennebaker, 1992).

Lepore (1997) and Pennebaker (1989) are the pioneer researchers in proposing that emotional expression not only facilitates adjustment to stress by diminishing the frequency of intrusive thoughts (Pennebaker, 1989) but also diminishes the impact of intrusive thoughts when expressed in a safe or supportive context (Lepore, 1989). The findings from the present study suggest that individuals might benefit from expressive writing to reduce the influence of depression, anger and AEE on pain. Through experimental procedures, Pennebaker (1989) established that this self-expressive writing

should occur in a safe or supportive context. The more unique (that is, the more removed from the person's accustomed world), the more likely people will be able to express their deepest thoughts and feelings. Moreover, the participants would benefit when the writing is anonymous, then it is almost judgement-free from the participant's perspective.

<div align="center">Limitations</div>

There are several limitations to this study that should be noted. Even though the results for hypotheses 1 to 4 trended in the expected direction, the non-significant interaction between intrusive thoughts and AEE in predicting pain could be due to limited statistical power due to very small sample size. Also, in the present study, the age range of participants was 19-76 years with mean age of 52.6. Hence, the results could have cohort effects as younger participants are more likely to express what they are feeling to friends and family. Older adults' (>60 years) emotion recognition is worse than that of young adults (Sullivan, Campbell, Hutton, & Ruffman, 2015). Normal aging is known to negatively impact the recognition of some emotions, and difficulties in emotional recognition are associated with reduced social competence, inappropriate social behavior, poor interpersonal functioning, and reduced quality of life (Shimokawa et al., 2001). The results of the present study are gender-specific as the participants were females with FM, therefore, the results might not generalize to males with chronic pain conditions. Feedback given by one of the participants was an inability to understand the meaning of statements related to state anger, which suggest that the ease of comprehension of the questionnaires could be called into question.

Another important limitation is related to shortcomings in the measures used in the present study. One potential problem with the AEEQ is that the items ignore the

social context of expression (Emmons & King, 1990). This disregard of social context is important as individuals are more likely to confide in or express emotions to particular individuals in their lives (spouses, friends, therapist) than others (e.g., employer).

<div align="center">Future Research Directions</div>

A future study examining the same hypotheses with a larger sample size would be beneficial. Should the hypotheses be robust, they would have a number of potential clinical implications as anger management and interventions focusing on emotional expression could be helpful for symptoms management of chronic pain conditions. Future studies should also evaluate the effects of perceived injustice and whether resolving intrusive thoughts may have attenuating effects on perceived injustice. Research has found perceived injustice as a source of anger among patients with chronic pain conditions (Scott et al., 2013). Higher perceived injustice has been associated with a lack of adherence to treatment, less improvement on measures of physical function, and lower probability of work return (Sullivan et al., 2008). In the present study, AEE and depression were significant predictors of pain. Hence, it would be interesting to know if perceived injustice would mediate the relationship between AEE and depression.

Also, interventions designed to reduce pain catastrophizing may be beneficial for resolving intrusive thoughts through communication of pain and emotion (Porter et al., 2005). It may be beneficial to design and evaluate emotion regulation interventions specifically targeted at reducing AEE and intrusive thoughts with the goal of reducing depression (Lu et al., 2015).

APPENDIX A

TABLES

Table 1. Demographic Characteristics ($N = 21$)

Characteristics	%	M	SD
Participants' Age		52.62	18.36
Participants' Ethnicity			
Hispanic	28.6		
White	57.1		
Asian	4.8		
African American	4.8		
Other	4.8		
Duration of FM diagnosis		12.76	8.91
Current treatment for FM			
Pain Medicine	14.3		
Herbal Remedies	4.8		
Counseling	4.8		
Other	9.5		
Two or more treatments	66.7		
Clinical diagnosis of depression/anxiety			
With diagnosis	81		
Without diagnosis	19		

Table 2. Correlation of Ambivalence Over Emotional Expression to Pain and Anger Measures

	Mean (*SD*)	Correlation with AEE
Ambivalence Over Emotional Expression (AEE) (*N = 20*)	81.40 (27.97)	
McGill Pain Questionnaire (MPQ) (*N = 18*)		0.63**
Present Pain Index	8.11 (1.13)	0.17
Pain Rating Index	53.83 (11.69)	-0.13
State-Trait Anger Expression Inventory-I (STAXI) (*N = 18*)		0.78***
State Anger	11.05(9.53)	0.39
Trait Anger	16.11(7.21)	0.45
Anger Control	17.05(3.70)	-0.19
Anger Out	20.55(5.90)	0.17
Anger In	11.88(2.63)	0.57*
Intrusive Thoughts Sub-scale of Impact of Event Scale-Revised (IES-R) (*N = 18*)	12.33(6.90)	0.29
Pain Disability Index (PDI) (*N = 17*)	39.29(16.53)	0.43
Center for Epidemiologic Studies-Depression (CES-D) (*N= 17*)	12.82(3.21)	0.4

