PARADOXICAL VOCAL CORD DYSFUNCTION: GAINING A BETTER UNDERSTANDING OF THIS DISORDER AND ITS PSYCHOLOGICAL CORRELATES

DISSERTATION

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By

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Paradoxical vocal cord dysfunction (PVCD) has been a highly misunderstood medical disorder that has been discussed in the literature as having varied etiologies. While neurological, as well as other medical explanations have been proposed as possible etiologies, many clinicians and researchers have suggested that PVCD is a psychological disorder. In suggesting a psychological etiology, there have been a wide variety of ideas of the different types of possible psychological classifications it could fall into. The most common psychological diagnosis suggested in the literature has been a conversion disorder, with anxiety and depression also receiving a large amount of support. Stressful and traumatic events have also been implicated as possible contributors. Throughout the literature, there has been a lack of information for how researchers have reached their conclusions and the methods used to make psychological diagnoses. Much of the evidence provided for explaining PVCD as a psychological disorder is the failure of these patients to respond to medical treatments that ordinarily ameliorate physical symptoms. Moreover, there has been an inability to identify an underlying medical cause. No one has studied PVCD from a psychological perspective using psychometrically sound psychological instruments.

The purpose of the present study was to investigate PVCD as a psychological disorder, specifically a conversion disorder. Anxiety and stress were also evaluated as
possible contributing factors to this disorder. It was hypothesized that individuals who have received a diagnosis of PVCD would exhibit symptoms requisite of a conversion disorder as defined by the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV; 1994) and measured by the Minnesota Multiphasic Personality Inventory (MMPI-2; 1989). Additionally, it was hypothesized that individuals with this disorder would report higher levels of anxiety than the general population as well as report higher levels of stress than individuals in the general population.

A battery consisting of two different measurement scales and a demographic questionnaire was administered to 47 patients diagnosed with PVCD at a medical outpatient clinic specializing in voice and swallowing disorders located in a large Midwestern city. PVCD was found to exhibit symptoms requisite of a conversion disorder. Further, it was found that patients diagnosed with PVCD do not report higher levels of anxiety, and only females report higher levels of negative stress than individuals in the general population. In addition, significant differences were found among different subgroups of patients on specific scales of the MMPI-2.

Implications of the results address the importance of gaining a better understanding of this disorder as having a psychological etiology. In addition, counseling implications, limitations of the present study, and suggestions for future research are also discussed.
DEDICATION

I dedicate this work to my family: Omar, Isabella, and Alexander.
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CHAPTER 1

INTRODUCTION

There is strong evidence supporting the relationship between psychological and physical health. In fact, at least one third of a typical medical practice is composed of patients with psychological or psychosomatic problems (Stout & Cook, 1999). Because psychologists are increasingly exposed to many of these patients, it is important that psychologists use their knowledge in assessment and psychopathology to help clients suffering from psychosomatic issues receive the best quality care and treatment. One way to accomplish this is to study some of the problems that present to medical settings and receive many unneeded medical tests, are often misdiagnosed, and are highly misunderstood. In many cases, these disorders do not have a physical or physiological cause.

One such disorder that has been discussed in the literature is paradoxical vocal cord dysfunction (PVCD), also referred to as paradoxical vocal fold motion, or vocal cord dysfunction. PVCD is a perplexing disorder where the vocal cords adduct upon inspiration instead of abduct. In normal patients, during quiet breathing, the vocal cords are abducted throughout the respiratory cycle, although there may be a slight adduction at the end of the expiratory phase (Wood, Jafek, & Cherniack, 1986). The apposition of the
vocal cords produces airflow obstruction and can cause coughing, wheezing, chest tightness, and dyspnea (shortness of breath). (Altman, Mirza, Ruiz, & Sataloff, 2000).

Attacks occur predominately during the day and seem to begin and resolve rather quickly (Wood & Milgrom, 1996). An interesting finding in these patients is that their wheezing does not worsen with a cough or panting, and their symptoms may be temporarily relieved when their attention is diverted (McFadden, 1987). The levels of distress made known by these patients range from indifference to “profound agitation” (Wood & Milgrom, 1996 pg. 482). The clinical presentation is often dramatic and is often misdiagnosed as asthma. This has often led to inappropriate treatment (Wood & Milgrom, 1996).

This disorder was originally described by Patterson, Schatz, and Horton (1974) as a Munchausen’s stridor, which suggests a nonorganic and psychiatric etiology. The etiology of PVCD is unknown, although a few explanations for this disorder have been proposed. A neurological explanation has been proposed (Maschka, Bauman, McCray, Hoffman, Karnell, & Smith, 1997) but no confirmatory neurological evidence has been reported in the literature (Carding & Raz, 2000). Many clinical reports describe the presence of gastroesophageal reflux symptoms which can lead to asthmatic and laryngopharyngeal symptoms in patients who may also suffer from other problems, including hoarseness, dysphagia (difficulty swallowing), or abusive voice habits (e.g. yelling too much) (Gallivan, Hoffman, & Gallivan, 1996). The importance of gastroesophageal reflux is supported by the clinical findings that antireflux drug therapy can lead to relief in paradoxical vocal cord movement symptoms (Loughlin & Koufman, 1996). Another possible explanation for the disorder has been psychogenic factors, particularly a
psychological conversion reaction where the abnormal laryngeal movement may serve the purpose of allowing the patient to avoid confrontation with an unpleasant life situation or emotion. In addition, it has been purported that PVCD, like some other psychological symptoms, gives the patient secondary gain through attention and sympathy (Christopher, Wood, Eckert, Blager, Raney, & Souhrada, 1983). Various other psychiatric disorders have also been implicated. Some of these include depression, anxiety, personality disorders, etc. (Carding & Raz, 2000). There has been a lack of consistency in the wide variety of psychological factors that have been suggested to be associated with this disorder. The only uniformity seems to be the high preponderance found in female patients, although it is equally prevalent among all age groups. In addition, there is debate as to whether PVCD is a conversion reaction. While many researchers agree with the conversion reaction theory, others challenge it because of the evidence given for the ability of patients to produce the symptoms in response to stimulation (Leo & Konakanchi, 1999). Controversy also exists in regard to the role of other psychological factors that have been proposed as contributing factors, including anxiety and emotional distress. Some (Freedman, Rosenberg, & Schmaling, 1991) have also reported an incidence of childhood sexual abuse among individuals with PVCD, but they did not study a control population. The incidence of sexual abuse in the general female population ranges from 6% to 62%, which without comparing the PVCD patients to a control population renders the results of these studies as insignificant, according to some (Koester & Amundson, 2002). Other clinicians and researchers have recognized the association between patients diagnosed with PVCD and high levels of stress but have failed to study levels of stress in relation to PVCD.
Christopher, Wood, Eckert, Blager, Raney, and Souhrada (1983) were some of the first to present extensive cases of this disorder. They discussed five patients who were initially misdiagnosed with uncontrolled asthma. Since then, many clinicians have also noted PVCD to be disguised as asthma. An accurate diagnosis of this disorder has been emphasized by those who report that a correct diagnosis avoids prescribing unwarranted doses of corticosteroids and bronchodilators that patients do not benefit from (Wood & Milgrom, 1996). In addition, patients can be referred to a mental health provider who can help them with their underlying problems.

The prevalence of PVCD is unknown but may be present in as many as 40% of patients seeking evaluation of asthma that fails to respond to aggressive therapy (Wood & Milgrom, 1996). Wood, Blager, and Milgrom (1997) report that a heightened awareness of this condition is critical, and it is more common than appreciated. While PVCD is often confused with asthma, it has been shown in the literature to be unresponsive to anti-asthma therapy (Goldman, 1997). While it is a difficult disorder to treat, this is not surprising given that there is not a clear etiology. There seems to be an abundance of different treatment options that have been proposed in the literature with little understanding as to what is the underlying cause. Some treatment options, including psychotherapy and speech therapy, have been found to be effective for patients with PVCD, which lends some evidence for a psychological component associated with this disorder. However, it is important to note that the evidence for the treatment efficacy is poor, even in some of the better designed case studies.

