

Cleveland State University
EngagedScholarship@CSU



ETD Archive

2017

Title Examination of Somatic Symptomatology Using the Cleveland Adaptive Personality Inventory and the Dimensional Somatic Questionnaire

Elizabeth Kisela
Cleveland State University

Follow this and additional works at: <https://engagedscholarship.csuohio.edu/etdarchive>



Part of the [Other Psychiatry and Psychology Commons](#)

How does access to this work benefit you? Let us know!

Recommended Citation

Kisela, Elizabeth, "Title Examination of Somatic Symptomatology Using the Cleveland Adaptive Personality Inventory and the Dimensional Somatic Questionnaire" (2017). *ETD Archive*. 1004.
<https://engagedscholarship.csuohio.edu/etdarchive/1004>

This Thesis is brought to you for free and open access by EngagedScholarship@CSU. It has been accepted for inclusion in ETD Archive by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.

EXAMINATION OF SOMATIC SYMPTOMATOLOGY USING THE CLEVELAND
ADAPTIVE PERSONALITY INVENTORY AND THE DIMENSIONAL SOMATIC
QUESTIONNAIRE

ELIZABETH C. KISELA

Bachelor of Arts in Psychology
The Ohio State University
June 2009

Submitted in partial fulfillment of requirements for the degree
MASTER OF ARTS IN CLINICAL PSYCHOLOGY
at
CLEVELAND STATE UNIVERSITY
May 2017

We hereby approve this thesis for
Elizabeth Kisela
Candidate for the Master of Arts in Psychology degree for the
Department of Psychology
and the CLEVELAND STATE UNIVERSITY
College of Graduate Studies by

Thesis Chairperson, (Amir Poreh, PhD)

Department & Date

Thesis Committee Member, (Christopher France, PsyD)

Department & Date

Thesis Committee Member, (Boaz Kahana, PhD)

Department & Date

Student's Date of Defense: May 4, 2017

EXAMINATION OF SOMATIC SYMPTOMATOLOGY USING THE CLEVELAND
ADAPTIVE PERSONALITY INVENTORY AND THE DIMENSIONAL SOMATIC
QUESTIONNAIRE

ELIZABETH KISELA

ABSTRACT

This study was designed to assess the reliability and validity of the Cleveland Adaptive Personality Inventory (CAPI) and the Dimensional Somatic Questionnaire (DSQ) on the chronic pain population, depression population, and healthy control population. A total of 178 chronic pain participants, 208 depression participants, and 220 healthy control participants were collected, though not all were used for analysis due to missing data. Each participant was administered an online version of the CAPI with the Dimensional Somatic Questionnaire. Both questionnaires were significantly shortened during or prior to analysis. The questionnaires were shortened to make them more practical for use in the clinical setting. This study documented acceptable to excellent reliability for all 10 main scales of the CAPI across all three groups. Additional findings for the CAPI showed that the somatic scale and depression scale were highly sensitive and specific to the chronic pain and depression populations, respectively. The DSQ demonstrated excellent overall reliability. The DSQ was not found to be useful in distinguishing between chronic somatic symptomatology and chronic emotional symptomatology and was not found to have three constructs (e.g. mental health, emotional health, and behavioral health). However, it was found sensitive and specific to chronic pain patients and would be useful in deciphering the amount of functional impairment a chronic pain participant may have.

TABLE OF CONTENTS

ABSTRACT.....	iii
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
CHAPTER	
I. INTRODUCTION	
1.1 Background.....	1
1.1.1 Somatic Manifestations and the Medical Community.....	2
1.1.2 Gender and Chronic Pain.....	3
1.1.3 Psychosocial Issues Derived from Chronic Illnesses.....	4
1.2 DSM-5, ICD-10, and CAPI with Dimensional Somatic Questionnaire.....	5
1.3 Why is a New Somatic Scale Needed?.....	6
II. REVIEW OF EXISTING MEASURES.....	7
2.1 Physical Health Questionnaire-15.....	7
2.2 Somatic Symptom Scale-8.....	8
2.3 Minnesota Multiphasic Personality Inventory (MMPI).....	9
2.3.1 MMPI Hypochondriasis Scale.....	10
2.4 The Cleveland Adaptive Personality Inventory (CAPI).....	12
2.5 Development of the Dimensional Somatic Questionnaire.....	13
III. METHOD.....	14
3.1 Participants.....	14
3.3 Procedure.....	15
IV. RESULTS AND DISCUSSION.....	17
4.1 CAPI Reliability and Validity.....	17
4.2 DSQ Reliability and Validity.....	30
4.3 Discussion.....	34
4.3.1 Limitations of This Study.....	36
4.3.2 Future Research.....	37

V. CONCLUSION.....	38
REFERENCES.....	39
APPENDICES.....	48
A. <i>DSM-5 criteria for Somatic Symptom and Related Disorders</i>	48
B. <i>ICD-10 Criteria for Somatic Symptom and Other Related Disorders</i>	49
C. <i>Consent Form</i>	51

LIST OF TABLES

Table	Page
I. CAPI Reliability for Chronic Pain Group.....	20
II. CAPI Reliability for Depressed Group.....	21
III. CAPI Reliability for Healthy Controls.....	22
IV. CAPI Reliability across all 4 groups.....	23

LIST OF FIGURES

Figure		Page
1.	Measure of specificity and sensitivity of the Depression scale for the depressed participants.....	24
2.	Measure of specificity and sensitivity of the Somatic scale for the chronic pain participants.....	25
3.	Overlapping CAPI profiles with chronic pain participants in blue, depression participants in orange, and healthy control participants in gray.....	26
4.	Chronic pain participant profile for the 10 main CAPI scales and the Naivet� scale.....	27
5.	Depressed participant profile for the 10 main CAPI scales and the Naivet� scale.....	28
6.	Healthy control participant profile for the 10 main CAPI scales and the Naivet� scale.....	29
7.	Measure of specificity and sensitivity of the 56-item DSQ and the possible factors for all participants.....	32
8.	Measure of specificity and sensitivity of the 20-item DSQ and the possible factors for all participants.....	33

CHAPTER I

INTRODUCTION

1.1 Background

A report written in 2011 by the Institute of Medicine, in collaboration with the National Academy of Sciences, stated that the United States spends up to \$635 billion each year in medical treatment and lost productivity due to chronic pain. The quality of life for people who suffer from chronic pain is greatly diminished and because of this, chronic pain patients can develop psychological issues like depression or anxiety. Chronic pain occurs in 33% of adult Americans (Johannes, Kim Le, Zhou, Johnston, & Dworkin, 2010). To more efficiently diagnose and productively treat the 33% of American adults as well as many other chronic pain patients around the world, a personality assessment and somatic questionnaire are necessary to streamline the process.

1.1.1 Somatic Manifestations and the Medical Community

It has been a long road for the outside world to believe that emotional problems can manifest themselves into physical illnesses. Freud developed theories regarding traumatic hysteria in the late 1800s, but due to the inability to replicate his work scientifically, his work was falling on deaf ears in the medical community (Aron & Starr, 2013). What did emerge from Freud's work was the recognition that irritability, mood changes, and pain are often symptoms of a psychosomatic problem, not simply a medical one. Even in the more recent medical community, studies have shown that anywhere from 25% to 50% of patients seen by physicians have psychological disorders in addition to medical problems (Asaad, 2000; Mostofsky & Barlow, 2000); and many of those patients are left undiagnosed and not referred for treatment of those psychosocial problems (American Journal of Managed Care, 1999).

Freud eventually abandoned some of his theories regarding the cause of hysteria and the American Psychological Association (APA) dropped hysteria from *The Diagnostic and Statistical Manual of Mental Disorders III* (3rd ed.; *DSM-III*; American Psychiatric Association, 1952) officially, stating that hysteria is too morally laden to be considered a psychological condition (Libbrecht & Quackelbeen, 1995). The American Medical Association also no longer use the term hysteria as a medical diagnosis, although somatic manifestations were occurring without known etiology remains a common phenomenon. Given these findings, Grobin (1960) stated that the medical community has a difficult time accepting psychosomatic medicine as a true science and believing in the fact that a person's psyche is directly related to the development and treatment of their

physical illness. He went on to begrudgingly admit that psychosomatic medicine offers a more comprehensive approach to the patient and the illness, but noted that questions remain as to whether the medical community at that time should take psychosomatic symptoms seriously.

More recently there have been numerous studies done that show a patient's mindset can influence the outcome of a surgical procedure and sometimes the cost and overall perception of success of the surgical procedure (Ayers, Franklin, & Ring, 2013; Fox et al., 2013; Sharma et al., 2016). More recent studies show that chronic pain, somatization, and psychosomatic issues may be a result of central sensitization, a central nervous system process causing hyperalgesia diffusely throughout the body (Woolf, 2011; Meeus & Nijs, 2007; Phillips & Clauw, 2011). Following the understanding that mind and body symptoms are related, the medical community has become more accepting of psychosomatic medicine. This is evidenced by the numerous interdisciplinary pain rehabilitation programs available to patients who face somatic disorders, which include the Cleveland Clinic Foundation and the Mayo Clinic. Further evidence of the medical community's acceptance are the relatively new requirements at many facilities of psychological evaluations prior to major surgeries.

1.1.2 Gender and Chronic Pain

It is a widely held clinical opinion that females are more susceptible to pain and exhibit more pain behaviors than their male counterparts (Lawlis, Achterberg, Kenner, &

Kopetz, 1984). Some pain modulation mechanisms and sex hormones could be contributing factors to this opinion (Nahman-Averbuch, Sprecher, Brill, Yarnitsky, & Jacob, 2016). There is even some research that suggests, in certain pain scenarios, the X chromosome has a role in how much pain is expressed, which makes women more likely to develop chronic, lasting pain (Linnstaedt, et al., 2015). No certain number of women or men were put into this trial despite the evidence that women may be more prone to exhibit pain and pain behaviors. A factor analysis of women and men separately was intended to be done to determine if factor structure is similar for both men and women, however, there was not enough men collected to perform a reliable analysis.

