An exploration of chronic pain experience, coping and the NEO five factors in high functioning adults

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AN EXPLORATION OF CHRONIC PAIN EXPERIENCE, COPING AND THE NEO FIVE FACTORS IN HIGH FUNCTIONING ADULTS

by

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ABSTRACT

Chronic pain affects nearly 48 million Americans (Haggard, Stowell, Bernstein, & Gatchel, 2008). Established guidelines for pain management encourage the use of personality assessment in chronic pain evaluation (Karlin, Creech, Grimes, Clark, Meagher, & Morey, 2005). In relation to the Big Five personality factors, low *Openness* relates negatively to treatment success, (Hopwood, Creech, Clark, Meagher, & Morey, 2008), and elevated *Neuroticism* scores also correlate with increased pain levels among individuals in hospital or rehab settings (Ashgari & Nicholas, 2006; Nitch & Boon, 2004). In contrast to these prior studies, this study identifies correlates in a relatively high-functioning population (college students) to further elucidate the connection between chronic pain and personality. This study compares scores on the NEO-FFI (Costa & McCrae, 1992), the West Haven-Yale Multidimensional Pain Inventory (WHYMPI, Kerns, Turk, & Rudy, 1985), and the Pain Catastrophizing Scale (PCS, American Academy of Orthopaedic Manual Physical Therapists, 2010). Significant correlations were found between *Neuroticism*, *Extraversion*, and *Agreeableness* and select subscales of both the WHYMPI and the PCS. A linear regression of scores showed that *Neuroticism* was very strongly related to WHYMPI scores. In fact, the WHYMPI scores accounted for 67.9% of variance in *Neuroticism*. Scores on the WHYMPI also correlated with PCS scores. *Helplessness* and *Overall* scores significantly correlated to *Life Control* and certain positive social support scores. The findings of this study emphasize the need for pain clinicians to incorporate psychological assessments, especially concerning *Neuroticism*, into their evaluations of chronic pain patients.

DEDICATION

For the ever-loving and always understanding Lily and Ian—I am the luckiest mom in the world; you inspire me to be the best that I can be.

For my husband, Shawn, whose unfailing love and support get me through each day and lift me to new heights; you are my world.

For my mother, Trudy Schmidt, whose strength and endless generosity constantly amaze and inspire me; your unyielding encouragement and help throughout this endeavor has made it possible.

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For chronic pain sufferers everywhere, may this and further studies help us find relief.

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INTRODUCTION

Almost 48 million Americans suffer from chronic pain (Haggard, Stowell, Bernstein, & Gatchel, 2008). In other words, around 15% of the country's population directly feels the effects of chronic pain. Chronic pain not only reduces the sufferers' quality of life, but also creates a social and economic burden on the country (Haggard, et al., 2008). Chronic pain is characterized as persistent pain that can last anywhere from weeks to years. It can be traced to a causal event (such as an injury) or to disease (such as arthritis) or may be purely psychogenic—i.e. lacking any physical explanation. Arthritis, headaches, back pain, gastrointestinal pain, neuralgia, and cancer pain are all common sources of chronic pain. Chronic pain conditions such as fibromyalgia, interstitial cystitis, and endometriosis often present alongside other sources of chronic pain (Office of Communications and Public Liason, 2011).

Due to the multi-dimensional nature of an individual's interpretation of pain, the methodologies for the assessment and treatment of pain must take into account both psychological and physiological factors (Mongini, et al., 2009). In fact, established guidelines for pain management encourage the use of personality, psychological, and coping strategy assessments when evaluating chronic pain patients in order to identify traits that may confound treatment (Karlin, Creech, Grimes, Clark, Meagher, & Morey, 2005). The use of these assessments also helps the clinician to individualize the treatment plan (Wade & Price, 2000).

Individuals experiencing chronic pain may be classified into one of three groups according to their scores on the West Haven-Yale Multidimensional Pain Inventory (WHYMPI: Kerns, Turk, & Rudy, 1985). One group, referred to as *Dysfunctional*, includes those whose pain

has a drastic negative effect on their daily lives. These patients suffer from severely decreased functioning. The *Dysfunctional* group tends to score high on the sub-scales of *Pain Severity, Life Interference,* and *Emotional Distress* and low on *Life Control* and on the activity section (*Household Chores, Outdoor Work, Activities Away from Home, Social Activities,* and *General Activity*) of the WHYMPI (Rusu & Hasenbring, 2008). A second group, the *Interpersonally Distressed,* includes those who feel they lack support from their loved ones. They also suffer from decreased functioning, but what differentiates them from the *Dysfunctional* sub-group is that they are more distressed by relationship issues than their pain (Junghaenel, Keefe, & Broderick, 2010). Traits common to this sub-group are similar to those of *Dysfunctional* sufferers with the addition of low scores on the social support (high *Negative Responses,* low *Solicitous Responses,* low *Distracting Responses*) portion of the WHYMPI (Rusu & Hasenbring, 2008). Lastly, individuals falling into the group known as *Adaptive Copers* have adjusted well to their pain and have a greater sense of control in regards to it (Nitch & Boon, 2004). They typically score higher on the WHYMPI subscales of *Life Control* and in the activity section, and lower in *Pain Severity, Life Interference,* and *Affective Distress* (Rusu & Hasenbring, 2008). Using the WHYMPI to identify patients sharing traits of these sub-groups aids clinicians in developing effective treatment foci.

The connection between chronic pain and overall emotional health has also been noted. A link between chronic muscle tenderness/ headaches to depression and anxiety has been observed (Mongini, Rota, Deregibus, Mura, Francia Germani, & Mongini, 2005). In general, chronic pain often leads to mood and/or anxiety disorders (Elsevier, 2007).