In summary, there seems to be a high degree of agreement among many clinicians and researchers that PVCD is a psychological rather than a medical disorder, and they
implicate a wide variety of psychological and psychosocial factors that may be important etiological components of PVCD. Although there seems to be a lack of consistency across patients in regard to the variety of psychological factors suggested by the majority of authors, PVCD as a conversion reaction seems to be the most mentioned and most highly favored diagnosis. Despite conversion disorder being the most common diagnosis given for PVCD in the literature, debate continues to surround this diagnosis. Controversy also exists in regard to the other psychological factors that have been proposed as contributing factors.

Throughout the literature, the proposed suppositions for explaining PVCD seem to be grounded on subjective assessments based on clinical judgment. Many researchers do not provide definitive reasons for their conclusions nor the methods they used to reach their conclusions. Much of the evidence provided for explaining PVCD as a psychological disorder is the failure of these patients to respond to medical treatments that ordinarily ameliorate physical symptoms; there has also been an inability to identify an underlying medical cause. Additionally, despite the large amount of agreement that PVCD is a psychological disorder, there has been a failure to study PVCD as a psychological disorder. Specifically, no one has studied PVCD using any standardized psychological assessment instruments.

Recognizing and gaining a better understanding of PVCD is important in both the medical and mental health fields to not only avoid unnecessary medications and invasive treatments, but to help patients find effective ways to resolve their symptoms (Leo & Konakanchi, 1999). While some medications may temporarily ameliorate the symptoms, symptoms will reoccur if the underlying problem is not addressed (Wood & Milgrom,
By gaining a better understanding of this disorder and some of the psychological covariates associated with it, psychologists can help both to educate and properly treat these patients. More knowledge about the etiology of this disorder may also pave the way for a better understanding and exploration of possible risk factors, differential treatment options, and improved outcomes.

In the hope of better understanding this commonly misdiagnosed disorder, the present study was performed to investigate PVCD as a psychological disorder, including an investigation into the relationship between psychological and psychosocial factors that may be contributing to PVCD. Specifically, PVCD was examined to assess if it meets the criteria for a conversion disorder according to the listed criteria in the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV-TR, 1994), and as measured by a standardized psychological assessment instrument, the Minnesota Multiphasic Personality Inventory (MMPI-2). Additionally, anxiety and high levels of stress were also investigated as possible correlates of PVCD as measured by psychometrically sound psychological assessments, including specific scales of the MMPI-2 and the Life Experiences Survey (LES). Demographic and background information were also examined to investigate possible commonalities among patients diagnosed with PVCD in order to assess any relationships among these factors, including the likelihood of contributing to the diagnosis of PVCD.

As this disorder is further investigated, it is hoped that a better understanding will shed light onto some of the causes of PVCD and help answer the question of whether or not this disorder truly is a psychological disorder. If so, it will be seen if it falls within the category of being classified as a conversion disorder. The present study is the first
study that has investigated PVCD from a psychological standpoint with the use of standardized and psychometrically sound psychological instruments.

It was hypothesized that individuals who have been properly diagnosed with PVCD, through endoscopy by a trained speech pathologist or otolaryngologist, will exhibit psychological symptoms requisite of a conversion disorder, as defined by the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV-TR, 1994), and being measured by a psychometrically sound instrument, the MMPI-2. It was further hypothesized that particular psychological variables, including anxiety, would also be correlated with PVCD. Further, it was hypothesized that patients who report higher levels of stress than the general population (e.g. have suffered or witnessed a traumatic or highly stressful event) will have a higher incidence of this disorder. Because patients with PVCD constitute a heterogeneous group, the patients’ medical history was also of interest in order to examine prior diagnoses of asthma and gastroesophageal reflux disease (GERD) and possible relationships found between these diagnoses. The following question was posed: What is the relationship between PVCD and psychological characteristics (as measured by the MMPI-2), in different subgroups of patients: patients with a history of asthma, gastroesophageal reflux disease (GERD) or both, patients without a previous medical history of asthma and/or GERD, patients with a psychological history, and patients without a psychological history.

The results of this study will be enlightening for both the medical and mental health fields and particularly useful to psychologists and other mental health care workers who work with these patients. The results should enable the mental health community to be attuned to specific correlates of this disorder to incorporate into their clinical
interview, as well as to formulate effective treatment plans for these patients. In addition, the results should help patients, family members, and psychologists have a greater understanding of the etiology of this disorder, further helping psychologists study and implement effective interventions to best help patients with PVCD cope with the underlying psychological conflict influencing their behavior.
CHAPTER 2
LITERATURE REVIEW

Cases of paradoxical vocal cord dysfunction (PVCD) have been described in the medical literature as far back as 1842. It was first seen in “hysterical” female patients who were given the diagnosis “hysterical croup” as a result of experiencing laryngeal spasms. The treatment involved throwing cold water into the face of the patient while also administering ammonia salts to the nose (Leo & Konakanchi, 1999). While advances have been made since these early documented cases, an exploration of the demographic and psychological issues associated with PVCD deserve attention in the psychological community.

An initial literature search in the psychology literature (using the Psychinfo search engine) listed 9 references. None of these articles were written by psychologists or other mental health professionals and varied in authorship, including a sociologist, speech pathologists, nurses, and physicians. Where psychosomatic and psychological factors are being implicated, it appears that it would be valuable for a mental health professional to study such a disorder. When PVCD and variants of the name PVCD were entered into the medical search engine (Medline) over 100 cases were listed. Most of these were individual case studies, with very few comprehensive studies of the disorder. Nevertheless, much more attention has been given to this disorder in the medical
community, but it seems to be an important topic for the psychological community as well.

The literature review that follows will attempt to review the literature on PVCD from both the psychological and medical literature available and will describe the presentation of PVCD, individual case studies, as well as the comprehensive studies and reviews that are available. The literature discusses three main areas of PVCD research, thus, the following literature review will be divided into these three areas: a) purported etiologies; b) diagnosis; and c) treatment recommendations.

Presentation and purported etiology of PVCD

Leo and Konakanchi (1999) presented a case report of PVCD as well as a literature review of 170 cases from the years 1966 to 1998. Of the 171 reviewed cases (including their case report), 39 were males and 132 were females. The majority of the cases (123) presented with symptoms suggestive of asthma or upper airway disease. Psychological or psychiatric evaluation was requested in 84 cases (49.1%), and the psychiatric diagnoses were varied. Some of these included conversion reactions (12%), anxiety disorders (11%), histrionic and other personality disorders (6%), family/school conflicts (4%), depression (4%), psychosomatic disorder (2%), factitious disorder (2%), and somatization disorder (1%). In 7% of the cases, no formal psychiatric diagnosis was made, although psychological predictors were implicated.

Most individuals diagnosed with PVCD come to medical attention through the emergency room or through contact with internal or pediatric medicine. Leo and Konakanchi (1999) cite in their experience that these patients often have frequent hospital presentations. Newman, Mason, and Schmaling (1995) reviewed clinical experience at
the National Jewish Center for Immunology and Respiratory Medicine from 1984 to 1991 and found 95 patients that met the criteria for a diagnosis of PVCD. Of these 95 patients, in the year preceding their evaluation, the patients with uncomplicated cases of PVCD averaged 9.7 emergency department visits and 5.9 hospital admissions. Most patients are initially diagnosed as having asthma since the attacks produce distressing breathing difficulties and tend to begin and end suddenly. Upon further evaluation, patients with PVCD fail to respond to anti-asthma treatment and are found to be experiencing inappropriate adduction of the vocal cords upon inspiration, with no known medical cause.

Some have described specific cases of PVCD where there is a history of asthma unresponsive to very aggressive medical management that eventually leads to intubation or hospitalization (Fritz, Fritsch, & Hagino, 1997). Place, Morrison, and Arce (2000) described 3 adolescents who were thought to have had asthma. However, upon further careful history taking and testing, they were found to have PVCD. These patients had made numerous presentations to the emergency room over the course of the previous year for symptoms of shortness of breath. All three patients were subsequently and definitively diagnosed using fiberoptic laryngoscopy and given a diagnosis of PVCD.