1.1.3 Psychosocial Issues Derived from Chronic Illnesses

Serious somatic symptoms, including chronic pain and fibromyalgia, cause a great deal of anger, depression, fatigue, and anxiety in people who have experienced them (Shuchang et al., 2011). Therefore, a great deal of research has been conducted to help people who experience these negative feelings chronically. New methods for identifying patients who are likely to develop chronic pain is therefore of great interest to both researchers and clinicians. Mansour et al. (2013), for example, studied, using brain imaging techniques, the white matter structural properties of pain patient and was able to predict the amount of pain manifested by at least eighty percent of the outcomes.

Recent brain imaging studies show that there are new treatments for patients with chronic pain. For example, Deogaonkar et al. (2016) used functional magnetic resonance

imaging (fMRI) to map areas of the brain that modulate pain. In that study, it was demonstrated that the brain's emotional networks, which process and facilitate emotional connectivity, could be relieved for chronic pain patients through therapeutic spinal cord stimulation. Although the study included only 10 patients, the results are informative and another stride forward in the treatment for patients who suffer from chronic pain.

Studies like those that had been previously reviewed suggest that there is a growing need for reliable and valid measures for the diagnoses of chronic pain patients. A way to distinguish origin of chronic conditions can help current chronic pain patients find their way to relief through cutting edge medical treatments as they progress coupled with the best psychotherapy for their current psychosomatic stressors. Another reason why new measures are necessary would be because of the high comorbidity rates of depression and anxiety with chronic pain. Depression is the most frequent comorbid mood disorder with chronic pain, with anxiety as a close second (Von Korff et al., 2005).

1.2 DSM-5, ICD-10, and CAPI with Dimensional Somatic Questionnaire

The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*; American Psychiatric Association, 2013), is the current diagnostic manual for mental health professionals. It is a manual for the classification and diagnosis of mental disorders and is updated periodically by the American Psychiatric Association (APA). *The International Statistical Classification of Diseases and Related Health Problems* (10th revision; *ICD-10*; World Health Organization, 1992) is a coding system that most

healthcare providers in the United States use to classify a patient's diagnoses, symptoms, procedures, and surgeries for use in billing and record-keeping for hospital care. It is a periodically updated with new illness types, symptoms, and procedures by the World Health Organization (WHO) and implemented throughout the United States' medical facilities. Every diagnosis in the DSM-5 is directly linked to an ICD-10 code.

1.3 Why is a New Somatic Scale Needed?

A reliable, valid personality assessment that is directly linked to DSM-5 criteria for psychosomatic disorders and ICD-10 diagnosis codes for somatization disorders would make diagnosing and treating somatically stricken patients with mental health issues more efficient and more effective.

CHAPTER II

REVIEW OF EXISTING MEASURES

2.1 Physical Health Questionnaire-15

A popular and often-used scale in the health care setting for somatization is the Physical Health Questionnaire-15 (PHQ-15) (Kroenke, Spitzer, & Williams, 2002) which recently produced the abbreviated version called the Somatic Symptom Scale-8 (SSS-8) (Gierk et al., 2013). The PHQ-15 is an assessment used to identify symptoms over the last four weeks while the SSS-8 is used to identify symptoms over the past seven days. Both measures have been empirically tested for validity and reliability and fare quite well (Gierk et al., 2015).

The PHQ was developed as a small part of a Type A behavior pattern assessment by Spence, Helmreich, and Pred (1987). Looking at physical health was not a focus for their study; instead, the PHQ was developed to look at four dimensions of somatic health: quality of sleep, digestion issues, headaches, and respiratory problems. When initially created and studied, Spence et al. (1987) reported that all four subscales were

significantly intercorrelated (ranging from .17 to .43) and their internal consistency reliabilities were above $\alpha = .75$. The more recent overall index including only 14 items was developed and used by Rogers and Kelloway (1997) and Schat and Kelloway (2000, 2003) in workplace aggression and violence studies. The original PHQ included 32 items, while the revised and more recently utilized PHQ was minimized to a 14-item scale using only three dimensions, excluding the respiratory problems dimension. Once that scale was developed, an overall index of somatic health based questionnaire was created on all items. Both scales, subscale and overall index, showed reliabilities above $\alpha = .80$ in separate studies (Rogers & Kelloway, 1997; Schat & Kelloway, 2000; Schat & Kelloway, 2003). In a study done by Schat, Kelloway, and Desmarais (2005), despite having narrowed down the dimensions to three and being reliable in measuring an overall somatic symptomatology index, the PHQ was found to be a psychometrically sound instrument that measures four dimensions: gastrointestinal problems, headaches, sleep disturbances, and respiratory illness. This outcome is very similar to the original, but it has only half of the questions, making it very usable for current clinicians.

2.2 Somatic Symptom Scale-8

The SSS-8 is an even shorter version of the PHQ-15. It has good internal consistency ($\alpha = .81$) and it also measures four dimensions: gastrointestinal issues, pain, fatigue, and cardiopulmonary somatic aspects. The SSS-8 was significantly associated with depression, anxiety, health status, and use of the health care system by a self-report

survey in Germany using a random-route sampling procedure and doing analysis on 2,510 participants' responses (Gierk et al., 2013). When studied by Gierk et al. (2014), the abbreviated version of PHQ-15, was found to identify individuals with low, medium, high, and very high somatic symptom burden. The SSS-8 was also found to have a higher correlation between somatic symptom burden to depression and anxiety than to general health status. This finding could suggest that somatic symptoms and mental health have a comorbid relationship. While the SSS-8 shows that this relationship exists, the CAPI and Dimensional Somatic Questionnaire can expand on that relationship to see if it is strong enough for diagnosis.

The PHQ-15 and the SSS-8 do measure symptoms but they do not measure a patient's personality and combine those results in making a tentative diagnosis as the somatic scales on the CAPI will hopefully accomplish. The PHQ-15 and SSS-8 are primarily used in order to determine symptomatology for a physical ailment and make no attempt in correlating their results to any mental health criteria. The Dimensional Somatic Questionnaire in congruence with the CAPI will allow for mental health professionals and physicians to get a better understanding of how these somatic symptoms are affecting their patients' thought processes in a mental health capacity.

2.3 Minnesota Multiphasic Personality Inventory (MMPI)

The MMPI is one of the most widely used personality assessment commercially available (Butcher & Perry, 2008; Kleinmuntz, 1967; Lanyon & Goodstein, 1982), which

is why there has been an ample amount of research conducted on the MMPI (Butcher & Perry, 2008; Lanyon & Goodstein, 1982). It is used in a variety of settings, including: the military, employment settings, police officers, and clinical inpatient and outpatient settings.

2.3.1 MMPI Hypochondriasis Scale

The Hypochondriasis scale of the MMPI and subsequent editions of the MMPI is a scale that was developed to identify patients displaying a pattern of symptoms associated with health and illness anxiety (Graham, 1990). A number of different constructs labeled poor physical health, digestive difficulties, bad eyesight, lung damage, poor bowel function, hypochondriasis, sinusitis, and hospitalization deal specifically with somatic concerns and can be conceptualized into a simple, unidimensional scale: hypochondriasis.

When a person scores extremely high ($T > 80$) on this scale on the MMPI, bizarre and exaggerated somatic complaints are likely occurring. This scale can be coupled with other scales, which have yet to be developed in the CAPI, to develop more complex diagnoses for an individual. Scores in the high mid-range ($T = 60-80$) typically identify patients with stomach issues. Patients who have true physical problems generally do not exceed $T \leq 60$. If a patient with a true physical problem scores higher than a 60, a psychological issue should be strongly considered.

As the MMPI is a personality assessment, personality traits can be discerned for patients who score at certain levels on this test. High scorers on the hypochondriasis scale ($T > 60$) are likely narcissistic and self-involved with a negative, pessimistic outlook on life. This type of person generally feel miserable and dissatisfied and makes life for their caregivers, family, and friends difficult by being demanding, critical, and indirectly hostile toward them. With these high scorers, their pain is more likely to be longstanding and the person may have minimal healthy coping mechanisms for their pain. Moderately high and high scorers tend to lack insight to the actual psychological causes or aspects of their physical presentation and have a hard time accepting psychological interpretation, this makes treatment methods more difficult. Because this scale is unidimensional, low scorers are typically the opposite of high scorers and are more accepting of treatment (Graham, 1990).

The MMPI-2 was used in a chronic pain research project and expanded on the MMPI hypochondriasis scale. Some questions were deleted and some modified for a multitude of reasons for the MMPI-2, so re-standardizing and confirming validity and reliability in the chronic pain subgroup was necessary. The analysis used a sample of chronic pain patients in the Minnesota and Midwestern region. The control group, however, was not a group in the Midwestern region and was not a medical population, which would have been the ideal control population for re-standardization of the MMPI-2 (Keller & Butcher, 1991). The population that the CAPI will be using as a control will be in the medical community, but will not be suffering from chronic pain symptoms. The CAPI with the Dimensional Somatic Questionnaire will likely offer similar outcomes to the MMPI with fewer questions, ease of taking it online for free, and will continually be

developed further by the top minds in the chronic pain world to make for the best coverage of all the possible symptoms involved. Creating the CAPI and the Dimensional Somatic Questionnaire is an endeavor to create more reliable and valid data than the MMPI Hypochondriasis scale provides, which will allow for an implementation of a treatment regimen and diagnosis that can be counted on by the treating physician and/or psychologist.

2.4 The Cleveland Adaptive Personality Inventory (CAPI)

The CAPI (Poreh, 2007) was in development for over a decade. The purpose of this new measure is to apply adaptive methodology, much like the one proposed by Butcher (2000) toward the study of personality functioning. While the Minnesota Multiphasic Personality Inventory (MMPI), the Millon Clinical Multiaxial Inventory (MCMI), and the Personality Assessment Inventory (PAI) are expensive, and too lengthy for use in many medical settings, the CAPI is shorter, after the most recent revision, free upon request, and geared toward the ICD-10. The expense of existing multidimensional measures is a barrier because several somatoform disorders have their highest incidence in the lower socioeconomic status patient population (American Psychiatric Association, 2013), and these patients are unlikely to be able to afford the expense of the test.