Chronic pain correlates in many studies with elevated scores on the Minnesota Multiphasic Personality Inventory (MMPI) (Fishbain, Cole, Cutler, Lewis, Rosomoff, & Rosomoff, 2006). Wade, Doughtery, Hart, and Cook (1992) found that chronic pain sufferers scored significantly higher on certain MMPI subscales including *Conversion V*, *Hypochondriasis*, *Emotionally Overwhelmed*, and *Denier/Coper* subscales. These same individuals also scored higher in *Neuroticism* on the NEO-PI. Chronic pain patients' previously elevated MMPI scores decreased after completion of a treatment plan (Fishbain, et al., 2006).

While the MMPI has been used to explore the relationship between psychopathology/psychological distress and chronic pain, less research has been conducted on general personality traits in relation to chronic pain. Thompson, et al. (2010) explored psychological factors related to the interpretation of pain and found that factors such as catastrophizing, pain awareness, and self-efficacy were significantly related to patients' reported pain intensity and level of disability. Chronic pain sufferers also tend to be higher in harm avoidance, i.e. a tendency to avoid activities that could lead to injury or pain, and lower in self-directedness and cooperativeness (Conrad, et al., 2007). This suggests that pain and psychological factors are profoundly related.

Some exploration of the big five personality factors (*Openness*, *Conscientiousness*, *Extraversion*, *Agreeableness* and *Neuroticism*) and chronic pain has also been conducted. In a sample of patients receiving care from a hospital pain center, Ashgari and Nicholas (2006) found that reduced pain-related self-efficacy and diminished sense of control of pain correlated positively with NEO PI-R *Neuroticism* scores. They concluded that *Neuroticism* may predispose

people to cope less effectively with pain, and influence how well an individual is able to adjust to chronic pain. Nitch and Boon (2004) also used the NEO PI-R to examine relationships between the big five personality factors and the three groups on the Multidimensional Pain Inventory in a sample of outpatient pain clinic patients receiving continuous treatment. They found that of the three groups, the *Adaptive Copers* were higher in *Openness* and *Extraversion*, and lower in *Neuroticism* (more emotionally stable) compared to the *Interpersonally Distressed* and *Dysfunctional* subgroups. The *Interpersonally Distressed* group was also lower in *Extraversion*. It may be that higher *Openness* and *Extraversion* and lower *Neuroticism* allow patients to adjust well to their pain. Similarly, Wade and Price (2000) found that extroverted patients, especially those high in assertiveness, were less likely to have disruption of their daily lives due to pain and were less likely to burden loved ones. However, they were more likely to vocalize their suffering. Wade and Price also found a link between *Neuroticism* and greater catastrophizing of pain, proneness to distress, and proclivity towards illness in clinical samples of chronic pain patients. Higher *Neuroticism* has also been found to be correlated with higher rates of symptom reporting (Nitch & Boon, 2004).

Adjustment to chronic pain is certainly related to personality variables (Ashgari & Nicholas, 2006). Therefore, the current study investigates the relationship between the big five personality factors, pain catastrophizing, and groups on the West Haven-Yale Multidimensional Pain Inventory. This study expands knowledge of chronic pain by exploring the relationship between the big five personality factors, pain catastrophizing, and the Multidimensional Pain Inventory subscales in a non-clinical population. To date, the vast majority of the exploration of

personality variables and chronic pain has utilized only clinical samples from hospitals or pain management centers and focused on the relationships between personality factors and the sub-groups of the MPI (*Adaptive Copers, Interpersonally Distressed, Dysfunctional)*—not their specific scores on the subscales. This study explores the relationship between chronic pain and personality in a high functioning, non-clinical population.

Hypothesis1: Adaptive Coping will be related to Personality Variables. Participants who display some or all of the traits of *Adaptive Copers* (high *Life Control* and *Activity,* low *Pain Severity, Life Interference,* and *Affective Distress*) will score significantly higher in *Extraversion, Openness*, and *Conscientiousness* on the NEO-FFI and will score lower on *Neuroticism* than those who do not display any of the traits of *Adaptive Copers*.

Hypothesis 2: Adaptive Coping will be related to Pain Catastrophizing. Participants who display some or all of the traits of *Adaptive Copers* will also score significantly lower on the Pain Catastrophizing Scale subscales (*Rumination, Magnification, Helplessness,* and *Overall*) compared to those who do not display any of the traits of *Adaptive Copers*.

Hypothesis 3: Interpersonal Distress will be related to Personality. Participants who display traits typical of the *Interpersonally Distressed* or *Dysfunctional* subgroups (high *Pain Severity, Life Interference,* and *Emotional Distress;* low *Life Control,* activity, and social

support) will score significantly lower on *Agreeableness* on the NEO-FFI than those that bear *Adaptive Copers'* traits.

Hypothesis 4: Personality will be related to Pain Catastrophizing. NEO-FFI *Neuroticism* scores will positively correlate with pain catastrophizing subscale scores. *Agreeableness* and *Conscientiousness* scores will negatively correlate with pain catastrophizing subscale scores.

METHODS

Participants

This study recruited participants who experience chronic pain. These participants were University of Central Florida (UCF) students who self-identified as having issues with chronic pain (e.g. migraines, arthritis, Fibromyalgia, etc.). The study recruited participants using the UCF Psychology Department's SONA Systems research participation website. All participants had the opportunity to receive extra credit in select courses in exchange for participation. Participants electronically acknowledged informed consent prior to participation. All of the 30 participants were 18 years of age or older, ages ranged from 18 to 41, with a mean age of 23.9 (*SD* = 5.486). Eighty-three percent of the sample was female and seventeen percent was male. Participants completed the study entirely online.