These patients varied in their background from volatile home environments, history of sexual abuse, witnessing a traumatic event (the shooting of a neighborhood friend), and agoraphobia. The authors concluded that PVCD is a psychosomatic illness that can be treated successfully if properly diagnosed, yet provided no information that supported a psychological cause, except for an absence of a medical cause. The authors further believe that the patients are not consciously producing their symptoms and are
generally unaware of the psychiatric issues underlying their symptoms. Additionally, they point out that it is important to emphasize this observation given the original description as Munchausen’s stridor (Christopher, Wood, Eckert et al., 1983; Martin, Blager, Gay, & Wood, 1987; Selner, Staudenmayer, Loepke et al., 1987; Sokol, 1993). As with other conversion disorders, the symptom choice with PVCD probably has some particular relevance to the individual patient. For example, individuals may have witnessed a traumatic respiratory event, (e.g. there may be a family member who is ill with asthma, or there may be a more symbolic meaning, such as a patient who has suffered from sexual abuse or forced oral sex). It has also been emphasized that it is important not to view PVCD as “merely the manifestation of a particular unresolved intrapsychic conflict” (Place, Morrison, & Arce, 2000, p. 127) but rather as part of a more general psychological disturbance.

Murray and Lawler (1998) published a case report about a 23-year-old female that was initially misdiagnosed with asthma. She was later questioned after hospitalization and several procedures were performed. Her asthma had reversed suddenly with no apparent reason. A number of other factors, including the lack of “wheeze” immediately following tracheal intubation, as well as normal airway pressure after initiating mechanical ventilation led diagnosticians to consider PVCD as the diagnosis, rather than an acute asthmatic attack. The patient re-presented with similar circumstances 2 weeks later. Upon this admission, an ear, nose, throat (ENT) surgeon examined the patient’s vocal cords, diagnosed the condition as PVCD, and discussed with the patient that the cause of her respiratory distress was not asthma. The physician also discussed with the patient the possibility of there being some emotional background to
her “laryngeal incoordination.” A psychiatrist was then consulted. Nothing further in regard to the patient’s diagnosis or treatment was discussed in this case study.

Other case reports have described patients presenting in a similar manner (Goldman, 1997; Corren, & Newman, 1992; Marsh, Trudeau, & Weiland, 1994). The presentation has variously been named PVCD, episodic laryngeal dyskinesia, Munchausen’s stridor, and factitious asthma. Many clinicians implicate a psychiatric component that reflects the fact that PVCD may be a conversion disorder in which patients may receive some sort of secondary gain from their symptoms (Christopher, Wood, Eckert, Blager, Raney, & Souhrada, 1983; Marsh, Trudeau, & Weiland, 1994).

Altman, Mirza, Ruiz, and Sataloff (2000) conducted a retrospective review over a six-year period of 10 patients with the diagnosis of PVCD. They addressed the association with psychiatric pathology, gastroesophageal reflux, and asthma. They reported that 7 out of 10 patients had psychiatric disorders, including anxiety, depression, personality disorders (nonspecific), and stress disorders. They did not address how these psychiatric disorders were assessed or diagnosed. Gastroesophageal reflux (GER) was present in 8 patients. Treatment of GER without also addressing psychiatric and pulmonary conditions was not shown to be effective for their series. These authors propose that PVCD appears to have a variety of etiologies, and may be multifactorial. They further purport that potential causes include (1) psychogenic or “conversion” disorders and (2) “true” laryngeal dystonias.

Altman, et al’s (2000) series reaffirms an association with psychiatric disorders, asthma, and female preponderance. Archer, Hoyle, McCluckey, and Macdonald (2000) observed the demographic data on these patients to often include children or adult
females (14 to 58 yrs of age), with variable histories of psychiatric or attention seeking behavior.

Leo and Konakanchi (1999) report that the diagnosis of conversion disorder becomes particularly difficult in cases where PVCD is present in a patient with a history of confirmed asthma. In their case study, the diagnosis of asthma, which the patient reported to have been diagnosed with previously, was no longer considered. They did not presume that she was trying to deceive them, but truly believe that she was told she had asthma by those who had previously treated her. In their opinion and based upon her history, prior episodes may have distracted her from stressors and may have softened the stress of internal conflicts. In addition, they suggested that she seemed to derive some clear secondary gains: in her case, support from her family.

The explanation that PVCD is a psychological conversion reaction states that the abnormal laryngeal movement has served or continues to serve the purpose of enabling the patient to avoid confrontation with an unpleasant situation or emotion, as well as eliciting attention and sympathy (Christopher, Wood, Eckert, et al., 1983). Some researchers consider asthma in itself to be an example of a psychosomatic disorder vulnerable to psychological factors, which can then present as a conversion disorder (Leo & Konahanchi, 1999). They further define a conversion disorder as being characterized by variations in physical functioning that is rooted in psychological conflict and that has no known physiological basis (Leo & Konakanchi, 1999). According to the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV-TR, 1994), a conversion disorder is characterized by deficits in voluntary motor or sensory functioning other than pain, with symptoms that are not intentionally produced or feigned. The symptoms cause
significant distress or impairment in important areas of functioning (e.g. social or occupational) or warrant medical evaluation. Further, after appropriate investigation, these symptoms cannot be fully explained by a general medical condition or from the effects of a substance or other culturally sanctioned behavior or experience.

Conversion disorders also tend to appear when a person is under severe stress. The DSM-IV-TR (1994) criteria state that the symptoms or deficits are judged to be psychological because they are usually preceded by conflict or other stressors that initiate or exacerbate the symptoms. The disorder helps to reduce stress by allowing the person to avoid unpleasant or threatening situations. Additionally, the person may show remarkably little concern about what is apparently a rather serious problem. Conversion disorder is a specific somatoform disorder where somatoform disorders are psychological problems in which there are symptoms of a physical disorder without a physical cause. Conversion disorder is where the person displays symptoms of a sensory or motor failure without a physical cause.

In performing a search of the literature over the past 10 years in the clinical and research articles pertaining to somatoform and somatization disorders, as well as reviewing the literature on somatoform disorders in children and adolescents, Fritz, Fritsch, and Hagino (1997) found that somatizing presentations are organized conceptually: somatizations disorder, body dysmorphic disorder, hypochondriasis, conversion disorder, vocal cord dysfunction, pain disorder, and recurrent abdominal pain are described in children and adolescents.

The common feature for a somatoform disorder, according to the DSM-IV (1994), is that a presenting medical disorder, with the presence of physical symptoms, that
suggests an underlying medical condition for which one cannot be found, and that does not fully account for the level of functional impairment. Diagnosable somatoform disorders represent the severe end of a continuum, which includes unexplained “functional” symptoms in the middle, and transient, everyday aches and pains at the other end of the continuum. The more severe somatoform cases are seen by psychiatrists, while the less severe cases present to primary care settings where they are managed with varying degrees of success. Several of the somatoform disorders have a number of features in common with Axis II personality disorders. These character traits are seen as evolving rather than firmly established in childhood.

Lipowski’s (1988) definition of somatization disorder is useful: “the tendency to experience and communicate somatic distress and symptoms unaccounted for by pathological findings, to attribute them to physical illness, and to seek medical help for them” (p. 1359). Torgersen (1986) performed a twin study to explore the links of somatoform disorders in monozygotic and dizygotic same-sex twins born between 1910 and 1955. The authors discussed conversion disorder as a condition where a symptom surfaces that suggests a medical condition but that cannot be fully explained by known pathophysiological mechanisms. Furthermore, they assert that the symptom must be closely associated with a significant psychological stressor (e.g. trauma, bereavement, etc.). They also claim that presenting symptoms should resemble a neurological dysfunction (paralysis, paresis, anesthesia).

Most clinicians and researchers would agree that conversion disorder symptoms are not intentionally produced and cannot be fully explained by a general medical condition, substance exposure, or culturally sanctioned behavior. It is important when diagnosing
conversion disorder to specify a psychological association and exclude medical or cultural causations.

Morris, Deal, Bean, Grbach, and Morgan (1999) conducted a cross-sectional controlled study in a pulmonary disease clinic using 40 military patients with complaints of exertional dyspnea (shortness of breath) and 12 military control subjects who were asymptomatic. Fifteen percent of patients studied (using laryngoscopy) had PVCD (higher than that anticipated by the researchers), while none of the control subjects did. The primary complaint of the symptomatic military patients was exertional dyspnea and an inability to pass a physical fitness test required by the army. These recruits were undergoing advanced individual training, which can be considered to be a time of great emotional, physical, and psychological stress. Many investigators consider PVCD to represent a conversion reaction with various other psychiatric conditions that are triggered by emotional and possibly physical stress (Selner, Staudenmayer, Koepke et al., 1987; Christopher, Wood, Eckert, et al., 1983; Brown, Merritt, & Evans, 1988). This is an involuntary disorder, such that patients cannot produce the abnormal laryngeal movements voluntarily (Newman & Dubester, 1994). Extremely stressful events, such as wartime, have also been documented to elicit PVCD symptoms (Craig, Sitz, Squire, et al., 1992). Others have also suggested that PVCD is not associated with a conversion disorder, but with a wide variety of other psychological disorders (Ramirez, Leon, & Rivera, 1986), including anxiety-related disorders (Anbar & Hehir, 2000). They found that exercise helps to induce the symptoms of PVCD in their patients (military recruits).