2.5 Development of the Dimensional Somatic Questionnaire

There are many somatization scales being utilized by medical professionals today (Zijlema et al., 2013). The scales used today and the somatization scales used in the past ask a variety of questions that can be clustered into a number of constructs such as gastrointestinal issues, fatigue, cardiopulmonary issues, bodily preoccupation, hypochondriasis, disease phobia, and concerns about pain. These constructs were used to develop a symptom profile with little incorporation of mental health diagnosis. The CAPI and Dimensional Somatic Questionnaire aims to get an understanding of the 3 broader constructs: mental health, behavioral health, and emotional health of the patient presenting with somatic complaints. By using the three broad constructs (mental, behavioral, and emotional health) and a lie scale, the patient will be able to convey their specific mental disorder, if one is present. The focus of the Dimensional Somatic Questionnaire is to not only develop the symptom profile of the patient, much like the numerous other somatic scales in use today, but to also give insight to how severe the patient's mental health problems may be. This will give the practitioner a clearer view of how to diagnose and treat the individual during and after their assessment.

CHAPTER III

METHOD

3.1 Participants

The chronic pain participants included in this research experiment were subjects enrolled in ResearchMatch.org who had self-reported a diagnosis of chronic pain, fibromyalgia, or any other serious somatic symptom disorder. The control sample of this research experiment included subjects enrolled in ResearchMatch.org who had not self-reported a diagnosis of chronic pain, fibromyalgia, or any other serious somatic symptom disorder causing pain. The depression sample of this research experiment included subjects enrolled in ResearchMatch.org who had self-reported a current or past diagnosis of any kind of depression.

3.2 Procedure

In the initial stage of development of the somatic scales for the CAPI items were generated per the DSM-5 and ICD-10 criteria of each somatic disorder in the somatic symptoms and related disorders chapter. All the items are measured on a 4-point Likert scale (true, mostly true, mostly false, and false). Items have been adopted and modified from previously published measures. The final item pool includes 330 questions for the CAPI and an additional 56 questions for the Dimensional Somatic Questionnaire.

Participants contacted through ResearchMatch.org were contacted only if they had self-disclosed a diagnosis of fibromyalgia or chronic pain. The control participants contacted through ResearchMatch.org were contacted if they had not disclosed any psychological disorder, chronic pain, or fibromyalgia diagnoses. Another group of participants, who have disclosed a diagnosis of depression, were included to establish if somatic pain disorders can be distinguished from emotional pain disorders, like depression.

Once participants were deemed eligible, they were invited through Researchmatch.org to participate in the CAPI and the Dimensional Somatic Questionnaire. If accepted, they consented and demographic questions were asked, including: age, gender, level of education, list of all current medical conditions, list of all medications the participant is currently taking, and to identify how the developed chronic pain (if they had chronic pain). All participants were administered the CAPI with the

Dimensional Somatic Questionnaire. It is estimated that it took 60-120 minutes to complete both the CAPI and the DSQ.

A total of 178 participants were collected for the chronic pain group, 208 participants were collected for the depression group, and 220 healthy control participants were collected. After removing all participants who had more than 10 missing answers, a total of 134 were in the chronic pain group, 137 in the depression group, and 151 in the healthy control group for the CAPI questionnaire. An additional 1 participant was removed in the depression group and 2 participants were removed in the healthy control group for the DSQ analysis due to 5 or more missing answers on the DSQ. The chronic pain group did not have any participants removed for the DSQ analysis. The DSQ had a repeat question, numbers 18 and 55, so question 55 was removed prior to analysis.

Reliability was measured using Cronbach α for the CAPI and DSQ. Validity was measured by ROC curve for both questionnaires. A factor analysis for the DSQ and a one-way ANOVA for the CAPI were used to measure validity as well. Mean T-score profiles for the CAPI were established for healthy participants, chronic pain participants, and depressed participants.

CHAPTER IV

RESULTS AND DISCUSSION

4.1 CAPI Reliability and Validity

The full-version CAPI was given to each participant (330 questions), but during the process of this research, the CAPI was shortened to 173 questions. The questions were removed to make the personality inventory more practical in the clinical setting. All questions have remained the same during the process of shortening the CAPI, so the reliability and validity of only the newer, shorter version of the CAPI will be discussed.

The CAPI has an excellent overall reliability (Cronbach $\alpha = .90$). Tables I-IV show the reliability of the various scale across the three groups (chronic pain, depression, and healthy controls) as well as the overall reliability of the various scales for all groups combined. One sees that the reliability ranges from $\alpha = .69$ -.91 in the chronic pain group, $\alpha = .68$ -.92 in the depressed group, $\alpha = .72$ -.92 in the healthy control group, and $\alpha = .71$ -.94 across all groups.

A one-way analysis of variance (ANOVA) for each scale was calculated on each of the three groups (chronic pain, healthy controls, and depressed participants) to determine if they significantly differ on all main scales of the CAPI. The analysis was significant at $p < .01$ or less, to correct for Type I error, for all scales: SOM: $F(2, 427) = 149.72, p < .001$; DEP: $F(2, 427) = 86.36, p < .001$; AVO: $F(2, 430) = 51.34, p < .001$; SOC: $F(2, 427) = 8.51, p < .001$; BOR: $F(2, 427) = 66.28, p < .001$; PAR: $F(2, 427) = 31.64, p < .001$; ANX: $F(2, 427) = 76.21, p < .001$; SCHIZ: $F(2, 427) = 19.44, p < .001$; MAN: $F(2, 427) = 21.92, p < .001$; OCPD: $F(2, 427) = 16.50, p < .001$. It should be noted that the Levene's test of the homogeneity of variance was not satisfied for 3 of the main scales (DEP: $p = .005$, BOR: $p = .004$, and PAR: $p = .031$), but was satisfied for the rest of the scales at $p > .14$ or higher.

A post-hoc analysis (Tukey's) was done to determine specific differences between groups on the Somatization, Avoidant, Sociopathy, Anxiety, Schizotypy, and Mania scales as they passed the Levene's test of homogeneity of variance. Tukey's post-hoc analysis revealed that all three groups did significantly differ at $p < .01$, to correct for Type I error, on each of the 10 main scales except for the following: The chronic pain group's mean score on the Sociopathy scale was higher than the control group but did not significantly differ ($p = .62$). This suggests that the Sociopathy scale may not be able to differ between the chronic pain group and the control group or that chronic pain and healthy control subjects do not differ when it comes to sociopathy. The chronic pain group and the depression group did not significantly differ on 4 of the main scales including the Anxiety scale ($p = .07$), Mania scale ($p = .33$), OCPD ($p = .06$), and the Schizotypy scale ($p = .97$). The chronic pain group's mean score on the Anxiety, Mania,

and OCPD scales were lower than the depression group, but not significantly different. The depression group's mean score was lower, but not significantly different, on the Schizotypy scales. This means that the CAPI does not differentiate these two patient populations on these scales.

A post-hoc analysis (Games-Howell) was done to determine specific differences between groups on the Depression, Borderline, and Paranoia scales as they did not pass the Levene's test of homogeneity of variance and Games-Howell is designed for unequal variances and is based on the q-statistic distribution. This shows a significant difference on all scales ($p < .005$) except for one. The depression group's mean score on the Depression scale was higher than the chronic pain group's mean score, but was not significantly different ($p = .12$). This means that the two groups are not able to be differentiated on another of the main scales (Depression), though the depression group did score higher, which is what the scale is intended to do.

The area under the curve (AUC) on the Depression scale for the depression group and on the Somatic scale for the chronic pain group are Figure 1 and Figure 2, respectively. The AUC measures sensitivity and specificity; how often the scale accurately predicts depression and somatization on depressed and chronic pain patients, respectively, and how often they don't have depression and somatization when they do not. The area under the curve for the Depression scale for the Depressed group is .72, which would be considered fair. The area under the Somatic scale for the Chronic Pain group is .83, which would be considered good.

Table I – CAPI Reliability for Chronic Pain group

Scale	Number of items	Cronbach Alpha	Mean	SD
Somatization (SOM)	15	.793	39.40	7.57
Depression (DEP)	15	.914	36.46	9.96
Avoidant (AVO)	15	.874	37.25	8.60
Borderline (BOR)	15	.869	28.02	8.26
Sociopathy (SOC)	19	.713	41.41	7.30
Paranoia (PAR)	15	.897	29.26	8.64
Anxiety (ANX)	15	.905	38.18	9.63
Schizotypy (SCHIZ)	15	.799	24.39	6.74
Mania/Bipolar (BI)	15	.801	29.87	7.22
OCPD (OCPD)	10	.693	20.93	4.91

Table II – CAPI Reliability for Depressed group

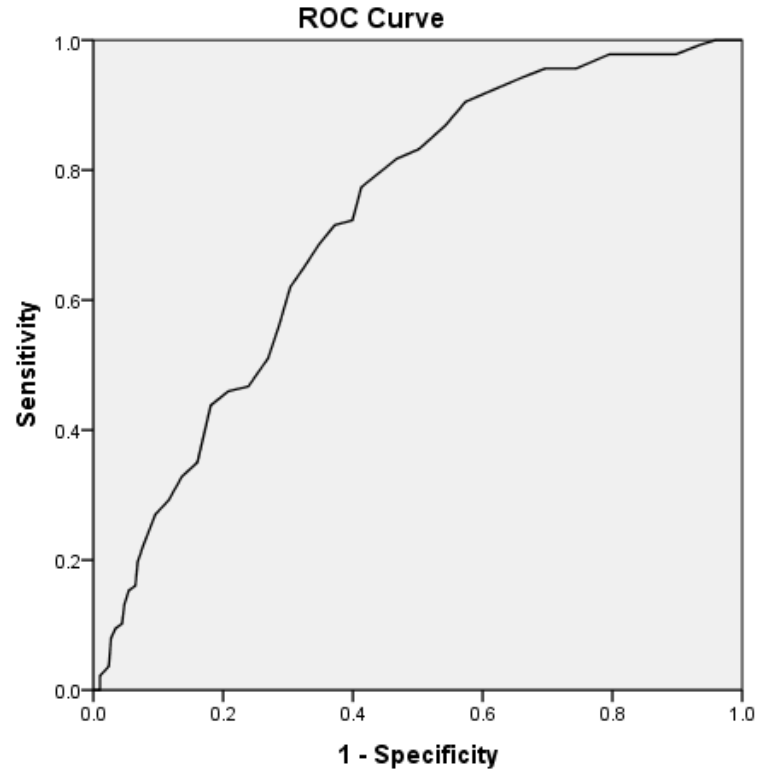
Scale	Number of items	Cronbach Alpha	Mean	SD
Somatization (SOM)	15	.828	33.23	8.10
Depression (DEP)	15	.915	38.70	10.10
Avoidant (AVO)	15	.849	41.81	7.80
Borderline (BOR)	15	.848	32.12	8.18
Sociopathy (SOC)	19	.753	38.54	7.70
Paranoia (PAR)	15	.896	32.70	8.90
Anxiety (ANX)	15	.880	40.68	8.61
Schizotypy (SCHIZ)	15	.835	24.20	6.98
Mania/Bipolar (BI)	15	.796	31.10	6.99
OCPD (OCPD)	10	.678	22.31	4.89