Measures

West Haven-Yale Multidimensional Pain Inventory (WHYMPI: Kerns, Turk, & Rudy, 1985). This 54 item scale employs a seven-point Likert scale; 0 represents an absence or low level of the event or experience in question and 6 represents a high level. The inventory determines the intensity, psychosocial impact and level of disability caused by the participants' pain and allows participants to be classified within *Dysfunctional, Adaptive Copers,* or *Interpersonally Distressed* sub-groups. The WHYMPI contains questions such as, *"How supportive or helpful is your spouse (significant other) to you in relation to your pain?"* The scale can be found in Appendix A.

NEO Five Factor Inventory (NEO-FFI: Costa & McCrae, 1992). This 60 item inventory measures five personality factors *(Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness*) using a five-point Likert scale; 1 representing *Strongly Disagree* and 5 representing *Strongly Agree*. The scale's reliability coefficients range from .56 to .81 (Nitch & Boon, 2004). The NEO-FFI contains questions such as, "*I generally try to be thoughtful and considerate."* This scale is located in Appendix B.

Pain Catastrophizing Scale (PCS: American Academy of Orthopaedic Manual Physical Therapists, 2010): This 13 item questionnaire employs a five point Likert Scale to measure the level at which the participant catastrophizes his or her pain level; 0 represents *Not at All* and 4 represents *All the Time*. The PCS contains questions such as, *"I keep thinking about how badly I want the pain to stop."* This scale is found in Appendix C.

Participant Information Form: This eight item questionnaire solicits general, demographic information from the participants and also information about the nature of the participants' chronic pain. The Participant Information Form contains questions such as, *"Do you experience chronic pain (persistent pain lasting three months or more)?"* See Appendix D for the Participant Information Form.

Procedure

Participants who report that they experience chronic pain were recruited. Participants were informed that they were taking part in a study to examine the correlation between chronic pain and personality factors. Data was collected anonymously, online, through the SONA Systems website. Participants logged into the site and, upon clicking the link for the study, the

participants acknowledged informed consent electronically. Following consent, participants were asked to indicate if they suffer from chronic pain and, if so, to describe it. For the purposes of this study, chronic pain was defined as pain lasting three months or longer, the minimum duration described by the American Chronic Pain Association (2011). Participants then completed the WHYMPI, the NEO-FFI, and the PCS. Lastly, they completed the Participant Information Form. Completion of the inventories required between 45 and 90 minutes.

RESULTS

Pearson bivariate correlation coefficients were computed to establish the statistical relationships among the scores of each of the subscales on the three inventories (NEO-FFI, WHYMPI, and PCS). These coefficients determined the presence of multiple significant relationships at alpha level .05. The correlations mentioned in the following paragraphs were the only correlations that were found to be statistically significant. The *r* values for each comparison of paired subscales can be found in Tables 1, 2, and 3. Significant *r* values are in boldface type. The mean scores and standard deviations for each subscale are reported in Tables 4, 5, and 6.

Table 1

Pearson's r correlation data for WHYMPI with NEO- FFI.

	Neuroticism **(N=30)**	***Extraversion*** **(N=30)**	***Openness*** **(N=30)**	***Agreeableness*** **(N=30)**	***Conscientiousness*** **(N=30)**
	r(p)	*r(p)*	*r(p)*	*r(p)*	*r(p)*
Part 1:					
Interference	.30(.10)	-.06(.75)	-.29(.12)	.04(.86)	.16(.40)
Support	.20(.29)	-.16(.39)	.11(.56)	.15(.43)	.03(.90)
Pain Severity	.22(.26)	.09(.63)	-.18(.35)	.15(.43)	.25(.18)
Life-Control	**-.42(.02)**	.26(.16)	.12(.55)	.15(.44)	.31(.09)
Affective Distress	**.67(.00)**	**-.40(.03)**	-.30(.10)	-.25(.19)	-.31(.09)
Part 2:					
Negative	**.36(.05)**	-.02(.94)	**-.38(.04)**	-.12(.52)	.02(.93)
Solicitous	.13(.50)	.09(.62)	.27(.15)	-.03(.89)	-.02(.92)
Distracting	.03(.88)	.24(.20)	-.00(.98)	-.05(.81)	.11(.58)
Part 3:					
Household Chores	-.18(.34)	.14(.48)	-.07(.71)	**.41(.03)**	.15(.43)
Outdoor Work	-.01(.97)	.01(.94)	-.07(.72)	-.10(.60)	.08(.68)
Activities Away from Home	.20(.29)	.14(.45)	.04(.85)	-.28(.14)	-.25(.18)
Social Activities	-.15(.43)	**.43(.02)**	.06(.75)	.16(.40)	-.04(.86)
General Activity	-.07(.71)	.24(.20)	-.02(.90)	.11(.56)	.01(.93)

Table 2

Pearson's r correlation data for PCS with NEO- FFI.

	Neuroticism **(N=30)**	***Extraversion*** **(N=30)**	***Openness*** **(N=30)**	***Agreeableness*** **(N=30)**	***Conscientiousness*** **(N=30)**
	r(p)	*r(p)*	*r(p)*	*r(p)*	*r(p)*
Rumination	.17(.38)	-.25(.19)	-.09(.65)	-.08(.69)	.20(.29)
Magnification	**.36(.05)**	-.20(.30)	-.05(.78)	-.12(.52)	.22(.25)
Helplessness	**.36(.05)**	.02(.92)	-.14(.47)	-.14(.45)	.13(.49)
Overall	.35(.06)	-.14(.47)	-.12(.53)	-.14(.47)	.20(.28)

Table 3

Pearson's r correlation data for WHYMPI with PCS.