Leo and Konakanchi (1999) suggest that other psychiatric conditions should be considered in addition to conversion disorder. Comorbid disorders are common in
somatoform disorders, including depression and anxiety. According to these authors, the shortness of breath and other respiratory difficulties are suggestive of panic or other acute anxiety disorders. They report further that reactions to stress serve to exacerbate or mimic symptoms and/or render the individual “refractory” to treatment. Others have also noted that in addition to a conversion disorder, psychiatric disturbances in patients with PVCD commonly include depression, anxiety, obsessive-compulsive behavior, and borderline personality disorder (Corren & Newman, 1992). It is unclear whether these disturbances are a cause or a result of the PVCD.

Wood and Milgrom (1996) report that most of the patients presenting with PVCD are women between the ages of 20 to 40, and have had difficulty letting go of their families. They further report the psychiatric conditions that have frequently been encountered in these adult patients include: depression, obsessive-compulsive personality, borderline personality, passive-dependent personality, adjustment reaction, and somatization disorder (Martin, Blager, Gay, & Wood, 1987).

PVCD has been increasingly identified in the pediatric population, particularly among high achievers who may or may not be involved in competitive sports. As these children have often been mistaken for having asthma, they have required special attention for a quick and accurate diagnosis of this disorder (Sandage & Zelazny, 2004). Wood, Blager, and Milgrom (1997) also discussed PVCD in pediatric patients. They report that these patients are “exceedingly anxious” (p. 923) and that as the anxiety increases so does the respiratory noise, as well as failing to respond to therapy for respiratory airway disease (RAD). The disorder has also been studied in adolescent female athletes where
such things as anxiety, depression, and perfectionism, have been found to be common (Landwehr, Wood, Blager, & Milgrom, 1994).

PVCD is also speculated to be associated with prior trauma, including physical or sexual abuse (Newman, Mason, & Schmaling, 1995; Nelson, 2002; Brown, Merritt, & Evans, 1988; Freedman, Rosenberg, & Schmaling, 1991). Nelson (2002) emphasizes that describing PVCD as a psychosomatic disorder should only be considered a hypothesis. She also notes that it is not at all clear why stress or emotional upset would cause people’s vocal cords to behave paradoxically. She proposes that a more plausible possibility is that something has been crudely forced down the throat of the patient, such as would take place in sexual abuse. She also points out that a sexual abuse history was acknowledged in all four PVCD patients studied by Freedman, Rosenberg, and Schmaling (1991) and suspected in Brown, Merrit, and Evan’s (1988) study. Other authors have pointed out that the incidence of sexual abuse in the general female population ranges from 6% to 62%. Further, it needs to be considered that a control population was not used in these studies, which may render the results of these studies as insignificant (Koester & Amundson, 2002).

There has also been some evidence that PVCD is associated with severe psychosocial stress, such as abandonment fears and family disputes. (Brown et al., 1988; Christopher, Wood, Eckert et al., 1983, Starkman & Appelblatt, 1984). Patients with PVCD have also been characterized as dependent (Geist & Tallett, 1990; Kattan & Ben-Zvi, 1985), histrionic (Appelblatt & Baker, 1981), borderline (Starkman & Appelblatt, 1984), obsessive (Christopher et al., 1983), and perfectionistic (Selner, Staudenmayer, Koepke, et al., 1987). Leo and Konakanchi (1999) also noted in their experience and in
their review that patients removed from the sources of conflict that are contributing to the symptoms of PVCD no longer serve a purpose in the hospital setting. In their case study, they report that the symptoms ended quickly with hospitalization, but dramatically recurred with an anticipated discharge.

Psychiatric involvement is generally requested through consultation and/or psychiatric referral. Leo and Konakanchi (1999) reported that certain psychiatric diagnoses were not possible in their review of the literature given the limited psychiatric information provided in the cases they cited. They reported that the psychiatric diagnoses were varied, with conversion disorder being the most common diagnosis. As is the case for PVCD, conversion disorder is suspected when the physical findings, specifically respiratory difficulties, are not consistent with known neuroanatomic and physiologic principles. Clearly, the respiratory distress and associated difficulties with speaking can serve the function of primary gain, specifically in temporarily resolving conflicts such as expressing anger or another conflictual emotional state. Despite the overt respiratory distress, which would naturally be associated with alarm and psychological distress, Leo and Konakanchi’s (1999) case study reported that the patient’s mood was “good” and that she appeared to demonstrate an “affective blandness” to her situation. This is consistent with symptomatology of a conversion disorder where the person may show remarkably little concern about what is apparently a rather serious problem (Graham, 1990). Other cases cited in their review were also associated with indifference despite the respiratory disturbance (Rogers, 1980; Neel & Posthumus, 1983).

In summary, there have been a wide variety of etiologies associated with PVCD that have been proposed in the literature. While conversion disorder has been the most
common diagnosis, other psychological disorders have been implicated numerous times throughout the literature, including anxiety, depression, and various personality disorders. Personality traits, psychosocial stressors, specific demographic correlates, and environmental experiences have also been considered as possible correlates. Many of these alleged etiologies have been based on single case studies where diagnoses have been made from clinical judgment without the aid of any formal diagnostic measures. Additional support for a psychological etiology, have come from the inability to find an underlying medical cause for the condition. The use of a psychometrically sound assessment instruments is helpful to clarify the influential correlates of PVCD.

**Diagnosis.**

In order for a condition to be classified as a conversion disorder, there must be the presentation of some type of sensory or motor failure without a physical cause. While PVCD is a failure of the vocal cords to properly abduct during inspiration, it is important to properly diagnosis a patient with PVCD by ruling out all possible physical causes. Additionally, an incorrect diagnosis may deny an asthmatic patient of life-saving treatment. The importance in recognizing PVCD results in the avoidance of both tracheal intubation and ventilation, and the subsequent management of their symptoms by proper referral to a mental health practitioner.

Diagnosis is usually made when patients present with asthma, which proves difficult to control, and thus clinical suspicions arise (Archer, Hoyle, McCluckey, & Macdonald 2000). PVCD is differentiated from asthma by the absence of nocturnal symptoms, localization of wheezing to the upper chest and throat, normal blood gas values despite extreme symptoms, and significant adduction of the vocal cords when
visualized on laryngoscopy. The airway distress often resolves with supportive medical care and relaxation (Brugman & Newman, 1993).

Wood and Milgrom (1996) also emphasize the importance of being knowledgeable about this disorder and being able to correctly diagnose these patients. Vocal cords are a unique organ in that they are under both voluntary and autonomic control. PVCD is best diagnosed with use of laryngoscopy, documenting inappropriate adduction of the vocal folds on inspiration and either a passive or active abduction on expiration (Altman, Mirza, Ruiz, & Sataloff, 2000). Using flexible fiberoptic rhinolaryngoscopy, PVCD can be distinguished from many other conditions, including hereditary angioedema, infections such as croup, epiglottitis, subglottic stenosis from exercise, abscesses involving surrounding structures, and upper respiratory tract infections (Wood & Milgrom, 1996). Some of these can also be ruled out as causes in a clinical interview by questioning the patient. For example, a history of traumatic injury, or a history of neck surgery that may have damaged the vagus or recurrent laryngeal nerve could help rule out underlying medical conditions. Fiberoptic rhinolaryngoscopy, performed by a skilled clinician (usually a speech pathologist or otolaryngologist), causes minimal discomfort and the complications are rare and insignificant. It is also considered the gold standard for diagnosing PVCD (Georgitis, Druce, & Goldstein, 1993). It has also been pointed out that PVCD is commonly seen during exertion and must be differentiated from exercise-induced bronchospasm (Wood & Milgrom, 1996).