Table III – CAPI Reliability for Healthy Control group

Scale	Number of items	Cronbach Alpha	Mean	SD
Somatization (SOM)	15	.819	24.40	6.90
Depression (DEP)	15	.920	25.20	8.60
Avoidant (AVO)	15	.890	31.83	8.40
Borderline (BOR)	15	.872	22.02	6.37
Sociopathy (SOC)	19	.733	37.07	7.00
Paranoia (PAR)	15	.888	25.04	7.38
Anxiety (ANX)	15	.923	28.29	9.26
Schizotypy (SCHIZ)	15	.838	20.23	5.87
Mania/Bipolar (BI)	15	.841	25.89	7.14
OCPD (OCPD)	10	.724	19.04	4.91

Table IV – CAPI Reliability across all 3 groups

Scale	Number of items	Cronbach Alpha	Mean	SD
Somatization (SOM)	15	.881	31.90	9.80
Depression (DEP)	15	.938	33.05	11.30
Avoidant (AVO)	15	.896	36.69	9.24
Borderline (BOR)	15	.890	27.12	8.67
Sociopathy (SOC)	19	.743	38.91	7.54
Paranoia (PAR)	15	.906	28.80	8.86
Anxiety (ANX)	15	.928	35.34	10.67
Schizotypy (SCHIZ)	15	.835	22.80	6.79
Mania/Bipolar (BI)	15	.822	28.80	7.46
OCPD (OCPD)	10	.711	20.68	5.08



Diagonal segments are produced by ties.

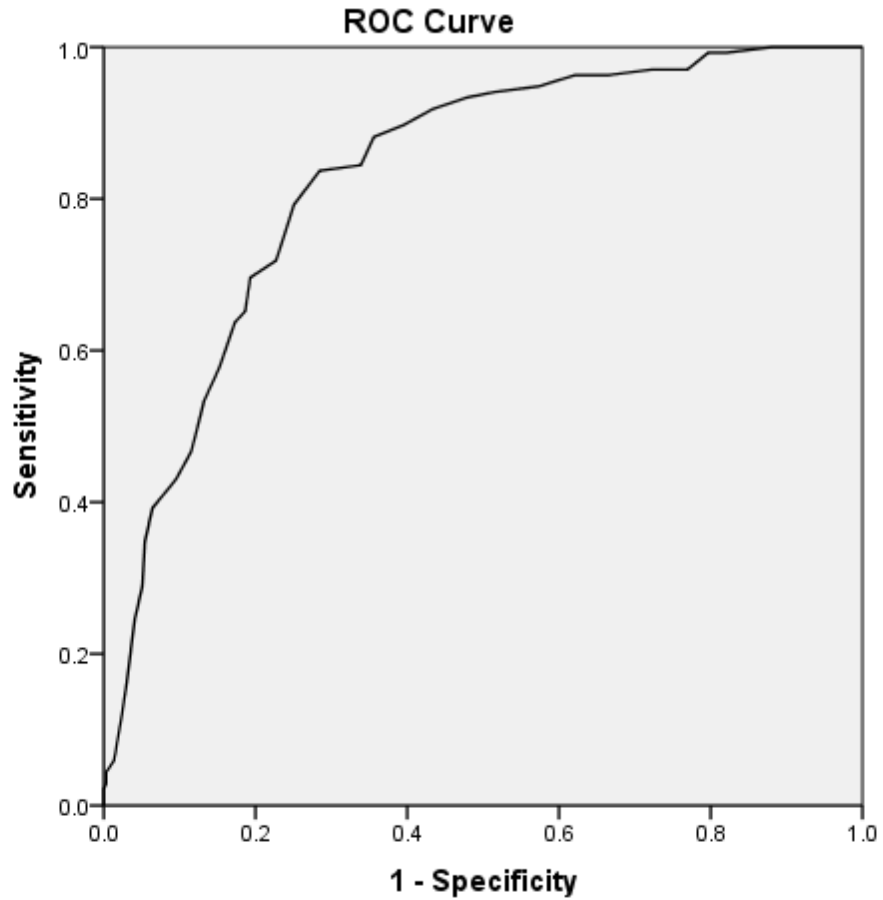
Area Under the Curve

Test Result Variable(s): DEP

Area
.722

The test result variable(s): DEP has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

Figure 1. Measure of specificity and sensitivity of the Depression scale for the depressed participants.



Diagonal segments are produced by ties.

Area Under the Curve

Test Result Variable(s): SOM

Area
.828

The test result variable(s): SOM has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

Figure 2. Measure of specificity and sensitivity of the Somatic scale for the chronic pain participants.

Figures 3-6 show the T-score profiles on each of the 10 main scales and the Naiveté scale for chronic pain participants (Figure 4), depressed participants (Figure 5), healthy controls (Figure 6), and all three overlapping (Figure 3).

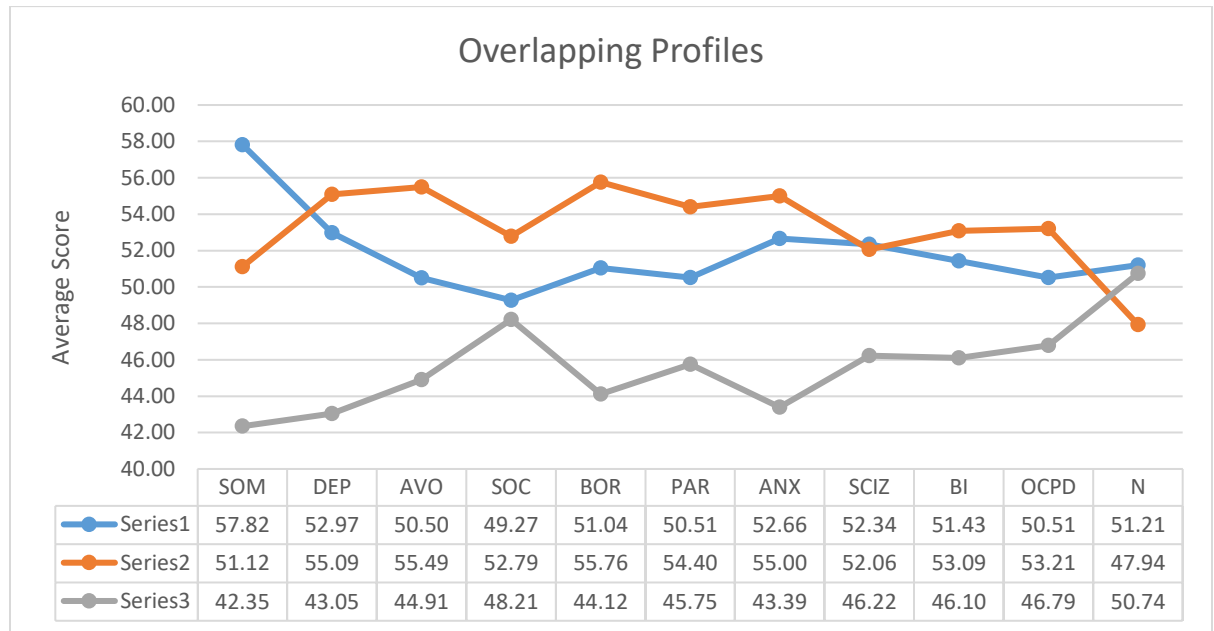


Figure 3. Overlapping CAPI profiles with chronic pain participants in blue, depression participants in orange, and healthy control participants in gray.

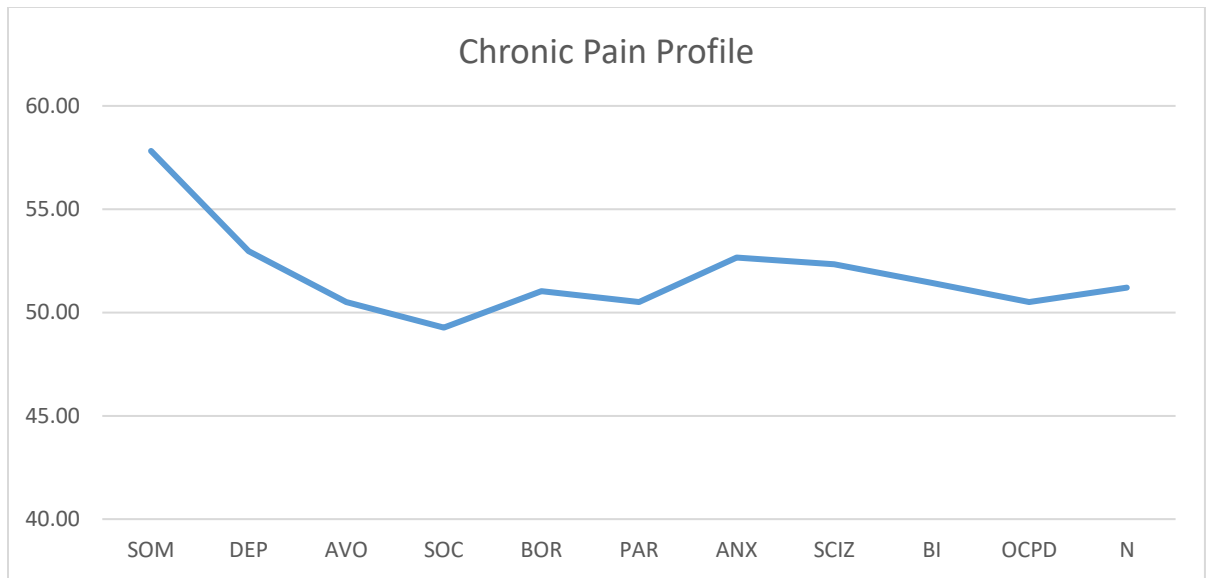


Figure 4. Chronic Pain participant profile for the 10 main CAPI scales and the Naiveté scale.