	Rumination **(N=30)**	***Magnification*** **(N=30)**	***Helplessness*** **(N=30)**	***Overall*** **(N=30)**
	r(p)	*r(p)*	*r(p)*	*r(p)*
Part 1:				
Interference	**.47(.01)**	.29(.12)	**.57(.00)**	**.56(.00)**
Support	.10(.60)	-.15(.44)	.12(.52)	.06(.75)
Pain Severity	.35(.06)	.24(.20)	**.54(.00)**	**.48(.01)**
Life-Control	-.24(.19)	-.13(.50)	**-.38(.04)**	-.32(.08)
Affective Distress	.20(.29)	.09(.65)	.21(.27)	.21(.27)
Part 2:				
Negative	.14(.47)	.34(.07)	.24(.21)	.27(.16)
Solicitous	.21(.27)	-.01(.94)	.30(.10)	.23(.22)
Distracting	.30(.11)	.22(.24)	**.43(.02)**	**.40(.03)**
Part 3:				
Household Chores	-.10(.60)	-.13(.49)	-.02(.93)	-.08(.66)
Outdoor Work	.07(.73)	-.06(.76)	.03(.90)	.02(.91)
Activities Away from Home	-.04(.84)	-.06(.74)	-.13(.49)	-.10(.60)
Social Activities	-.05(.81)	.06(.75)	-.03(.86)	-.02(.92)
General Activity	-.04(.83)	-.08(.68)	-.04(.82)	.06(.75)

Table 4

Participant means and standard deviations for the WHYMPI.

Subscale	*Mean*	*(SD)*
Part 1:		
Interference	2.74	*(0.87)*
Support	3.26	*(1.33)*
Pain Severity	3.18	*(1.17)*
Life-Control	3.78	*(1.26)*
Affective Distress	3.24	*(1.34)*
Part 2:		
Negative Responses	1.12	*(1.11)*
Solicitous Responses	3.05	*(1.47)*
Distracting Responses	2.19	*(1.26)*
Part 3:		
Household Chores	4.03	*(1.36)*
Outdoor Work	1.24	*(1.22)*
Activities Away from Home	3.31	*(1.01)*
Social Activities	2.71	*(1.81)*
General Activity	2.80	*(0.84)*

Table 5

Participant means and standard deviations for the NEO-FFI.

Subscale	*Mean*	*(SD)*
Neuroticism	22.57	*(9.84)*
Extraversion	28.00	*(8.26)*
Openness	30.47	*(5.95)*
Agreeableness	30.23	*(5.17)*
Conscientiousness	34.23	*(7.13)*

Table 6

Participant means and standard deviations for the PCS.

Subscale	*Mean*	*(SD)*
Rumination	7.63	*(4.00)*
Magnification	4.87	*(2.83)*
Helplessness	9.50	*(5.28)*
Overall	22.00	*(10.31)*

Hypothesis1: Adaptive Coping will be related to Personality Variables. A significant negative correlation existed between *Life Control* (WHYMPI) and *Neuroticism* (NEO-FFI), $r(29)=-.422$, $p=.020$, as well as with *Helplessness* (PCS), $r(29)=-.373$, $p=.042$. Also noted was a significant positive correlation among *Affective Distress* and *Neuroticism*, $r(29)=.665$, $p=.000$, along with a negative correlation between *Affective Distress* and *Extraversion*, $r(29)=-.403$, $p=.027$. These data support the hypothesis that participants displaying one or more traits of *Adaptive Copers* will score higher in *Extraversion* and lower in *Neuroticism.* These data do not support the prediction that those same participants will score higher in *Conscientiousness* and *Openness.* The data did indicate that a significant negative correlation exists between *Openness* and *Negative Responses* (also known as punishing--social support factor), $r(29)=-.383$, $p=.037$, suggesting that the *Interpersonally Distressed* may display less *Openness* than *Adaptive Copers.*

Hypothesis 2: Adaptive Coping will be related to Pain Catastrophizing. The data show a positive correlation between *Interference* and *Rumination*, $r(29)=.469$, $p=.009$; *Helplessness*, $r(29)=.573$, $p=.001$; and *Overall* pain catastrophizing, $r(29)=.556$, $p=.001$. A positive correlation also existed between *Pain Severity* and *Helplessness*, $r(29)=.542$, $p=.002$, and *Overall* pain

catastrophizing, $r(29)=.479$, $p=.007$. *Life Control* negatively correlated with *Helplessness*, $r(29)=-.373$, $p=.042$. These findings support the hypothesis that participants who shared traits with *Adaptive Copers* would score lower on the PCS. However, a positive subscale (higher scores are preferable) of the social support section of the WHYMPI, *Distracting* (a facet of the scale used to label the *Interpersonally Distressed* subgroup), positively correlated significantly with both *Helplessness*, $r(29)=.433$, $p=.017$, and the *Overall* portion of the PCS, $r(29)=.398$, $p=.029$.

Hypothesis 3: Interpersonal Distress will be related to Personality. There was a significant positive correlation between *Household Chores* activity and *Agreeableness*, $r(29)=.405$, $p=.026$. No other correlations with *Agreeableness* occurred in this study. The lack of correlations with *Agreeableness* and typical WHYMPI subgroup traits indicates a failure to support the hypothesis that *Agreeableness* is strongly related to the WHYMPI subgroups or that any significant difference between the subgroups exist.

Hypothesis 4: Personality will be related to Pain Catastrophizing. Helplessness and *Neuroticism* were positively correlated, $r(29)=.364$, $p=.048$. This supports the hypothesis that a positive correlation exists between *Neuroticism* and the PCS subscales. No evidence of correlations between the PCS subscales and *Agreeableness* or *Conscientiousness* existed in this study, therefore, the prediction that a negative correlation would exist between those factors is unsupported by these findings.

Because *Neuroticism* is such a profound theoretical predictor, a linear regression was performed and indicated that select WHYMPI subscale scores (*General Activity*, *Interference*,

Negative Responses, Solicitous Responses, Affective Distress, Support, Life Control, Pain Severity, and *Distracting Responses)* were significantly predictive of the *Neuroticism* subscale , $F(9,20)=4.694$, p=.002. They accounted for 67.9% of its variance. *Life Control* (β=-.734, $p=.018$), *Negative Responses* (β=.725, $p=.004$), and *Distracting Responses* (β=-.819, $p=.018$) subscale scores significantly related to *Neuroticism* scores. See Table 7 for a complete summary of the regression.