The importance in recognizing PVCD lies in the prevention of unnecessary treatment and correctly identifying a condition with potential psychological causes that could be properly treated by a trained mental health professional.
Treatment

Many options for treatment have been discussed throughout the literature, with some evidence suggesting that psychological treatments are effective in treating PVCD. Other treatments that are effective for medical disorders have not been as effective with PVCD. This evidence supports the notion that PVCD may be a psychological disorder, thus treatment options for PVCD will be briefly discussed.

Wood and Milgrom (1996) report that the most successful treatment are breathing exercises which have been used for hyperfunctional voice disorders to decrease laryngeal muscle tone. They further report that these techniques are accepted by most patients who are eager to exert control over their symptoms. They also report that in extreme cases, hypnosis, biofeedback, and psychotherapy has been used successfully (Martin, Blager, Gay, & Wood, 1987; Anbar & Hehir, 2000).

Altman, Mirza, Ruiz, and Sataloff (2000) recommend behavioral treatment for somatoform disorders. Relaxation techniques and hypnosis have been found to be helpful in treating PVCD, conversion disorders, and pain syndromes (Brugman & Newman, 1993). Cognitive-behavioral therapy has been found to be helpful, as well as psychotherapy for these patients. Some have also found that voice therapy is helpful, as well as the use of visual laryngoscopic biofeedback (Altman, Mirza, Ruiz, & Sataloff, 2000). Panting has also been shown to be an effective treatment in relieving PVCD when employed when the dyspneic episodes occur (Pitchenick, 1991).

Wood, Blager, and Milgrom, (1997) recommend heliox (a mixture of helium and oxygen) as an effective treatment for the acute symptoms of PVCD in the pediatric patient population. They further report that there are psychologic elements that they
emphasized in their report that should be considered in treatment. Heliox only provides short-term relief of dyspnea and associated anxiety for patients suffering an acute episode of PVCD.

Helium-oxygen therapy has not been found to be effective in treatment of asthma and/or lower airway disease states. The effect of this treatment in reducing symptoms of PVCD is insightful, and according to Leo and Konakanchi (1999) aids in clarifying the diagnosis. They further suggest that such an expedient response of reduced respiratory distress in patients experiencing psychogenic respiratory distress may help promote an understanding or recognition of the relationship between psychological correlates of PVCD.

A number of studies report the value of anti-anxiety and antidepressant drugs in the treatment of PVCD, as well as other treatment modalities. Some of these include psychotherapeutic techniques, such as reassurance, relaxation, counseling, anxiety control, cognitive-behavioral therapy, personal construct therapy, and patient education (Gallivan, Hoffman, & Gallivan, 1996; Christopher, et al., 1983; Selnar, Staudenmayer, Kopeke et al. 1987; Geist, & Tallett, 1990).

Treatment of PVCD often consists of psychotherapy and speech therapy that has been reported to be an effective treatment for PVCD (Gallivan, Hoffman, & Gallivan, 1996, Christopher, et al., 1983; Martin, Blager & Gay, et al. 1987). The literature review performed by Leo and Kanakanchi (1999) showed that the cases that received speech therapy alone, 20% were found to be ineffective. Other psychiatric and psychological interventions that were employed in the studies that they reviewed included various
techniques, including relaxation training, biofeedback, behavior modification, hypnosis, pharmacotherapy, and family therapy.

While psychotherapy may help to clarify and remedy some of the factors perpetuating and maintaining the symptoms of PVCD, the descriptions about the extent of, and issues related to therapy were often not described in the literature. Psychotherapeutic interventions have, according to the literature, varied in terms of modality, duration, frequency, and efficacy. In Leo and Konakanchi’s review (1999), the efficacy of psychotherapy was questionable in some cases, but in other cases the success was remarkable.

With no clear etiology, it is not surprising that there are a number of different treatment options proposed in the literature, with differing outcomes. The quality of the evidence of treatment efficacy is poor even in the better designed single case studies (Carding & Raz, 2000). It is important for mental health professionals to understand the underlying causes of this disorder in order to effectively plan interventions and techniques for treatment. Furthermore, a better understanding of commonalities in the patients presenting with PVCD would further our knowledge, and possibly give insight into better and more effective ways to treat PVCD.

While psychological causes of PVCD have been implicated, patients may not be accepting of a psychological explanation for their disorder. In fact, in the review performed by Leo and Konakanchi (1999), they found several reports where it was indicated that patients were resistant to the idea of the psychogenic origins to their respiratory difficulties. In some cases, patients refused speech therapy and/or psychotherapy, abandoned treatment, or sought treatment elsewhere with clinicians who
perpetuated the notion of a physical disorder (McFadden & Zawadski, 1996). These reactions may be a result of the way in which the information was relayed to the patients. For example, if the patient is accused of faking the symptoms. Any “confrontation” with a patient would need to invoke ego strengths.

Patients may also need to be educated about the psychological underpinnings of PVCD, as well as others that may be involved in their treatment. Education to families, other supports, and medical personnel may reduce the resentment and negativity conveyed by them toward the patient, which could predispose the patient to distress and may perpetuate symptoms.

In summary, PVCD is a complex disorder of the larynx that has varied etiologies. The psychological underpinnings of PVCD are equally complex. The recognition of PVCD is important to avoid unnecessary medications, prevent intubation and tracheostomy, and to secure appropriate psychological treatment. It is important to identify cases of PVCD and clarify the psychological correlates of the disorder. The literature is limited by a lack of prospective studies comparing patients with PVCD with control subjects to allow for clarification of causal psychosocial and psychological variables. By better understanding the psychological correlates of this disorder, more effective treatment for PVCD will be possible.

Purpose and Hypotheses

Based on the preceding review of the literature on PVCD, the purpose of the present study was to examine PVCD as a psychological disorder, specifically a conversion disorder. Conversion disorder is defined by the criteria listed in the DSM-IV-TR and will be measured using the MMPI-2. In the current study, it was hypothesized
that patients diagnosed with PVCD would show symptoms requisite of a conversion disorder where the improper movement of the vocal cords is rooted in psychological conflict and where a medical cause can be excluded. A conversion disorder was measured using the MMPI-2, where clinical scales 1 and 3 were expected to be elevated. In addition, it was hypothesized that patients receiving a diagnosis of PVCD would show significant levels of anxiety, as also measured by the MMPI-2. Further, it was hypothesized that patients with PVCD would exhibit symptoms that are initiated or exacerbated by significant psychological stressors, where levels of stress were measured using the Life Experiences Survey (LES). The hypotheses for the study were as follows:

Hypothesis 1a: Patients diagnosed with PVCD will exhibit symptoms requisite of a conversion disorder.

Hypothesis 1b: Patients diagnosed with PVCD will exhibit elevated levels of anxiety.

Hypothesis 2a: Patients diagnosed with PVCD will exhibit significantly higher levels of stress than individuals in the general population.
CHAPTER 3

METHOD

Participants

The participants for this study were recruited from an outpatient medical clinic that specializes in swallowing and voice disorders, located in a large Midwestern city. Patients, over 18 years old, that were formally diagnosed with PVCD through laryngoscopy by a trained speech pathologist or otolaryngologist were given information about the study and invited to participate (See Appendix A). During the ten-month period that data was collected for the current study, approximately 130 patients were referred to the clinic for examination of PVCD. Only those patients that were over 18 years of age and received a definite diagnosis of PVCD were invited to participate in the study. Additionally, all patients that were invited to participate were newly diagnosed patients that had not yet completed a full course of treatment for PVCD. Forty-seven patients expressed interest and participated in the study. They were paid $20.00 each for their participation. Sixty-two patients met criteria to participate. Of the 62 patients that met criteria for participation, 7 initially expressed interest in participating, but declined participation due to time and travel constraints. Another 8 patients also initially expressed interest about the study, and were contacted by the experimenter to discuss it, but later decided not to participate. This group of 8 patients were described by the diagnosing speech pathologists and otolaryngologists as anxious, nervous individuals.
who asked a lot of questions about the study. Diagnosticians also noted that these individuals tended to “display different personality traits” that seemed indicative of a previous psychological history. Upon contact with the experimenter, these patients continued to ask a lot of questions about many aspects of the research and seemed to be excessively worried about the information that would be gathered from them and what might be done with this information. Thus, they declined participation in the study.