Note. *p < .05; **p < .01; ***p < .001

Table 3. Mediation Analysis Results for AEE, Anger, and Pain

	B	SE B	β
Model 1: R^2 = .39**			
AEE	0.51	0.15	.63**
Model 2: ΔR^2 = .15			
AEE	0.13	0.21	0.16
Anger	0.45	0.19	.61*

*Note. *$p < .05$, **$p < .01$.*

Table 4. Correlation of Pain to Anger and AEE

	Mean (SD)	Correlation with Pain
Ambivalence Over Emotional Expression (AEE) (N = 20)	81.40 (27.97)	.63**
STAXI-I (N = 21)	65.71 (33.26)	.79**

*Note. **$p < .01$*

Table 5. Simultaneous Multiple Regression for Predicting Pain

	B	SE B	β
Depression	3.7	0.59	0.93***
AEE	-0.33	0.1	-0.49**

*Note. **$p < .01$, ***$p < .001$*

Table 6. Moderation Analysis to Determine Interaction Between Intrusive Thoughts and AEE in Predicting Pain

	B	SE B	β
Model 1: $R^2 = .12$			
AEE	0.14	0.17	-0.21
Intrusive Thoughts	0.63	0.46	0.35
Model 2: $\Delta R^2 = .010$			
AEE	0.1	0.2	-0.15
Intrusive Thoughts	0.57	0.5	0.31
Interaction	0.008	0.02	0.11

Table 7. Hierarchical Regression to determine anger predicting pain accounting for the covariates

	B	SE B	β
Model 1: $R^2 = .69**$			
Participants' Age	0.23	0.16	0.29
Duration of FM diagnosis	-0.65	0.3	-0.43
Pain Disability Index	-0.31	0.27	0.4
Center for Epidemiological Studies-Depression	1.73	1.38	0.44
Model 2: $\Delta R^2 = .009$			
Participants' Age	0.2	0.17	0.24
Duration of FM diagnosis	-0.64	0.31	-0.42
Pain Disability Index	0.32	0.28	0.42
Center for Epidemiological Studies-Depression	1.86	1.44	0.47
STAXI -I	-0.07	0.13	-0.11