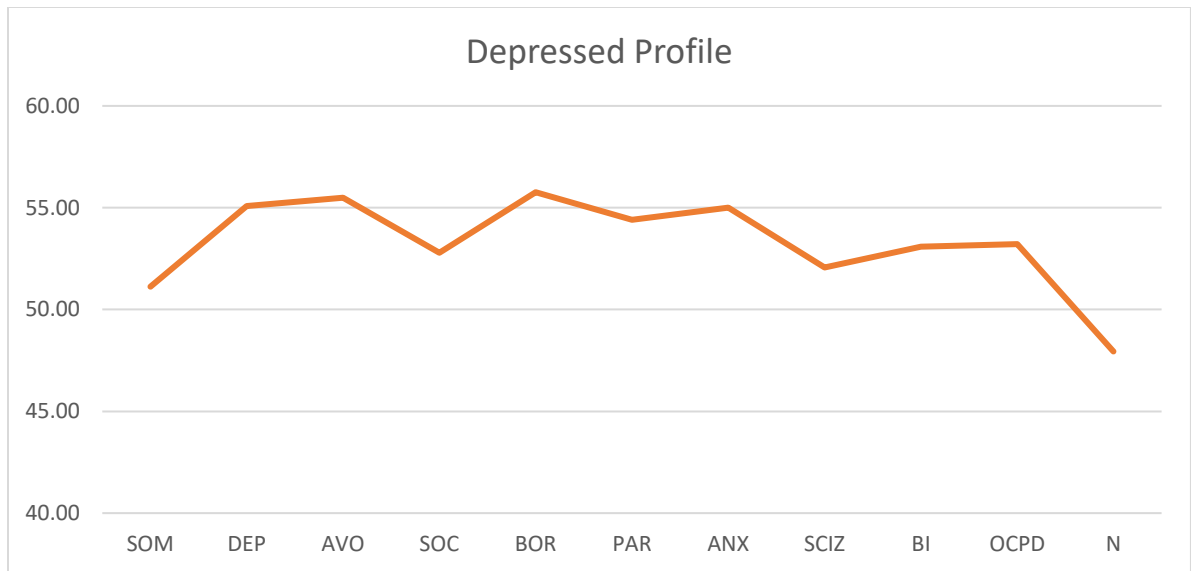


Figure 5. Depressed participant profile for the 10 main CAPI scales and the Naiveté scale.

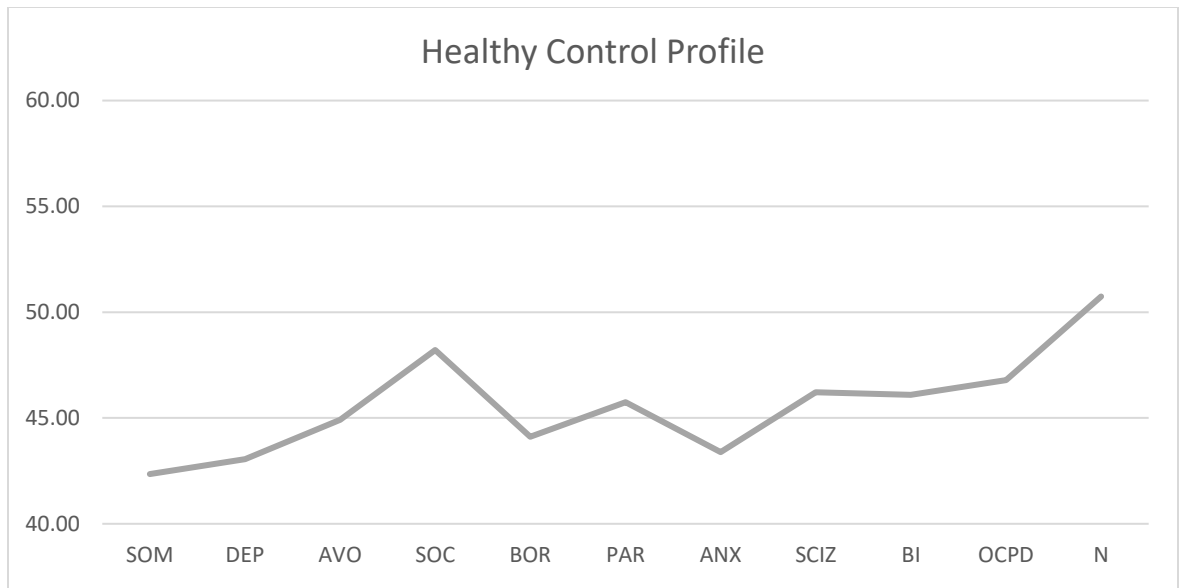


Figure 6. Healthy control participant profile for the 10 main CAPI scales and the Naiveté scale.

4.2 DSQ Reliability and Validity

Prior to the removal of questions, the DSQ had excellent reliability (Cronbach $\alpha = .92$). For the 56-question DSQ, the Bartlett's test of sphericity was significant ($\chi^2(395) = 4327.39, p < .001$). The Kaiser-Meyer Olkin measure of sampling adequacy was .93, well above the commonly recommended value of .60. However, the MSA values on the anti-image matrix were .65 or above and some partial correlation values were above .8. This indicates that some questions needed to be removed due to multicollinearity prior to completing a factor analysis.

A total of 36 questions were removed due to multicollinearity and to shorten the questionnaire to make it more feasible for use in the clinical field. After the removal of 36 questions the DSQ had even better overall reliability (Cronbach $\alpha = .95$). The resulting DSQ was 20 questions in length, the Bartlett's test of sphericity was still significant ($\chi^2(395) = 4633.40, p < .001$) and the Kaiser-Meyer Olkin measure of sampling adequacy was improved to .96. The MSA values on the anti-image matrix were all above .90, and the partial correlation values were .70 or below, further confirming that each item shared some common variance with other items. Therefore, factor analysis was deemed suitable after the removal of highly multicollinear questions.

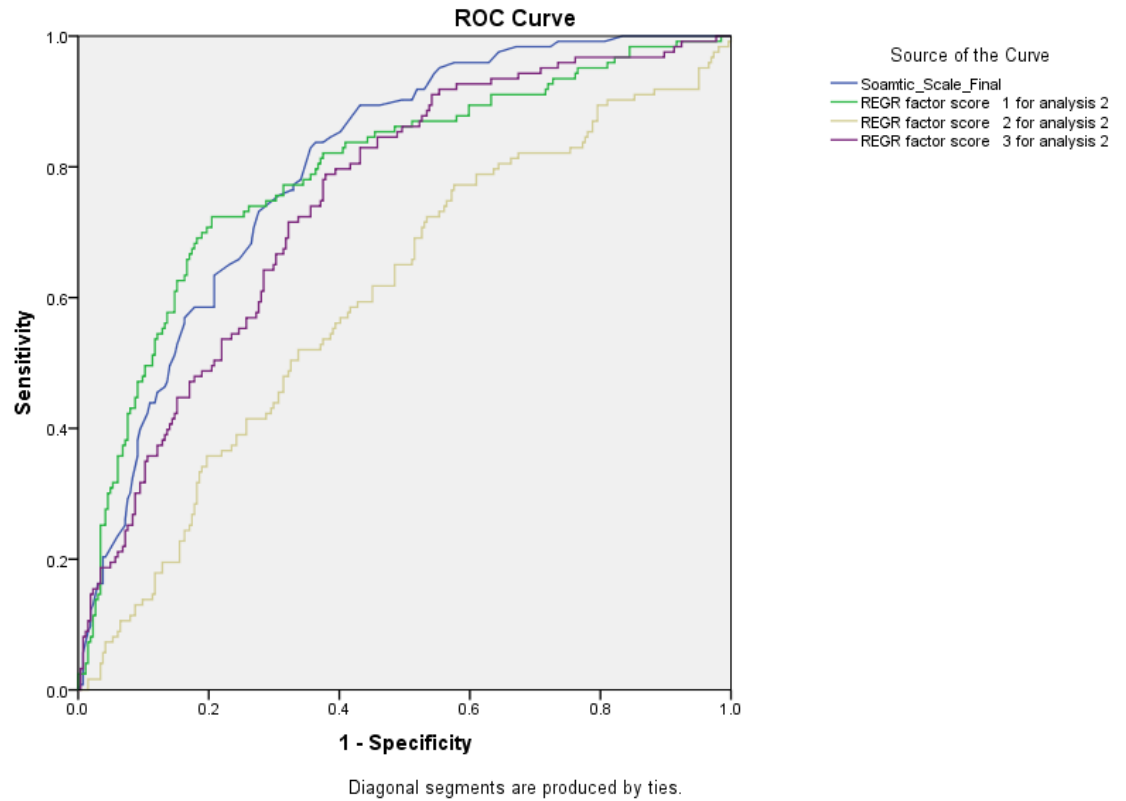
The factor analysis used a principal component extraction method with a varimax rotation. There were three possible factors, but after examining the eigenvalues and removing all factors below a value of 2 that did not account for at least 6% of the variance there was only one factor. The primary factor accounted for 50.05% of the

variance in individual's responses. Upon examining the scree plot, the eigenvalue analysis that defined only one factor exists was supported.

The area under the curve for each of the three possible factors and the full, 56-question DSQ is shown in Figure 7. The area under the Somatic Scale Final (56-question DSQ) curve is 0.80, which would be considered fair. The AUC for the Somatic Scale 20 Item (20-question DSQ) is 0.85, which improved to good after the removal of 36 questions. The 20-question DSQ improved on all the factors' area under the curve and improved on the 56-question DSQ, which means the shortened DSQ is the most effective at discriminating between chronic pain participants and healthy participants (Figure 8).

A one-way analysis of variance (ANOVA) was calculated on each of the three groups (chronic pain, healthy controls, and depressed participants) to determine if they significantly differ on the DSQ. The analysis shows that they do significantly differ on the DSQ $F(2, 392) = 156.87, p < .001$. Post-hoc analysis (LSD and Tukey's) showed a significant difference between all groups ($p < .001$).