While data was collected from approximately 47 patients, two did not complete valid assessments and were excluded from the sample. Of the 45 respondents, 8 (19.1%) were males and 37 (80.9%) were females. The sample was predominantly Caucasian, where 36 (76.6%) identified themselves as European American. Age groups of participants varied widely, with a large proportion being over the age of 50. For example, 27 (60.0%) were over the age of 50, and 14 (31.1%) were over the age of 60. Frequencies of the demographic data are provided in Appendix H on the demographic questionnaire.

Table 3.1 displays the number of times patients have been to the Emergency Room or Primary Care Setting for symptoms of PVCD, which ranged from zero to more than 5, with the average number of visits being 2.4. Table 3.1 also displays the number of weeks since receiving a diagnosis of PVCD and the number of weeks since their breathing problems began, which also range from zero to more than 5. The numbers in the table represent the number of participants that fall within each category.
Medical and psychological histories were also of interest for the current study. Twenty-two (48.9%) respondents reported previously having sought the assistance of a psychologist or other mental health provider, while 23 (51.1%) had not. Of the 22 respondents that reported seeing a mental health provider, 14 (63.6%) reported receiving a formal diagnosis from that mental health provider, with 3 (13.6%) being depression, 1 (4.5%) anxiety, 8 (36.4%) a comorbid diagnosis of anxiety and depression, and 2 (9.1%) reported receiving a diagnosis of something other than the above categories.
Information from the patients’ medical intake questionnaire showed that 18 (40.0%) were taking psychiatric medication, while 27 (60.0%) were not. Further, 17 (37.78%) reported being a victim of abuse, although the type of abuse was not specified.

Instruments

**Demographics.** A brief demographic questionnaire was used to assess each participant’s gender, age, race/ethnicity, marital status, education, vocation, duration of PVCD symptomatology, and previous formal psychological diagnoses. (see Appendix D).

**MMPI-2.** Criteria requisite for a conversion disorder and elevated levels of anxiety were assessed using the Minnesota Multiphasic Personality Inventory –2 (MMPI-2; Hathaway & McKinley, 1989). The MMPI-2 is the revised version of the MMPI and is the most widely researched and broadly used personality instrument in psychology (Duckworth, 1991). For example, over 200 articles a year are published using the MMPI-2 (Butcher & Rouse, 1996). The original developers of the MMPI, Hathaway and McKinley, developed this measure to assess important clinical problems and validly portray their patients in an objective manner. It is a self-report and empirically driven assessment.

The research and revision of the MMPI took place over a ten-year period and involved testing over 15 thousand individuals from the general population and from various normal and clinical groups (Butcher, 1985). Several important factors make the MMPI-2 different from other personality evaluation instruments. In developing the assessment, Hathaway and McKinley sampled clinical charts, as well as the psychiatric
research literature to obtain a comprehensive sampling of beliefs, symptoms, problems, attitudes, and so forth as their initial item pool. They tested “normals” (people from the community not under a doctor’s care) and clinical patients (those in treatment with clearly defined symptoms).

There are a total of 567 items on the MMPI-2, all of which are written in a “True” or “False” format. The items are written at an eighth-grade reading level. Some sample items include “I have never been in trouble with the law” and “There seems to be a lump in my throat most of the time”. These items are scored with respect to several validity indices, 10 clinical scales, and several additional supplementary and content scales. There is also a large number of additional research scales (Keller & Butcher, 1991). The MMPI-2 is based on a criterion-key test construction method, which means that scale membership is based on selecting items for scales by identifying those that discriminated a clinical (criterion) group from a group of normals. All scale scores are expressed as T-scores, which are calculated on the basis of normative data.

The MMPI-2 scales were normed on a nationally representative sample of 2600 normal individuals (1138 men and 1462 women) from five regions of the United States. In order to provide an unbiased general norm set, efforts were made to balance the normative sample in terms of ethnicity. For example, people were sampled in areas with large minority populations, including Hispanic (Southern California), African American (urban Philadelphia and North Carolina) and American Indians (an Indian reservation in Washington state) (Butcher, 1999). There have been some criticisms that it is still not representative of the nation as a whole. For example, there is an underrepresentation of Hispanics and Asian Americans (Duckworth, 1991).
In addition to the normative data collection, clinical samples were collected, including inpatient psychiatric cases, chronic pain medical patients, alcohol and drug abusers, married couples in counseling, women being judged at risk for child abuse, and prison inmates.

There are many settings and populations for which the MMPI-2 is used. Some of the more common applications include: assessment of patients in pretreatment planning, evaluation of treatment effects, epidemiological research using personality-based criteria, psychological research studies in which objective personality evaluations are used as an external criterion to study group differences. Hathaway and McKinley (1989) envisioned the MMPI to be a multidimensional assessment device, which would have utility in decision-making processes for both medical and psychiatric patients.

Each test protocol was examined to determine its sufficiency as a basis for making personological inferences, using the MMPI-2 validity scales: ?, L, F, K, F(b), VRIN, and TRIN. The validity indicators are used singly and in combination to evaluate the acceptability of the assessment. Participants may respond in a variety of ways that potentially could distort the results. For example, participants could leave a large number of items unanswered, fail to comply with the test instructions, answer in a random or chance pattern, or role-play different positions that alter the true pattern of self-descriptions. With a valid profile, it can be assumed that the individual completing the assessment consistently marked the items in a way that accurately reflects his/her self-perceptions. Only those profiles that were interpreted as valid were included in the present study.
Each validity indicator that was utilized to assess the acceptability of each protocol will briefly be discussed. The ? (Cannot Say) score is a count of the number of items that were either left unanswered or were marked both True and False. These items are not scored, and essentially are omitted from the test. As a result, the higher the Cannot Say score, the weaker any of the component scales may be to provide the desired discrimination. It has been suggested that profiles with a Cannot Say score greater than 30, are to be considered highly suspect, if not completely invalid (Hathaway & McKinley, 1989). In the present study, the highest Cannot Say score was 3. There were no profiles that were excluded according to this indicator.

The L (Lie) score is meant to detect those individuals that mark the items in such a way that they describe someone whom they envision as having a perfect personality or an ideal adjustment. Markedly elevated scores on this scale reflect this mind set, and critically affect the meaning of the scores on the clinical scales. T-scores greater than 70 on this indicator are to be considered questionable in terms of its validity. Other validity indicators are examined to further assess the elevation on this scale, including the VRIN (variable responding scale) (Hathaway & McKinley, 1989). In the present study, there was one profile excluded from the study because of a very high elevation on this scale.

The F (Infrequency) scale was constructed to detect profiles where the individual responded to items in a random manner, may not be in full contact with reality, or may be deliberately exaggerating their difficulties and concerns. Any of these approaches to the test may generate elevated scores on this scale. T-scores between 70 and 90 may be indicative of emotional problems to a significant degree, thus the VRIN scale and elevations on the clinical scales are examined in concordance with this scale. A random
record will produce very high elevations on this scale, thus it has been suggested that T-scores greater than 90 on this scale cast serious doubt on the validity of the profile (Hathaway & McKinley, 1989). In the present study, one profile was excluded on the basis of this data, with a T-score on this scale of greater than 90.

The K (Correction) scale is meant to detect the tendency to present one’s self in a way that minimizes one’s presentation of poor emotional control or personal ineffectiveness. Hathaway and McKinley (1989) point out that it is also important to consider that individuals that are emotionally stable will often describe themselves in a way that suggest that their life is well-managed, as would be measured by this scale. Elevations on this scale are also to be evaluated in context with other scales, and the individual’s circumstances (Hathaway & McKinley, 1989). T-scores above 70 need to be considered with other validity indicators in order determine if the individual was noticeably defensive when responding to the items, faking good, or responding with all False responding. Low T-scores on this scale (less than 40) may indicate all True responding, a plea for help, or “faking bad”.

The Fb (Back F) scale is to help detect random responding for the second half of the test, when an individual may have stopped paying attention to the test items and shifted to a random pattern of responding. T-scores for this scale are interpreted in the same way as they are for the F scale.