Table 7

Summary of linear regression analyses for variables predicting *Neuroticism* (*N*=30).

Variable	*B*	*SE B*	*β*
Interference	0.095	2.505	.008
Support	-0.324	1.861	-.044
Pain Severity	0.520	2.025	.062
Life-Control	-5.716	2.214	-.734*
Affective Distress	0.949	1.953	.129
Negative Responses	6.438	1.970	.725**
Solicitous Responses	3.433	1.874	.513
Distracting Responses	-6.386	2.476	-.819*
General Activity	4.237	2.159	.363
R^2		.679	
F		4.694*	

*p < .05. **p < .01.

DISCUSSION

The interrelation between *Neuroticism* and pain factors was the most prevalent in the data reported by the sample. This may indicate that either *Neuroticism* is a strong predictor for negative effects from pain and pain catastrophizing, or that negative effects from pain and higher catastrophizing are predictors of *Neuroticism.* *Neuroticism* correlates with the WHYMPI and PCS subscales in a way that suggests that *Neuroticism* has an ill-effect on coping and adjustment to pain and that its presence is detrimental to the quality of life for the pain sufferer. These findings corroborate previous studies in which *Neuroticism* was linked to higher catastrophizing (Wade & Price, 2000) and to WHYMPI scores (Nitch & Boon, 2004). *Neuroticism* was also linked to other factors of the pain experience and coping styles (Ashgari & Nicholas, 2006). The strong relationship revealed by the linear regression, despite the small sample size, indicates that *Neuroticism* scores should be considered when formulating a treatment plan in order to fully individualize the management program thereby increasing the chances of its success for the patient. The percent of variance in *Neuroticism* attributed to the WHYMPI subscale scores was staggeringly high; this, along with evidence from prior studies, emphasizes how imperative it is for physicians to evaluate *Neuroticism* levels alongside physical examinations in order to individualize and optimize their treatment modalities. The regression data indicated that a particularly significant predictive relationship exists between *Negative Responses* from significant others and *Neuroticism.* This suggests that low social support and frequent punishing behavior from a significant other towards the chronic pain sufferer may induce increased *Neuroticism*. Of course, there is also the possibility that increased *Neuroticism* elevates the

likelihood that significant others will use punishing responses when dealing with the pain sufferer. *Distracting Responses* was a significant inverse predictor of *Neuroticism.* This suggests that people who are higher in *Neuroticism* may evoke less positive social support from their significant others. Conversely, these correlations could also indicate that people higher in *Neuroticism* simply perceive less social support and more punishing behavior from their significant others, which can be equally detrimental to their quality of life. With so many correlations between pain related factors and *Neuroticism,* it would be prudent for any chronic pain management plan to incorporate some sort of psychological modality to help abate the effects of *Neuroticism* when it is identified in a chronic pain sufferer.

The predictive relationship between *Neuroticism* and WHYMPI subscales, besides suggesting that *Neuroticism* exacerbates ill-effects of chronic pain, may also indicate that chronic pain amplifies *Neuroticism.* In a study inspired by evidence that depression could affect trait scores conducted by Fishbain, et al. (2006), data indicated that traits scores were affected by pain treatment. Fishbain, et al. warned that personality profiles assessed after the onset of pain may not be indicative of the patient's real personality. It, therefore, seems that the predictive relationship between WHYMPI scores and *Neuroticism* may be reciprocal. All the more reason for *Neuroticism* scales to be included in the pain assessment battery.

The negative relationship between *Openness* and *Negative Responses* must also be considered. It seems the more vocal a chronic pain sufferer is; the less likely his or her significant other is to use punishing behavior or locutions in response. It may be due to frustration the significant other feels at not knowing what is wrong with their loved one, or

perhaps aggravation at not knowing what to do to help that person. The possibility also exists that the reverse is true. The person with higher *Openness* and chronic pain may be more likely to vocally rebuke his or her significant other when the significant other acts unkind or verbalizes negative remarks.

The relationship between positive responses regarding social support WHYMPI subscales and the PCS scores was also an interesting result. This could relate to the learned helplessness theories (Seligman & Maier, 1967), in that increased spousal support correlates with greater feelings of helplessness. Surprisingly, *Distracting Responses* (positive significant other behaviors such as reading to the pain sufferer) positively correlated with *Helplessness* and *Overall* pain catastrophizing. The data suggest that there may be a limit to how much help is actually helpful and that not all kinds of help are actually beneficial. By frequently providing distractions the pain sufferer, the significant other may be diminishing the pain sufferer's sense of self-efficacy or depriving the sufferer from developing his or her own coping methods. *Helplessness* also correlated with a number WHYMPI disability and pain related subscales, which could be an indicator that ill-managed pain and life interference from pain may lead to these feelings of futility. The fact that *Life Control* correlated negatively to a significant extent with *Helplessness* also suggests that the two factors coincide with one another, i.e. feelings of *Helplessness* co-exist with loss of *Life Control.*

The lack of very many significant relationships between typical subgroup WHYMPI subscale scores and *Agreeableness/Openness* scores within this sample does not corroborate the findings of prior studies. This may indicate that there is some difference between clinical and

non-clinical populations in terms of the predictive qualities of NEO traits and pain adjustment. It may also indicate that the non-clinical population may not be affected by the same amount of variance in these areas as the clinical populations.