*Note. **p < .01*

Table 8. Simple Regression to Determine Anger Predicting Pain

	B	SE B	β
Model 1: $R^2 = .79$**	0.59	0.11	0.79

Note. **$p < .01$
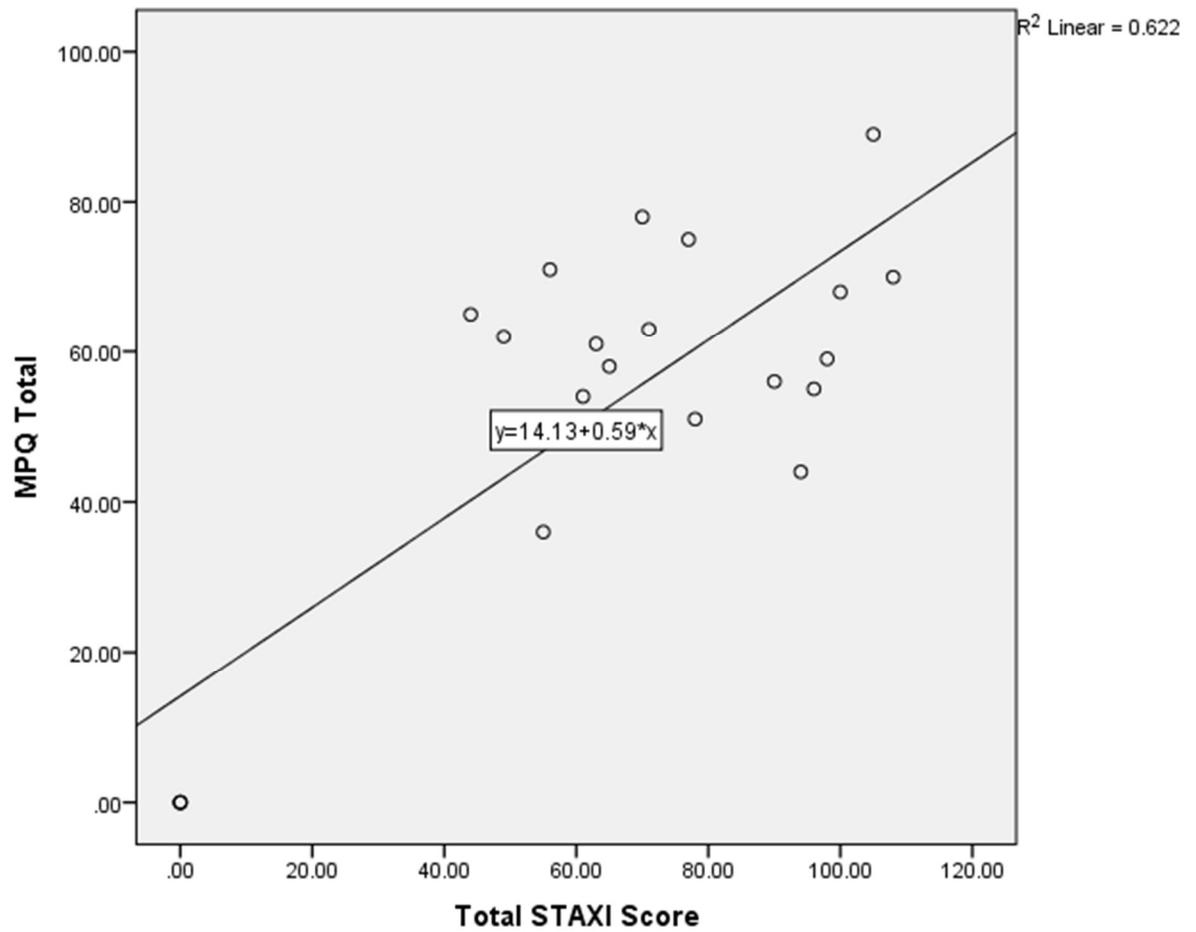
APPENDIX B

FIGURES
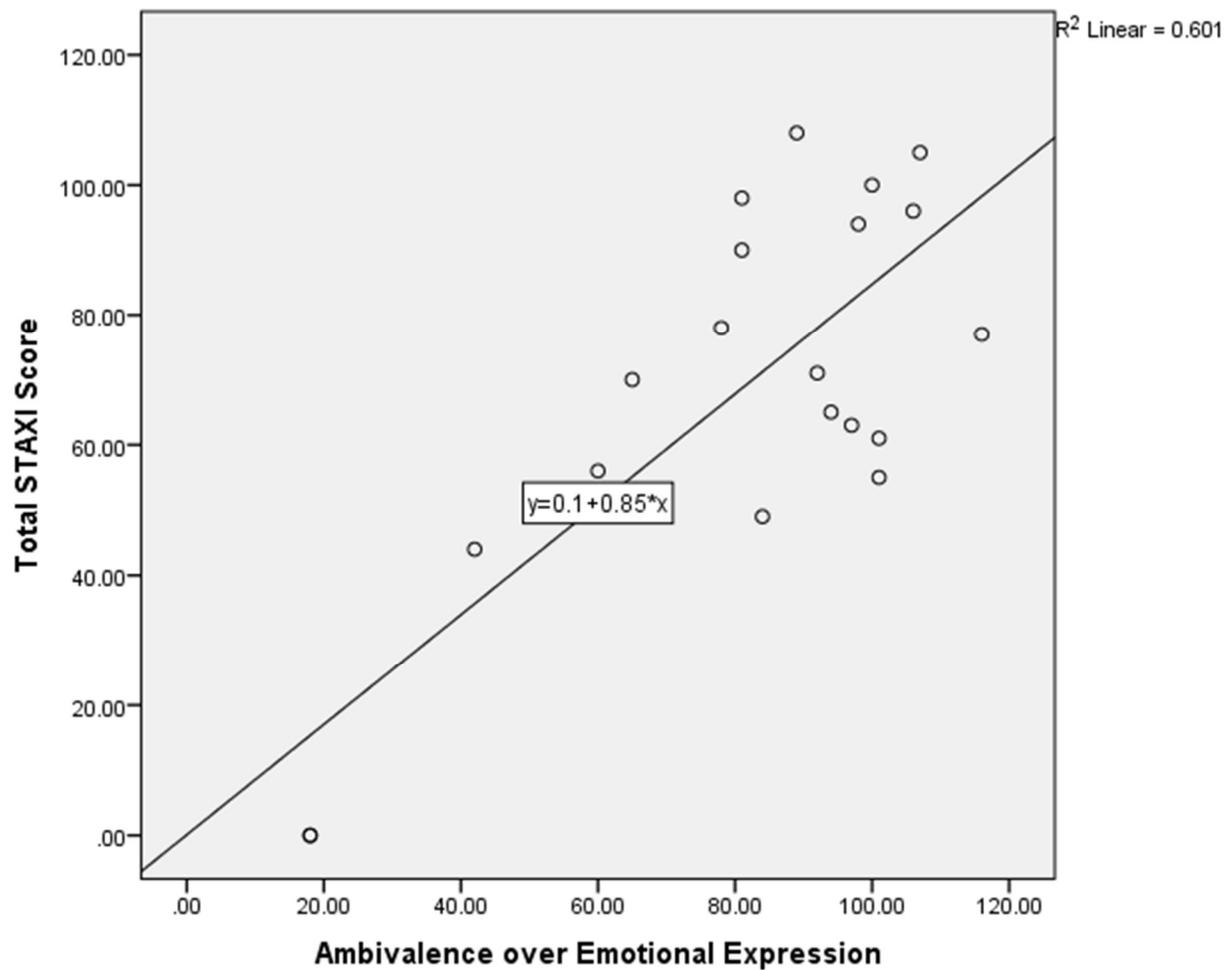