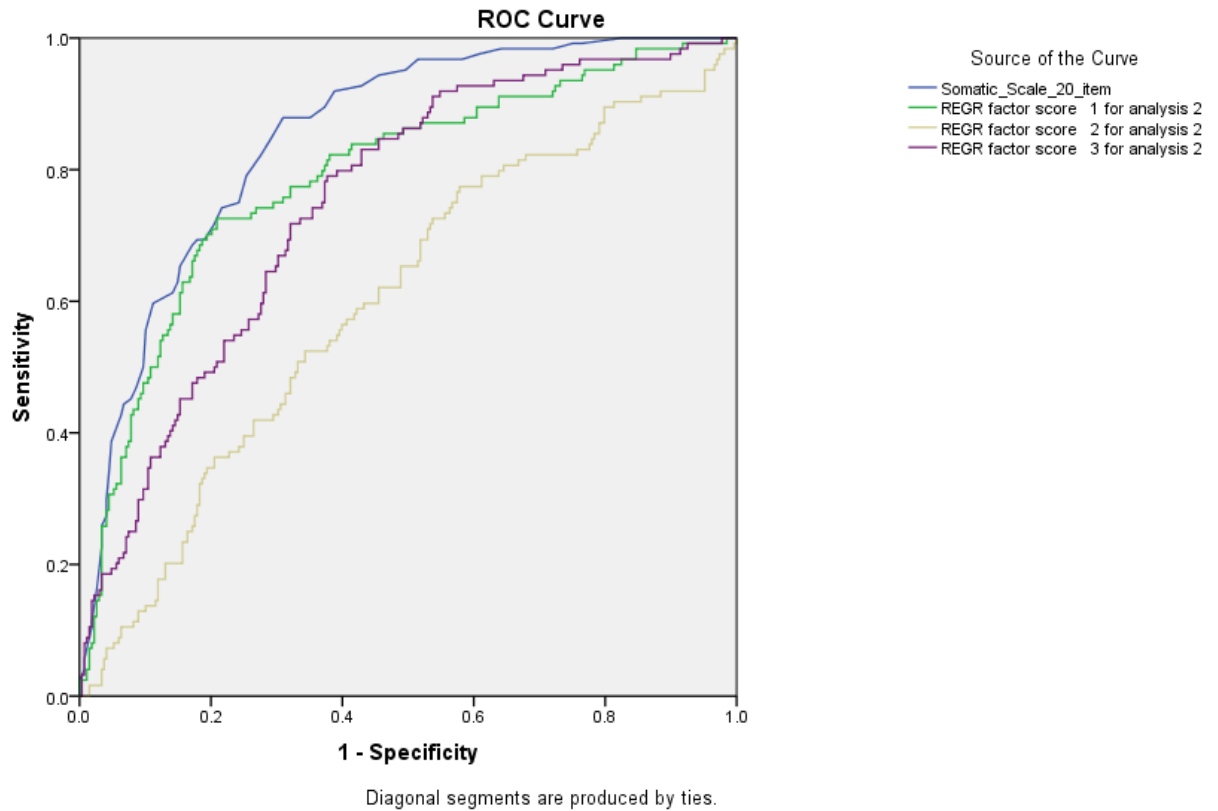
An analysis between women and men was not performed due to lack of male participants.



Area Under the Curve	
Test Result Variable(s)	Area
Somatic_Scale_Final	.799
REGR factor score 1 for analysis 2	.791
REGR factor score 2 for analysis 2	.601
REGR factor score 3 for analysis 2	.748

The test result variable(s): Somatic_Scale_Final has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

Figure 7. Measure of specificity and sensitivity of the 56-item DSQ and the possible factors for all participants.



Area Under the Curve	
Test Result Variable(s)	Area
Somatic_Scale_20_item	.850
REGR factor score 1 for analysis 2	.789
REGR factor score 2 for analysis 2	.600
REGR factor score 3 for analysis 2	.749

The test result variable(s): Somatic_Scale_20_item has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.

Figure 8. Measure of specificity and sensitivity of the 20-item DSQ and the possible factors for all participants.

4.3 Discussion

The current study was an attempt to examine the reliability and validity of the CAPI among the chronic pain and depression populations. It was also an attempt to examine the reliability, validity, and specificity of the DSQ among chronic pain and depressed populations. Both questionnaires were shortened from their original form prior to or during analysis for practical use in a clinical setting and for increased reliability and validity purposes.

As noted above, the CAPI was a very reliable and valid questionnaire for all three groups of participants (healthy, chronic pain, and depressed). The one-way ANOVAs on each of the scales showed that the chronic pain group and depression group did not significantly differ on 5 of the main scales. This is not surprising as chronic pain patients often suffer from depression and anxiety, (Fishbain, Cutler, Rosomoff, & Rosomoff, 1997; Poole, White, Blake, Murphy, & Bramwell, 2009; Sullivan, Reesor, Mikail, & Fisher, 1992; Worz, 2003) making differentiating between these two groups very difficult. It was found that the depressed group scored higher, though not significantly higher the Depression, Anxiety, Mania, and OCPD scales, which could mean that these scales are close to being able to differentiate the chronic pain population despite the comorbidity rates, but are not quite adequate yet. Further work will need to be done on these scales to properly differentiate between the two groups on the Depression, Anxiety, Mania, OCPD, and Schizotypy scales.

Chronbach's α showed acceptable ($\alpha=.711$) to excellent ($\alpha=.938$) across all three groups on each scale. There were only two reliabilities lower than acceptable for each group on every scale. These were on the OCPD scale in the depression population ($\alpha=.68$) and the chronic pain population ($\alpha=.69$), which is considered questionable reliability. Overall, the CAPI is a highly reliable questionnaire.

The area under the curve (AUC), measuring specificity and sensitivity, for the depression population on the depression scale was fair. This indicates that the depression scale can accurately predict depression when the subject does have depression (sensitivity) and accurately identify patients as not having depression when they do not (specificity) within the depressed population, even when depression is highly comorbid with chronic pain. The AUC for the chronic pain population on the somatic scale was good, indicating that the somatic scale is sensitive and specific when identifying the chronic pain (including fibromyalgia) population. This shows that the depression and somatic scales are both reliable and valid within their respective populations.

The DSQ was also a reliable and valid questionnaire, which was specific and sensitive to chronic pain patients. Post-hoc analysis (Tukey's and LSD) revealed that the DSQ significantly differentiates between chronic pain, depressed, and healthy control populations ($p<.001$). However, the factor analysis showed that there were not three factors, as theorized, just one. This means it is unable to distinguish between emotional, cognitive, and physical issues; therefore, it cannot help narrow down a diagnosis for practitioners. The shortened, 20-item DSQ improved reliability, sensitivity, and specificity from the longer DSQ, which makes it a very quick way for clinicians to assess functioning in their chronic pain patients. The results showed that the 20-item DSQ

would be best used as a measure of severity in overall functioning than as a diagnostically relevant tool as it does not distinguish between emotional health, behavioral health, and mental health as theorized.

4.3.1. Limitations of This Study

A significant limitation to this study is the fact that the DSQ was taken by 326 women and only 66 men and the CAPI was taken by 352 women and only 70 men. Researchmatch.org metrics (2017) updates very regularly, but at the time of this publication it shows of the over 113,000 volunteers, 70.8% are female, 28.9% are male, and .3% are transgender. This makes the generalizability to the population very difficult as the sample population was not equally distributed between sexes. Another limitation to note is that researchmatch.org metrics (2017), shows that 76.4% of participants are white. Though race was not collected in the experiment it could be assumed that the sample population of races were not equally distributed, which limits generalizability to the population.

Another possible limitation is the web-based means of collecting data. Hardré, Crowson, Xie, and Ly (2007) found that web-based and computer-based administration of questionnaires in research collected poorer quality data than paper-based in controlled laboratory conditions. The poorer quality data may be attributed to computer anxiety in certain populations (Schulenberg & Yurtzenka, 1999), which could diminish over time as all ages become more familiar and comfortable with computers. However, many studies

have shown that web-based questionnaires are just as reliable and generalizable as a paper-pencil questionnaire (Davis, 1999; Gosling, Vazire, Srivastava, & John, 2004). The CAPI will be primarily a web-based personality questionnaire, but to have the best, most reliable data for the validation of the CAPI and the DSQ, it may be best to have in-person, paper-pencil questionnaire data as well as web-based data.

4.3.2 Future Research

Further studies should be performed on male participants to ensure that the DSQ and CAPI can discriminate between male chronic pain, depressed, and healthy participants as this study had significantly fewer males compared to females. Though, research does show that women suffer from chronic pain conditions, like fibromyalgia, and depression at twice the prevalence of men (Munce & Stewart, 2007; Wolfe, Ross, Anderson, & Russell, 1995; Yunus, 2001). Future studies should also collect race data to ensure the data is generalizable to the population based on race.

Researchmatch.org is a self-report, volunteer-based website. This means that many of the participants could have self-diagnosed themselves with chronic pain or depression. This study should be repeated with a confirmed physician-diagnosed sample of participants. This additional research would help ensure the profiles developed by T-scores in each of the 11 scales in this experiment for chronic pain patients, healthy controls, and depressed patients are accurate. It would also confirm that the CAPI and DSQ are reliable and valid measures with significant results.

CHAPTER V

CONCLUSION

In summary, the present study provides further evidence that the CAPI is a reliable and valid personality inventory that emphasizes modern diagnostic criteria with minimal time required for practitioner and patient. The collaborative nature of the inventory will improve the usefulness of such a personality inventory and increase the usefulness in practice. The DSQ is also a reliable and valid chronic pain questionnaire that can be useful in practice as a measure of functionality within the chronic pain population, however, cannot identify what underlying issues the patient may be having (e.g. mental health, emotional health, behavioral health). Future research should be done to further the development of profiles for the CAPI, especially the OCPD scale, among different patient populations.