One limitation of this study, and most ongoing research in the area of chronic pain, is the lack of a universally accepted, explicit definition for chronic pain. For the purposes of the study, chronic pain was defined as pain that lasts or occurs for three months or more--the low end of the three to six month range described by the American Association of Chronic Pain (2011). This was somewhat arbitrary and may have incorrectly included and excluded participants. Another limitation of this study is that the participants self-identified as having chronic pain as opposed to an examination by a medical expert making this determination. Using an anonymous, fully online self-report of chronic pain yields the possibility of including participants who do not actually suffer from chronic pain. Having a physician evaluate participants for chronic pain would confirm that they do in fact meet the criteria to be included in the study while also providing a more uniform definition of chronic pain for the purposes of the study.

This study involved a small sample size. An increased sample size would be beneficial. The limited sample may have prohibited finding significant relations between subscales that do actually exist in the population. Furthermore, the sample was relatively young (ages 18 to 41) and overrepresented by females. Including older adults and more males in future studies could provide a more accurate portrait of the chronic pain suffering population. Possibly the greatest limitation of the study is the inability to establish causation and direction of effect between the factors due to its design.

Future studies should use a larger sample size and also compare the NEO values to a normative population that does not suffer from chronic pain. Subsequent studies should also investigate and employ a method to more accurately define chronic pain parameters for participants. The connection between *Openness* and the social support section of the WHYMPI along with the connection between positive social support and *Helplessness* are also promising avenues for further investigation. Examining exactly what types and quantities of help are beneficial vs. disempowering to the chronic pain sufferer would be of great use in the endeavor to optimize pain management programs.

APPENDIX A: WEST HAVEN-YALE MULTIDIMENSIONAL PAIN INVENTORY

WEST HAVEN-YALE MULTIDIMENSIONAL PAIN INVENTORY

(Kerns, Turk & Rudy, 1985)

BEFORE YOU BEGIN, PLEASE ANSWER 2 PRE-EVALUATION QUESTIONS BELOW:

1. Some of the questions in this questionnaire refer to your "significant other". A significant other is *a person with whom you feel closest.* This includes anyone that you relate to on a regular or infrequent basis. It is very important that you identify someone as your "significant other". Please indicate below who your significant other is (check one):

__Spouse Partner/Companion ___Housemate/Roommate ___Friend ___Neighbor
___Parent/Child/Other relative ___Other (please describe):_____

2. Do you currently live with this person? ٱ YES ٱ NO

When you answer questions in the following pages about "your significant other", always respond in reference to the specific person you just indicated above.

A.

In the following 20 questions, you will be asked to describe your pain and how it affects your life. Under each question is a scale to record your answer. Read each question carefully and then circle a number on the scale under that question to indicate how that specific question applies to you.

1. Rate the level of your pain at the present moment.

0 1 2 3 4 5 6

No pain Very intense pain

2. In general, how much does your pain problem interfere with your day to day activities?

0 1 2 3 4 5 6

No interference Extreme interference

3. Since the time you developed a pain problem, how much has your pain changed your ability to work?

0 1 2 3 4 5 6

No change Extreme change

___ Check here, if you have retired for reasons other than your pain problem

4. How much has your pain changed the amount of satisfaction or enjoyment you get from participating in social and recreational activities?

0 1 2 3 4 5 6

No change Extreme change

5. How supportive or helpful is your spouse (significant other) to you in relation to your pain?

0 1 2 3 4 5 6

Not at all supportive Extremely supportive

6. Rate your overall mood during the past week.

0 1 2 3 4 5 6

Extremely low mood Extremely high mood

7. On the average, how severe has your pain been during the last week?

0 1 2 3 4 5 6

Not at all severe Extremely severe

8. How much has your pain changed your ability to participate in recreational and other social activities?

0 1 2 3 4 5 6

No change Extreme change

9. How much has your pain changed the amount of satisfaction you get from family-related activities?

0 1 2 3 4 5 6

No change Extreme change

10. How worried is your spouse (significant other) about you in relation to your pain problem?

0 1 2 3 4 5 6

Not at all worried Extremely worried

11. During the past week, how much control do you feel that you have had over your life?

0 1 2 3 4 5 6

Not at all in control Extremely in control

12. How much suffering do you experience because of your pain?

0 1 2 3 4 5 6

No suffering Extreme suffering

13. How much has your pain changed your marriage and other family relationships?

0 1 2 3 4 5 6

No change Extreme change

14. How much has your pain changed the amount of satisfaction or enjoyment you get from work?

0 1 2 3 4 5 6

No change Extreme change

__ Check here, if you are not presently working.

15. How attentive is your spouse (significant other) to your pain problem?

0 1 2 3 4 5 6

Not at all attentive Extremely attentive

16. During the past week, how much do you feel that you've been able to deal with your problems?

0 1 2 3 4 5 6

Not at all Extremely well

17. How much has your pain changed your ability to do household chores?

0 1 2 3 4 5 6

No change Extreme change

18. During the past week, how irritable have you been?

0 1 2 3 4 5 6

Not at all irritable Extremely irritable

19. How much has your pain changed your friendships with people other than your family?

0 1 2 3 4 5 6

No change Extreme change

20. During the past week, how tense or anxious have you been?

0 1 2 3 4 5 6

Not at all tense or anxious Extremely tense or anxious

B.

In this section, we are interested in knowing how your significant other (this refers to the person you indicated above) responds to you when he or she knows that you are in pain. On the scale listed below each question, **circle a number** to indicate how often your significant other generally responds to you in that particular way when you are in pain.