The VRIN (Variable Response Inconsistency scale) and the TRIN (True Response Inconsistency scale) were designed to complement the traditional validity indicators previously discussed (L, F, and K). They are an index of the tendency to respond in ways that are contradictory or inconsistent. High VRIN scores (raw scores of 13 or greater)
caution that a test subject may have answered in an indiscriminate manner and raise the possibility that the profile is invalid. Additionally, very high TRIN scores (raw scores 13 or greater) indicate a tendency for the test-taker to give True answers to items arbitrarily. Very low TRIN scores (raw scores of less than 5) indicate a tendency to answer False indiscriminately. Very high or very low TRIN scores indicate that the profile may be invalid or uninterpretable (Hathaway & McKinley, 1989). In the present study, these scales were used in combination with L, F, and K, to help interpret the validity of each profile. A total of 2 profiles were interpreted as invalid according to the aforementioned validity indicators, and thus were excluded from the study.

For the clinical and supplementary scales, raw scores and T-scores are given, where a mean T-score is 55, with a standard deviation of 10. Scores are considered elevated at 65 or higher. Elevated scores (T scores above 65) were examined and the subscale components that primarily contribute to these elevations were noted. The scores on the supplementary scales were also examined to elaborate on the interpretive hypotheses already generated and to formulate a coherent summary of the personality dynamics and diagnostic status of the patients with proper limitations on the dependability of these conclusions.

Consistent with the aforementioned hypotheses, the specific MMPI-2 clinical and supplementary scales of interest in this study will now be discussed. Increases on the Hypochondriasis (Hs), Depression (D), and Hysteria (Hy) scales are frequently reported in pain patients, reflecting affective disturbance and somatic problems, whereas increases in other scales may indicate more serious pathology (Kvale, Ellerstsen, & Skouen, 2001). It has been purported in the literature that patients suffering from PVCD suffer from
conversion disorder, a so-called “conversion-V”, consisting of elevated scores on the scales Hs and Hy and slightly lower scores on scale D. The conversion-V profile, sometimes also described as the “psychosomatic profile”, is interpreted as reflecting the typical defensive style of a somatisizing patient. Further, individuals that code this profile are described to exhibit a denial of awareness of their psychological conflict and an expression of this conflict through somatic concerns and bodily symptoms (Ellerston & Vaeroy, Endresen, and Forre, 1991).

Elevations on scales 1 (Hs: Hypochondriasis) and 3 (Hy: Conversion Hysteria) are expected, as well as a slightly elevated Scale 2 (D: Depression). A profile coded 1-3 or 3-1 with a slightly lower 2 (the classic “conversion-V”) describes someone that has many somatic complaints but is not worried about them. They may find the illness role as reinforcing. This is consistent with patients exhibiting a conversion disorder (Ellerston, et al., 1991). Scores on the supplementary scale, A (anxiety), are also expected to be elevated.

The scales where an expected elevation exists will now be described in more detail. Test-retest reliability data will also be provided for the current scales of interest. Test-retest reliability data is based on 82 males and 111 females that were retested at an average interval of 8.58 days, with a median of 7 days (Hathaway & McKinley, 1989). Further analyses were performed on the effect of the length of interval between testings that revealed no consistent trends in the size of the retest coefficients (Hathaway & McKinley, 1989).

Scale 1 (Hs: Hypochondriasis) was developed on a group of patients who had many somatic complaints with little or no organic basis, and great concern about their
physical health. There are a total of 32 items in this scale. Some of the items on this scale reflect particular symptoms or specific complaints. Other items reflect a more general preoccupation with the body, or a self-centered focus. A sample item is “I do not worry about catching diseases”. Reported raw score means for 82 male community adults range from 4.00 to 4.87 with a retest correlation coefficient of .85. Reported means for 111 female community adults range from 5.86 to 6.86, and had a retest coefficient of .85 (Hathaway & McKinley, 1989).

Scale 2 (D: Depression). This scale was developed on psychiatric patients with various forms of depression. The items in this scale reflect feelings of discouragement, hopelessness, and pessimism that characterize clinically depressed individuals. There are a total of 57 items in this scale. A sample item is “At times I think I am no good at all”. There are a set of five content areas identified by Harris and Lingoes (1955). These include subjective depression, psychomotor retardation, physical malfunctioning, mental dullness, and brooding. The content groups provide a basis for assessing various possible special reasons for the occurrence of moderate elevations on this scale. It is hypothesized that this scale will be somewhat elevated, but with T-scores less than those elevations on scales 1 and 3. Reported raw score means on this scale for 82 male community adults range from 17.95 to 18.5, and had a retest coefficient of .75, while reported means for 111 female community adults range from 20.36 to 21.12, and had a retest coefficient of .77 (Hathaway & McKinley, 1989).

Scale 3 (Hy: Conversion Hysteria) was formed using patients who displayed signs of a motor or sensory disorder for which an organic basis could not be established. There are 60 component items in this scale that reflect such specific physical complaints or
troubling disorders. Many other items involve a denial of problems in one’s life or the lack of social anxiety often seen in individuals with these defenses. A sample item is “My neck spots with red often”. The items in this scale are also divided into Wiener-Harmon subtle and obvious components and five Harris-Lingoes content areas: denial of social anxiety, need for affection, lassitude-malaise, somatic complaints, and inhibition of aggression. Reported raw score means on this scale for 82 male community adults range from 20.60 to 21.00, and had a retest coefficient of .72, while reported means for 111 female community adults range from 21.52 to 22.16 with a retest coefficient of .76 (Hathaway & McKinley, 1989).

Supplementary Scales.

The supplementary scales of the MMPI-2 are additional scales that are offered to assist in interpreting the clinical scales and to increase the coverage of disorders and clinical problems. It has been suggested, as is the case for the clinical scales, T-scores greater than 65 are considered to be high scores. The interpretive data for some of the supplementary scales, the A (Anxiety) scale being one of them, has been reported to generally be “more complete” than it is for some of the newer measures on the MMPI-2 (Hathaway & McKinley, 1989). Thus, the supplementary, A scale, will be used in the current study to measure anxiety.

The A scale was developed by Welsh (1956) to evaluate the first dimension that emerged when the clinical scales and basic validity scales of the MMPI were factor-analyzed. The A scale has 39 items. High scores on the A scale reflect anxiety, distress, discomfort, and overall emotional upset. High scorers tend to be reserved, inhibited, and may have difficulty making decisions without hesitation and uncertainty. Additionally,
these individuals tend to easily be upset in social situations (Hathaway & McKinley, 1989). A sample item is “I have nightmares every few nights”. Reported raw score means on this scale for 82 male community adults range from 8.61 to 9.55, and had a retest coefficient of .91, while reported means for 111 female community adults range from 10.93 to 12.60, and had a retest coefficient of .91 (Hathaway & McKinley, 1989). This scale has been found to be reliable, with the internal consistency estimate of .89 for males and .90 for females.

*A Life Experiences Survey (LES).* To assess the relationship between levels of stress and PVCD, the LES (Sarason, Johnson, & Siegel, 1978) was used. The LES is a 57-item self-report measure that asks respondents to rate events that they have experienced in the last year. It is separated into two different sections. Section 1 includes items that represent life changes that are frequently experienced in the general population in a variety of situations. This section is comprised of 47 specific events, plus three blank spaces for respondents to fill in other events that they might have experienced that are not listed in the 47 items. Many of these items are based on previous life stress measures, namely the Schedule of Recent Experiences (SRE; Holmes, & Rahe, 1967). Other items were added by the scale’s developers that potentially could exert a significant impact on the lives of those experiencing them. Sample items include “serious injury or illness of close friend” “change of residence”. There are also items that allow both men and women to endorse an item that on previous stress measures was only possible to be endorsed by males or females. For example “Female: pregnancy” and “Male: Wife’s/girlfriend’s pregnancy”. Section 2 includes 10 items that were written specifically for students and deal specifically with changes experienced in an academic environment.
Because the current study evaluated individuals from the general population, these items were not used in the current study.

The format of the LES asks respondents to rate separately the desirability and impact of the events that they have experienced, which allows for an individualized rating of the impact of events. Taking into consideration that events vary in terms of their desirability depending upon the circumstances and perception of the respondent, respondents are asked to indicate those events experienced in the last year. Respondents indicate whether the event has happened within the last 6 months or between 7 and 12 months. Additionally, respondents specify 1) whether they view the event as positive or negative and 2) the perceived impact of the event in their life at the time of the occurrence. Ratings are based on a 7-point scale, ranging from extremely negative (-3), to extremely positive (3). A positive change score is calculated by summing the ratings of those events designated as positive. A negative change score is calculated by summing the impact ratings of those events that were experienced and rated negatively. A total change score is acquired by adding the positive change score to the negative change score, which represents the total amount of rated change experienced by the respondent in the past year. All three scores were considered in the present study.