REFERENCES

- American Journal of Managed Care. (1999). Introduction. *American Journal of Managed Care*, 5, S764-S766.
- American Psychiatric Association. (1952). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Arlington, VA: American Psychiatric Publishing.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Aron, L., & Starr, K. (2013). Charcot and Bernheim: Origins of Intrapsychic and Relational Models of Mind. In L. Aron & K. Starr (Eds.), *A Psychotherapy for the People: Toward a Progressive Psychoanalysis* (pp. 182-209). New York, NY & East Sussex, BN3 2FA: Taylor & Francis.
- Asaad, G. (2000). Somatization disorder. In M. Hersen, M. Biaggio, M. Hersen, M. Biaggio (Eds.), *Effective brief therapies: A clinician's guide* (pp. 179-190). San Diego, CA, US: Academic Press. doi:10.1016/B978-012343530-9/50011-5
- Ayers, D.C., Franklin, P.D., & Ring, D.C. (2013). The role of emotional health in functional outcomes after orthopaedic surgery: extending the biopsychosocial model to orthopaedics: AOA critical issues. *The Journal of Bone and Joint Surgery, American Volume*, 95(21), e165. <http://doi.org/10.2106/JBJS.L.00799>
- Butcher, J.N. (2000). Revising psychological tests: Lessons learned from the revision of the MMPI. *Psychological Assessment*, 12(3), 263-271. doi:10.1037//1040-3590.12.3.263

- Butler, J.N., & Perry, J.N. (2008). Introduction to the Minnesota Multiphasic Personality Inventory (MMPI-2). *Personality assessment in treatment planning: use of the MMPI-2 and BTPI* (pp. 23-48). New York, NY: Oxford University Press.
- Davis, R. (1999). Web-based administration of a personality questionnaire: Comparison with traditional methods. *Behavior Research Methods, Instruments & Computers*, 31(4), 572-577. doi: 10.3758/BF03200737
- Deogaonkar, M., Sharma, M., Oluigbo, C., Nielson, D. M., Yang, X., Vera-Portocarrero, L., Molnar, G. F., Abduljalil, A., Sederberg, P. B., Knopp, M. and Rezai, A. R. (2016). Spinal Cord Stimulation (SCS) and Functional Magnetic Resonance Imaging (fMRI): Modulation of Cortical Connectivity with Therapeutic SCS. *Neuromodulation: Technology at the Neural Interface*, 19: 142–153. doi:10.1111/ner.12346
- Fishbain, D.A., Cutler, R., Rosomoff, H.L., & Rosomoff, R.S. (1997). Chronic pain associated depression: antecedent or consequence of chronic pain? A review. *Clinical Journal of Pain*, 13, 116-137. doi: 10.1097/00002508-199706000-00006
- Fox, J.P., Philip, E.J., Gross, C.P., Desai, R.A., Killelea, B., & Desai, M.M. (2013). Associations between mental health and surgical outcomes among women undergoing mastectomy for cancer. *The Breast Journal*, 19(3), 276-284. doi:10.1111/tbj.12096
- Gierk, B., Kohlmann, S., Kroenke, K., Spangenberg, L., Zenger, M., Brähler, E., Löwe, B. (2013) The Somatic Symptom Scale-8 (SSS-8) A brief measure of somatic

symptom burden. *JAMA Intern Med.* 174(3), 399-407.

doi:10.1001/jamainternmed.2013.12179

Gierk, B., Kohlmann, S., Toussaint, A., Wahl, I., Brünahl, C., Murray, A., & Löwe, B. (2014). Assessing somatic symptom burden: A psychometric comparison of the Patient Health Questionnaire-15 (PHQ-15) and the Somatic Symptom Scale-8 (SSS-8). *Journal of Psychosomatic Research*, 78, 352-355.

<http://dx.doi.org/10.1016/j.jpsychores.2014.11.006>

Gosling, S.D., Vazire, S., Srivastava, S., & John, O.P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist*, 59(2), 93-104. doi: 10.1037/0003-066X.59.2.93

Graham, J.R. (1990). *MMPI-2 Assessing personality and psychopathology*. New York, New York: Oxford University Press.

Grobin, W. (1960). Etiology of psychosomatic disease. *The Canadian Medical Association Journal*, 82, 1170-1171. Retrieved from

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1938470/>

Hardré, P.L., Crowson, H.M., Xie, K., & Ly, C. (2007). Testing differential effects of computer-based, web-based, and paper-based administration of questionnaire research instruments. *British Journal of Educational Technology*, 38(1), 5-22. doi:10.1111/j.1467-8535.2006.00591.x

Institute of Medicine of the National Academies. *Relieving Pain in America: A blueprint for Transforming Prevention, Care, Education, and Research*. Washington, DC: National Academy of Sciences.

Johannes, C., Kim Le, T., Zhou, Xiaolei, Johnston, J.A., & Dworkin, R.H. (2010). The Prevalence of chronic pain in United States adults: results of an internet-based survey. *The Journal of Pain*, 11(11), 1230-1239. doi: 10.1016/j.jpain.2010.07.002

Keller, L.S & Butcher, J.N. (1991). *Assessment of chronic pain patients with the MMPI-2*. Minneapolis, Minnesota: University of Minnesota Press.

Kleinmuntz, B. (1967). *Personality Measurement*. Homewood, Illinois: The Dorsey Press.

Kroenke, K., Spitzer, R.L., & Williams, J.W. (2002). The PHQ-15: Validity of a new measure for evaluating the severity of somatic symptoms. *Psychosomatic Medicine*, 64(2), 258-266. doi: 10.1097/00006842-200203000-00008

Kroenke, K., Spitzer, R. L., Williams, J. W., & Löwe, B. (2010). The Patient Health Questionnaire somatic, anxiety, and depressive symptom scales: A systematic review. *General Hospital Psychiatry*, 32(4), 345-359.
doi:10.1016/j.genhosppsych.2010.03.006

Lanyon, R.I., & Goodstein, L.D. (1982). *Personality Assessment: Second Edition*. New York, NY: John Wiley & Sons, Inc.

- Lawlis, GF., Achterberg J., Kenner, L., & Kopetz K. (1984). Ethnic and sex differences in response to clinical and induced pain in chronic spinal pain patients. *Spine*, 9(7), 751-754. doi:10.1186/1471-2474-9-102
- Libbrecht, K., & Quackelbeen, J. (1995). On the early history of male hysteria and psychic trauma: Charcot's influence on Freudian thought. *Journal of the History of the Behavioral Sciences*, 31, 370-384. doi:10.1002/1520-6696(199510)31:4<370::AIDJHBS2300310404>3.0.CO;2-6
- Linnstaedt, S. D., Walker, M. G., Parker, J. S., Yeh, E., Sons, R. L., Zimny, E., & ... McLean, S.A. (2015). MicroRNA circulating in the early aftermath of motor vehicle collision predict persistent pain development and suggest a role for microRNA in sex-specific pain differences. *Molecular Pain*, 11. doi:10.1186/s12990-015-0069-3
- Mansour, A., Baliki, M. N., Huang, L., Torbey, S., Herrmann, K., Schnitzer, T. J., & Apkarian, A. V. (2013). Brain white matter structural properties predict transition to chronic pain. *Pain*, 154(10), 2160–2168. <http://doi.org/10.1016/j.pain.2013.06.044>
- Meeus, M. & Nijs, J. (2007). Central sensitization: A biopsychosocial explanation for chronic widespread pain in patients with fibromyalgia and chronic fatigue syndrome. *Clinical Rheumatology* 26(2), 465-473. doi:10.1007/s10067-006-0433-9
- Mostofsky, D.I., & Barlow, D.H. (Eds.) (2000). *The management of stress and anxiety in medical disorders*. Needham Heights, MA: Allyn & Bacon.

- Nahman-Averbuch, H., Dayan, L., Sprecher, E., Hochberg, U., Brill, S., Yarnitsky, D., & Jacob, G. (2016). Sex differences in the relationships between parasympathetic activity and pain modulation. *Physiology & Behavior*, 15440-48.
doi:10.1016/j.physbeh.2015.11.004
- Phillips, K. & Clauw, D.J. (2011). Central pain mechanisms in chronic pain states maybe it is all in their head. *Best Practices & Research: Clinical Rheumatology* 25(2), 141-54. doi: 10.1016/j.berh.2011.02.005
- Poole, H., White, S., Blake, C., Murphy, P., & Bramwell, R. (2009). Depression in chronic pain patients: prevalence and measurement. *Pain Practice*, 9(3), 173-180.
doi:10.1111/j.1533-2500.2009.00274.x
- Poreh, A. (2004). The Cleveland Personality Inventory. Unpublished manuscript, Graduate School of Clinical Psychology, Cleveland State University, Cleveland, OH.
- Poreh, A. (2007). The Cleveland Personality Inventory. Unpublished manuscript, Graduate School of Clinical Psychology, Cleveland State University, Cleveland, OH.
- Rogers, K., & Kelloway, E.K. (1997). Violence at work: Personal and organizational outcomes. *Journal of Occupational Health Psychology*, 2, 63-71.
<http://dx.doi.org/10.1037/1076-8998.2.1.63>
- Sarno, J.E. (2007). *The divided mind: the epidemic of mindbody disorders*. New York, NY: Harper Perennial.

- Schat, A.C.H., & Kelloway, E.K. (2000). The effects of perceived control on the outcomes of workplace aggression and violence. *Journal of Occupational Health Psychology, 4*, 386-402. doi:10.1037//1076-8998.5.3.386
- Schat, A.C.H., & Kelloway, E.K. (2003). Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. *Journal of Occupational Health Psychology, 1*, 110-122. doi:10.1037/1076-8998.8.2.110
- Schat, A.C.H., Kelloway, E.K., & Desmarais, S. (2005). The physical health questionnaire (PHQ): Construct validation of a self-report scale of somatic symptoms. *Journal of Occupational Health Psychology, 10*(4), 363-381. <http://dx.doi.org/10.1037>
- Schulenberg, S.E. & Yurtzenka, B.A. (1999). The equivalence of computerized and paper and-pencil psychological instruments: Implications for measures of negative affect. Behavior research methods. *Instruments and Computers, 31*(2), 315-321. doi: 10.3758/BF03207726
- Schultz, D.P. & Schultz, S.E. (2005). *Theories of Personality: Eighth Edition*. Blemont, California: Wadsworth Publishing.
- Sharma, P., Henriksen, C.H., Zargar-Shoshtari, K., Xin, R., Poch, M.A., Pow-Sang, J.M., Sexton, W.J., Spiess, P.E., & Gilbert, S.M. (2016). Preoperative patient reported mental health is associated with high grade complications after radical cystectomy. *The Journal of Urology, 195*(1), 47-52. <http://dx.doi.org/10.1016/j.juro.2015.0.095>