1. Ignores me.

0 1 2 3 4 5 6

Never Very often

2. Asks me what he/she can do to help.

0 1 2 3 4 5 6

Never Very often

3. Reads to me.

0 1 2 3 4 5 6

Never Very often

4. Expresses irritation at me.

0 1 2 3 4 5 6

Never Very often

5. Takes over my jobs or duties.

0 1 2 3 4 5 6

Never Very often

6. Talks to me about something else to take my mind off the pain.

0 1 2 3 4 5 6

Never Very often

7. Expresses frustration at me.

0 1 2 3 4 5 6

Never Very often

8. Tries to get me to rest.

0 1 2 3 4 5 6

Never Very often

9. Tries to involve me in some activity

0 1 2 3 4 5 6

Never Very often

10. Expresses anger at me.

0 1 2 3 4 5 6

Never Very often

11. Gets me some pain medications.

0 1 2 3 4 5 6

Never Very often

12. Encourages me to work on a hobby.

0 1 2 3 4 5 6

Never Very often

13. Gets me something to eat or drink.

0 1 2 3 4 5 6

Never Very often

14. Turns on the T.V. to take my mind off my pain

0 1 2 3 4 5 6

Never Very often

C.

Listed below are 18 common daily activities. Please indicate how often you do each of these activities by circling a number on the scale listed below each activity. Please complete all 18 questions.

1. Wash dishes.

0 1 2 3 4 5 6

Never Very often

2. Mow the lawn.

0 1 2 3 4 5 6

Never Very often

3. Go out to eat.

0 1 2 3 4 5 6

Never Very often

4. Play cards or other games.

0 1 2 3 4 5 6

Never Very often

5. Go grocery shopping.

0 1 2 3 4 5 6

Never Very often

6. Work in the garden.

0 1 2 3 4 5 6

Never Very often

7. Go to a movie.

0 1 2 3 4 5 6

Never Very often

8. Visit friends.

0 1 2 3 4 5 6

Never Very often

9. Help with the house cleaning.

0 1 2 3 4 5 6

Never Very often

10. Work on the car.

0 1 2 3 4 5 6

Never Very often

11. Take a ride in a car.

0 1 2 3 4 5 6

Never Very often

12. Visit relatives.

0 1 2 3 4 5 6

Never Very often

13. Prepare a meal.

0 1 2 3 4 5 6

Never Very often

14. Wash the car.

0 1 2 3 4 5 6

Never Very often

15. Take a trip.

0 1 2 3 4 5 6

Never Very often

16. Go to a park or beach.

0 1 2 3 4 5 6

Never Very often

17. Do a load of laundry.

0 1 2 3 4 5 6

Never Very often

18. Work on a needed house repair.

0 1 2 3 4 5 6

Never Very often

APPENDIX B: NEO-FFI

NEO FIVE FACTOR INVENTORY

(Costa & McCrae, 1992)

Please read each statement carefully and then circle the number that best represents your opinion of yourself according to the answer choices below.