Figure 1. Correlation between Anger & Pain.
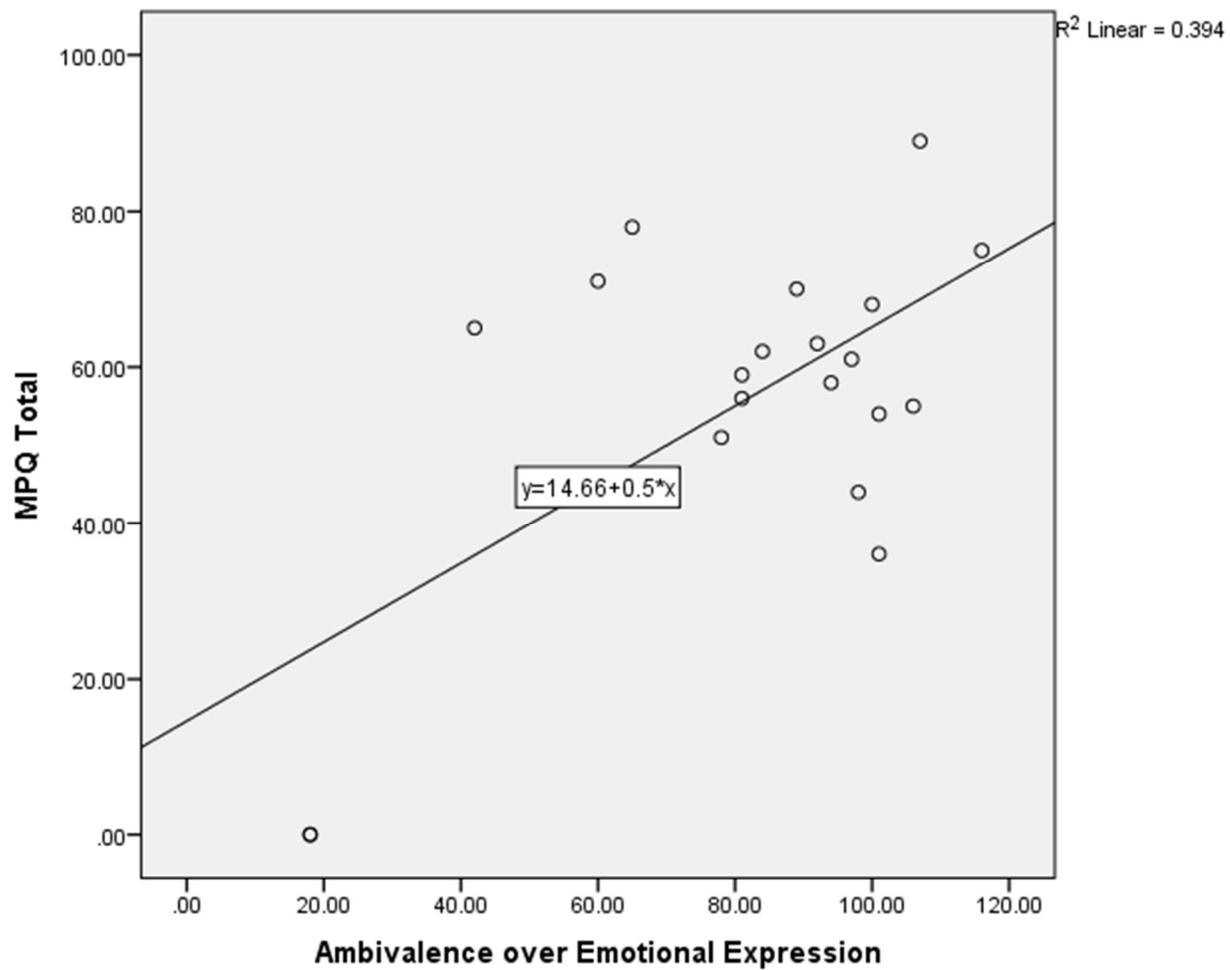
Figure 2. Correlation between Anger & AEE.

Figure 3. Correlation between Pain & AEE.

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