- Shuchang, H., Mingwei, H., Hongxiao, J., Si, W., Xing, Y., Antonius, D., & Opler, M. (2011). *Pain Research and Management: The Journal of the Canadian Pain Society* 16(1), 41-43.
- Spence, J.T., Helmreich, R.L., & Pred, R.S. (1987). Impatience versus achievement strivings in the Type A pattern: Differential effects on students' health and academic performance. *Journal of Applied Psychology*, 72, 522-528.
doi:10.1037/0021-9010.72.4.522
- Sullivan, M.J.L., Reesor, K., Mikail, S., & Risher, R. (1992). The treatment of depression in chronic low back pain: review and recommendations. *Pain* 50(1), 5-13.
[https://doi.org/10.1016/0304-3959\(92\)90107-M](https://doi.org/10.1016/0304-3959(92)90107-M)
- U.S. Department of Health and Human Services' Office on Women's Health. (2008). Pain. In *The Healthy Woman: A Complete Guide for All Ages* (chapter 26). Retrieved from
<http://www.womenshealth.gov/publications/our-publications/the-healthy-woman/>
- Von Korff, M., Crane, P., Lane, M., Miglioretti, D.L., Simon, G., Saunders, K., Stang, P., Brandenburg, N., Kessler, R. (2005). Chronic spinal pain and physical-mental comorbidity in the United States: results from the national comorbidity survey replication. *Pain*, 113(3), 331-339. doi:10.1016/j.pain.2004.11.010
- Wolfe, F., Ross, K., Anderson, J., & Russell, I.J. (1995). Aspects of fibromyalgia in the general population: sex, pain threshold, and fibromyalgia symptoms. *Journal of Rheumatology*, 22(1), 151-156. doi: 10.1002/art.1780380104

- Woolf, C.J. (2011). Central sensitization: Implications for the diagnosis and treatment of pain. *Pain*, 152(3 Suppl), S2-15. doi:10.1016/j.pain.2010.09.030
- World Health Organization. (1992). International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). Geneva: WHO.
- Wörx, R. (2003). Pain in depression – depression in pain. *Pain*, 11(5), 1-4. doi: 10.1016/j.pain.2003.11.002
- Yunus, M.B. (2001). The role of gender in fibromyalgia syndrome. *Current Rheumatology Reports* 3(2) 128-134. doi: 10.1007/s11926-001-0008-3
- Zijlema, W. L., Stolk, R. P., Löwe, B., Rief, W., White, P. D., & Rosmalen, J. M. (2013). How to assess common somatic symptoms in large-scale studies: A systematic review of questionnaires. *Journal of Psychosomatic Research*, 74(6), 459-468. doi:10.1016/j.jpsychores.2013.03.093

APPENDICIES

APPENDIX

DSM-5 criteria for Somatic Symptom and Related Disorders

SOMATIC SYMPTOM AND RELATED DISORDERS

Somatic Symptom Disorder
<i>Key Criteria:</i>
One or more somatic symptoms that are distressing or result in significant disruption of daily life
Excessive thoughts, feelings, or behaviors related to the somatic symptoms
The state of being symptomatic is persistent, more than 6 months, whether somatic symptoms are continuous or not
Illness Anxiety Disorder
<i>Key Criteria:</i>
Preoccupation with having or acquiring a serious illness
Somatic symptoms are not present or, if present, are only mild in intensity
There is a high level of anxiety about health
Health-related behaviors are performed excessively or exhibits maladaptive avoidance behaviors
Illness preoccupation has been present for 6 months or more
Illness preoccupation cannot be explained by another disorder
Conversion Disorder
<i>Key Criteria:</i>
One or more symptoms of altered voluntary motor or sensory function
Clinical findings provide evidence of incompatibility between the symptom and recognized neurological or medical conditions
Symptom is not better explained by another medical/mental disorder
Symptom causes clinical significant distress
Psychological Factors Affecting Other Medical Conditions
<i>Key Criteria:</i>
Medical symptom or condition (other than mental disorder) is present
Psychological or behavioral factors adversely affect the medical condition
The psychological and behavioral factors are not better explained by another mental disorder
Factitious Disorder (Imposed on Self)
<i>Key Criteria:</i>
Falsification of physical or psychological signs or symptoms
Individual presents to others as ill, impaired, or injured
Deceptive behavior is evident even in the absence of obvious external rewards
Behavior is not better explained by another mental disorder

APPENDIX

ICD-10 Criteria for Somatic Symptom and Other Related Disorders

F45.0 Somatization disorder	The main features are multiple, recurrent and frequently changing physical symptoms of at least two years duration. Most patients have a long and complicated history of contact with both primary and specialist medical care services, during which many negative investigations or fruitless exploratory operations may have been carried out. Symptoms may be referred to any part or system of the body. The course of the disorder is chronic and fluctuating, and is often associated with disruption of social, interpersonal, and family behavior. Short-lived (less than two years) and less striking symptom patterns should be classified under undifferentiated somatoform disorder (F45.1).
F45.1 Undifferentiated somatoform disorder	When somatoform complaints are multiple, varying and persistent, but the complete and typical clinical picture of somatization disorder is not fulfilled, the diagnosis of undifferentiated somatoform disorder should be considered.
F45.2 Hypochondriacal disorder	The essential feature is a persistent preoccupation with the possibility of having one or more serious and progressive physical disorders. Patients manifest persistent somatic complaints or a persistent preoccupation with their physical appearance. Normal or commonplace sensations and appearances are often interpreted by patients as abnormal and distressing, and attention is usually focused upon only one or two organs or systems of the body. Marked depression and anxiety are often present, and may justify additional diagnoses.
F45.3 Somatoform autonomic dysfunction	Symptoms are presented by the patient as if they were due to a physical disorder of a system or organ that is largely or completely under autonomic innervation and control, i.e. the cardiovascular, gastrointestinal, respiratory and urogenital systems. The
.30 Heart and cardiovascular system	
.31 Upper gastrointestinal tract	
.32 Lower gastrointestinal tract	
.33 Respiratory system	
.34 Genitourinary system	

.38 Other organ or system	symptoms are usually of two types, neither of which indicates a physical disorder of the organ or system concerned. First, there are complaints based upon objective signs of autonomic arousal, such as palpitations, sweating, flushing, tremor, and expression of fear and distress about the possibility of a physical disorder. Second, there are subjective complaints of a nonspecific or changing nature such as fleeting aches and pains, sensations of burning, heaviness, tightness, and feelings of being bloated or distended, which are referred by the patient to a specific organ or system.
F45.4 Persistent somatoform pain disorder	The predominant complaint is of persistent, severe, and distressing pain, which cannot be explained fully by a physiological process or a physical disorder, and which occurs in association with emotional conflict or psychosocial problems that are sufficient to allow the conclusion that they are the main causative influences. The result is usually a marked increase in support and attention, either personal or medical. Pain presumed to be of psychogenic origin occurring during the course of depressive disorders or schizophrenia should not be included here.
F45.8 Other somatoform disorders	Any other disorders of sensation, function and behavior, not due to physical disorders, which are not mediated through the autonomic nervous system, which are limited to specific systems or parts of the body, and which are closely associated in time with stressful events or problems.
F45.9 Somatoform disorder, unspecified	Psychosomatic disorder NOS

APPENDIX

CONSENT FORM

Cleveland State University

Department of Psychology

2300 Chester Avenue, Room 158

Cleveland, OH 44115-2214



Consent Form

Study title: Cleveland Adaptive Personality Inventory (CAPI) with Additional Physical Symptoms Questions

Sponsor: N/A

PI: Amir Poreh, PhD 216-704-1507

Student Study Coordinator (under observation of PI): Elizabeth Perry 740-605-4937

After hours phone contact #: 740-605-4937

Please note:

- **You are being asked to take part in a research study.**
- **Ask as many questions as needed so you can make your choice.**
- **You must be 18 years of age or older to take part.**

1. ABOUT THE RESEARCH

Why is the study being done?

The study is to find out if the CAPI and the additional questions about your physical symptoms will be a useful tool to help find mental disorders. Some people with physical problems also have a mental disorder. If the CAPI helped find these people, it would help their doctor choose the best treatment for them.

The CAPI has been given to college students, but has not yet been given to people with long-lasting, long-term pain. We hope to learn more about why certain people develop this kind of pain when others do not. You are being asked to join in this study because you have long-lasting, long-term pain or you do not have any long-lasting, long-term pain and will be a control.

What is involved if you decide to take part in this research study?

Taking part in the study includes finishing 330 questions on the CAPI and an additional 56 questions about your physical health. Taking all 386 questions should take about 60-120 minutes. The questionnaire can be taken at any time after consenting through the SurveyMonkey website link.

2. RISKS

What are the risks of taking part in the research study?

There are no physical risks involved with this study. You can choose not to answer any question if you wish. There is a small risk of loss of privacy. Every effort will be made to keep your answers safe.

3. BENEFITS

What are benefits of taking part in the research study?

There are no direct benefits to you by taking part in this research.

4. COSTS & PAYMENT

Are there any costs or payments to you if you take part in this study?

There are no costs or payments to you for taking part in this study.

5. PRIVACY

What will happen to your information that is collected for this research?

Your answers to the questions will be kept private. The data will be kept on a secure database. Your name will be changed to a number so your data will be safe. You will not be identified in any way from this study or in any data files shared with other researchers.

You may decide not to allow use of your data at any time by getting in touch with the Principal Investigator (PI) or student study coordinator, who is supervised by the PI, by using the phone numbers or address listed at the top.

You will be given the questionnaire through SurveyMonkey.com's secure site.

6. CONFLICT OF INTEREST

Do the researchers or institution have any conflicts of interest relating to this study?

There are no conflicts of interest to report.

7. QUESTIONS

Who do you call if you have any questions or problems?

If you have any questions or problems, please contact Amir Poreh, PhD at 216-704-1597. After business hours, call 740-605-4937 and ask for Elizabeth Perry, the student study coordinator.

8. TAKING PART IS OPTIONAL

What are your rights?

Taking part in this study is completely up to you. You may choose not to take part or may leave the study at any time with no penalty.

9. SIGNATURES

Please read the following: *"I understand that if I have any questions about my rights as a research subject, I can contact the Cleveland State University Institutional Review Board at (216) 687-3630."*

After signing this form, please print one copy for your records.

Your electronic signature below on SurveyMonkey.com means that you understand the contents of this document. You also are at least 18 years of age. Finally, you voluntarily consent to participate in this research study.

Printed name of person obtaining consent

Signature of person obtaining consent

Date