1 Strongly Disagree 2 Disagree 3 Neutral 4 Agree 5 Strongly Agree

1. I am not a worrier 1 2 3 4 5

2. I like to have a lot of people around me 1 2 3 4 5

3. I don't like to waste my time daydreaming 1 2 3 4 5

4. I try to be courteous to everyone I meet 1 2 3 4 5

5. I keep my belongings clean and neat 1 2 3 4 5

6. I often feel inferior to others 1 2 3 4 5

7. I laugh easily 1 2 3 4 5

8. Once I find the right way to do something, I stick to it 1 2 3 4 5

9. I often get into arguments with my family and co-workers 1 2 3 4 5

10. I'm pretty good about pacing myself so as to get things done on time 1 2 3 4 5

11. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces 1 2 3 4 5

12. I don't consider myself especially "lighthearted" 1 2 3 4 5

13. I am intrigued by the patterns I find in art and nature 1 2 3 4 5

14. Some people think I'm selfish and egotistical 1 2 3 4 5

15. I am not a very methodical person 1 2 3 4 5

16. I rarely feel lonely or blue 1 2 3 4 5

17. I really enjoy talking to people 1 2 3 4 5

18. I believe letting students hear controversial speakers can only confuse and mislead them

1 2 3 4 5

19. I would rather cooperate with others than compete with them 1 2 3 4 5

20. I try to perform all the tasks assigned to me conscientiously 1 2 3 4 5

21. I often feel tense and jittery 1 2 3 4 5

22. I like to be where the action is 1 2 3 4 5

23. Poetry has little or no effect on me 1 2 3 4 5

24. I tend to be cynical and skeptical of others' intentions 1 2 3 4 5

25. I have a clear set of goals and work toward them in an orderly fashion 1 2 3 4 5

26. Sometimes I feel completely worthless 1 2 3 4 5

27. I usually prefer to do things alone 1 2 3 4 5

28. I often try new and foreign foods 1 2 3 4 5

29. I believe that most people will take advantage of you if you let them 1 2 3 4 5

30. I waste a lot of time before settling down to work 1 2 3 4 5

31. I rarely feel fearful or anxious 1 2 3 4 5

32. I often feel as if I'm bursting with energy 1 2 3 4 5

33. I seldom notice the moods or feelings that different environments produce 1 2 3 4 5

34. Most people I know like me 1 2 3 4 5

35. I work hard to accomplish my goals 1 2 3 4 5

36. I often get angry at the way people treat me 1 2 3 4 5

37. I am a cheerful, high-spirited person 1 2 3 4 5

38. I believe we should look to our religious authorities for decisions on moral issues 1 2 3 4 5

39. Some people think of me as cold and calculating 1 2 3 4 5

40. When I make a commitment, I can always be counted on to follow through 1 2 3 4 5

41. Too often, when things go wrong, I get discouraged and feel like giving up 1 2 3 4 5

42. I am not a cheerful optimist 1 2 3 4 5

43. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement 1 2 3 4 5

44. I am hard-headed and tough-minded in my abilities 1 2 3 4 5

45. Sometimes I'm not as dependable or reliable as I should be 1 2 3 4 5

46. I am seldom sad or depressed 1 2 3 4 5

47. My life is fast-paced 1 2 3 4 5

48. I have little interest in speculating on the nature of the universe or the human condition

1 2 3 4 5

49. I generally try to be thoughtful and considerate 1 2 3 4 5

50. I am a productive person who always gets the job done 1 2 3 4 5

51. I often feel helpless and want someone else to solve my problems 1 2 3 4 5

52. I am a very active person 1 2 3 4 5

53. I have a lot of intellectual curiosity 1 2 3 4 5

54. If I don't like people, I let them know it 1 2 3 4 5

55. I never seem to be able to get organized 1 2 3 4 5

56. At times I have been so ashamed I just want to hide 1 2 3 4 5

57. I would rather go my own way than be a leader of others 1 2 3 4 5

58. I often enjoy playing with theories or abstract ideas 1 2 3 4 5

59. If necessary, I am willing to manipulate people to get what I want 1 2 3 4 5

60. I strive for excellence in everything I do 1 2 3 4 5

APPENDIX C: PAIN CATASTROPHIZING SCALE

PAIN CATASTROPHIZING SCALE

(American Academy of Orthopaedic Manual Physical Therapists, 2010)

Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time
I worry all the time about whether the pain will end	0	1	2	3	4
I feel I can't go on	0	1	2	3	4
It's terrible and I think it's never going to get any better	0	1	2	3	4
It's awful and I feel that it overwhelms me	0	1	2	3	4
I feel I can't stand it anymore	0	1	2	3	4
I become afraid that the pain will get worse	0	1	2	3	4
I keep thinking of other painful events	0	1	2	3	4
I anxiously want the pain to go away	0	1	2	3	4
I can't seem to keep it out of my mind	0	1	2	3	4
I keep thinking about how much it hurts	0	1	2	3	4
I keep thinking about how badly I want the pain to stop	0	1	2	3	4
There's nothing I can do to reduce the intensity of the pain	0	1	2	3	4
I wonder whether something serious may happen	0	1	2	3	4

APPENDIX D: PARTICIPANT INFORMATION FORM

PARTICIPANT INFORMATION FORM

1. Do you experience chronic pain (persistent pain lasting three months or more)?
    a. Yes
    b. No
2. Have you had pain (other than minor aches) today?
    a. Yes
    b. No
3. Where is the primary source of your pain located?

    __Head __Back __Abdomen __Chest __Widespread

    __Neck __Extremities __Cancer Related __Other __N/A
4. When did your pain begin? _____(# days/months/years ago)
5. What is your gender?
    a. Male
    b. Female
6. What is your age? _____
7. What is your ethnic/racial background?
    a. American Indian or Alaskan Native
    b. Asian
    c. Black or African American (Not of Hispanic origin)
    d. Hispanic or Latino

e. Native Hawaiian or Other Pacific Islander

f. White or Caucasian (Not of Hispanic origin)

8. What is your UCF classification?

    a. Freshman

    b. Sophomore

    c. Junior

    d. Senior

    e. Other

9. How many semester hours are you currently enrolled in?

_____

10. How many semester hours have you earned since beginning your undergraduate career?

_____

APPENDIX E: INFORMED CONSENT

EXPLANATION OF RESEARCH

Title of Project: **Pain and the NEO Five Factors Correlates in a College Population**

Principal Investigator: Karen Mottarella, Psy.D.

Other Investigators: Juliana Stalter , Shannon Whitten, Ph.D.

You are being invited to take part in a research study. Whether you take part is up to you.

- The persons conducting this research are Drs. Karen Mottarella and Shannon Whitten from the UCF Psychology Department along with Juliana Stalter, an Honors in the Major undergraduate student in the Psychology Department. This research is conducted in partial fulfillment of the requirements for the Honors in the Major Program in Psychology. The purpose of this study is to examine the correlation between chronic pain and the NEO Five Factors. Chronic pain affects over 48 million people and those effects can extend to psychological realms. This study aims to elucidate chronic pain's relationship to personality.
- In this study, you will be asked to complete the West Haven-Yale Multidimensional Pain Inventory (54 item questionnaire), the NEO-PI-R (240 item questionnaire), the Pain Catastrophizing Scale (13 item questionnaire), and a Participant Information Form which solicits demographic and pain related information. You do not have to answer every question or complete every task. You will not lose any benefits if you skip questions or tasks. The study is entirely online and can be completed from a location that provides you with internet access.
- We expect that this research study will take 45 to 90 minutes to complete.
- There is no direct compensation for taking part in this study. However, participation may provide you with the opportunity to earn SONA points which can be applied to your psychology courses that are utilizing SONA points as an extra credit option. Refer to your course syllabi or speak to your instructor for information regarding their extra credit policy. Also check your syllabi or speak to your instructor for information regarding alternatives to research participation. Extra credit will be awarded through the SONA system used by the UCF Psychology Department.
- Your responses to all questions in this study will be anonymous. Upon completion of the study, you will be given a code and asked to email the researcher with your name and the code. You will be providing your name only for the purposes of assigning you credit in the SONA system. You must provide your name in order to be assigned SONA credit. You do not need to provide your name if you do not want to receive SONA credit. It is important to realize that your name and the code are not connected to or associated with any of the information you provided in this study.

You must be 18 years of age or older to take part in this research study.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints, or feel the research has harmed you, contact Dr. Karen Mottarella, Building 3 Room 226, Psychology Department--University of Central Florida Palm Bay Campus. Dr. Mottarella can be reached by phone at 321-433-7987 or by email at kmottare@mail.ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

APPENDIX F: IRB APPROVAL FORM

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Karen E. Mottarella** and Co-PIs: **Juliana C. Stalter, Shannon N. Whitten**

Date: **November 09, 2011**

Dear Researcher:

On 11/9/2011, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	An Exploration of Chronic Pain Experience, Coping, and the NEO Five Factors in High Functioning Adults
Investigator:	Karen E Mottarella
IRB Number:	SBE-11-07936
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 11/09/2011 11:31:15 AM EST

Joanne Muratori

IRB Coordinator

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