Normative data was provided that included information about the effects of demographic variables (e.g. gender). No significant differences were found between males and females on any of the three life change measures. Positive and negative life change scores are essentially uncorrelated (Sarason, Johnson, & Siegel, 1978). Test-retest reliability studies show adequate reliability over 5 to 6 week intervals. Test-retest correlations were found from two independent studies. For the positive change score,
correlations were .19 and .53 (p< .001). The reliability coefficients for the negative change score were .56 (p<.001) and .88 (p< .001). The coefficients for the total change score were .63 (p<.001) and .64 (p<.001). Correlations with relevant personality indices for the total and negative change scores correlated significantly and in a positive direction with the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970), whereas, the positive change score was not significantly related to the measure. This suggests a relationship between negative change and anxiety. The relationship between life change scores and the Marlowe-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972) were nonsignificant. Correlations between positive, negative, and total change scores were -.05, .05, and .01 respectively. This suggests that responses to the LES were relatively free of influence of social desirability response bias. The negative life change score has been found to be significantly related to a number of stress-related dependent measures including depression, anxiety, and locus of control. This suggests that the LES is a useful instrument in both clinical and research settings. A significant relationship was found between the negative change score and scores on the Beck Depression Inventory (Sarason, Johnson, & Siegel, 1978). Other significant findings provide support for a relationship between negative life change as assessed by the LES and psychological problems.

Procedure

Participants were made aware of the current study through their diagnosing speech pathologist or physician or through a flyer that was provided to them at the Ohio State University Voice Clinic. The flyer included a brief description of the study, eligibility for participation, as well as contact information of the experimenter (see
Appendix A). Participants were offered $20.00 for their participation. Participants had the opportunity to sign up for the current study in one of two ways: by contacting the experimenter, or by giving permission through their diagnosing physician or speech pathologist be contacted by the experimenter.

At the first contact with the experimenter, participants were read a standard script including a brief description of the study, as well as offering potential participants to ask questions (see Appendix B). Participants set up an appointment to complete the questionnaires in groups ranging from 1 to 10. Because some patients were concurrently in treatment for PVCD, administration of the instruments were done at their treatment site or at another associated and approved medical clinic.

Prior to administration of the instruments, the experimenter read an instructional script explaining the general purpose of the study (see Appendix C). A consent form was read and provided for consenting participants to sign (see Appendix E). In addition, another consent form was read and provided to participants to allow the experimenter access to their Voice Clinic intake questionnaire for specific demographic data (see Appendix F). Once the participants were fully informed, consenting participants completed a demographic questionnaire (see Appendix G), the Minnesota Multiphasic Personality Inventory (MMPI-2; Hathaway & McKinley, 1985), and the Life Experience Survey (LES; Sarason, Johnson, & Siegel, 1978). The measures were administered in an invariant order, beginning with the MMPI-2. While there are several different test administration formats for the MMPI-2, the paper and pencil form with a reusable printed booklet (booklet version) was used for the current study. This type of format permits convenient administration to groups. Items are presented in a reusable test booklet, and a
separate answer sheet is used for each subject’s responses. The booklet presents 567 items. The basic scales are scored from the first 370 items, but participants were given instructions to complete the entire test so that the supplementary and content scales could be scored, as well as the F(b) scale so as to assure accurate validity of the instrument. The LES was also administered in a paper and pencil format. The assessments took approximately 1.5 hours to complete, with the range of times being between 1.16 and 2.33 hours. Participants were made aware of the time commitment entailed before beginning participation in the study.

When administering the MMPI-2 and LES, standard instructions were read, and the test instructions were clearly explained. The test was administered in a comfortable, private environment away from distractions. Upon completion of the questionnaires, participants received a debriefing statement informing them of the purpose of the study (see Appendix D). Participants also received $20.00 for their participation in the study.

The MMPI-2 was computer-scored through the University’s Psychology Department Psychological Services Clinic. Each test protocol was examined to determine its acceptability as a basis for making personological inferences. Only if the profile was deemed valid, according to the MMPI-2 validity scales, and it could be assumed that the individual completing the test consistently marked the items in a way that accurately reflects his/her self-perceptions, was the MMPI-2 interpreted. Of the 47 test protocols, two were deemed as invalid. The LES was hand-scored.

Analysis of Data

Descriptive statistics were calculated for the data to identify group means based on gender for each of the constructs studied. Raw-score and T-score distributions were
derived separately for males and females for the normative sample of the MMPI-2. Thus, the MMPI-2 data was analyzed separately for males and females. The LES normative sample was also separated for males and females, so data from the present study for the LES was also analyzed separately by gender. Z-tests were performed to assess significant differences between the means of the present study and those of the general population for each of the constructs studied. A two-way ANOVA was performed in order to examine possible differences among different subgroups of patients on the MMPI-2 scales of interest: Scale 1, 2, 3, and A.
Participants for this study were individuals from the general population who were formally diagnosed with PVCD by a trained speech pathologist or otolaryngologist, using laryngoscopy. Patients were recruited from a Voice and Swallowing Disorders Clinic in a large, predominately White, Midwestern city. In order to consider the hypotheses that PVCD is a psychological disorder, analyses were performed on selected clinical and supplementary scales of the Minnesota Multiphasic Personality Inventory –2 (MMPI-2; Hathaway & McKinley, 1989), as well as the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978).

Descriptive Statistics: Means, Standard Deviations, and Group Comparisons

Means and standard deviations for the measured variables are presented in Tables 4.1, 4.2, 4.3, and 4.4. Mean and standard deviations of the T-scores from the MMPI-2 were calculated, and are presented separately for males and females in Tables 4.1 and 4.2, respectively, while the means and standard deviations for the LES variables are presented separately for males and females in Tables 4.3 and 4.4.

In order to determine the relative elevation levels of both the MMPI-2 and LES scores for participants in this study, comparisons were made with the standardization sample. Specifically, the means for males and females of the present study were
compared to reported means for males and females for the MMPI-2 restandardization sample, as well as being compared to the normative sample for the LES. Comparisons were made by putting the sample means into their standard form and performing a one-sample z-test, where the population variance is known (Hays, 1994). Comparison means for the MMPI-2 scales of interest are shown in Tables 4.1 and 4.2, while comparison means for the LES subscales are shown in Tables 4.3 and 4.4. The following Tables present means and standard deviations by gender for the sample, as well as Cohen’s d effect size for comparison of differences between the present sample and the general population. Effect size measures the amount of practical significance in assessing the magnitude of the differences between mean scores of the present sample and those of the standardization sample. Cohen (1977) suggested that in assessing the magnitude of the differences in group means, effect sizes between .20 and .50 indicate a small to moderate difference, while effect sizes of .50 to .80 reflect large differences.

Examination of Table 4.1 reveals a significant difference between males of the current sample and males from the general population on Scales 1, 2, and 3. Specifically, comparison means for males for the MMPI-2 of the present sample with normative data for males for the MMPI-2 Scale 1 (Hs) (Hathaway & McKinley, 1989) show that the mean for males in the present sample on Scale 1 ($M = 68.50$ $SD = 17.72$) was significantly higher than the reported mean for the general population ($M = 55$ $SD = 10$) ($z = 1.645$, $p < .05$). The effect size for this comparison was large, 1.13. This large effect size indicates a large difference between males of the present sample and males in the general population. The mean for Scale 2 (D) for the current sample ($M = 60.50$ $SD = 13.83$) was also significantly higher than that reported by Hathaway & McKinley (1989).
(M = 55 SD = 10) (z = 1.645, p < .05). The effect size for this comparison was moderate, indicating a moderate difference between the present sample and the general population. Regarding Scale 3 (Hy), the mean for the present sample (M = 67.88 SD = 17.25) was significantly higher than the mean reported by Hathaway and McKinley (1989), (M = 55 SD = 10) (z = 1.645, p < .05). The effect size for this comparison was large, 1.29, which also indicates a large difference between scores Scale 3 for the current sample and the general population. Conversely, the mean for the Scale A (Anxiety) in the present sample (M = 56.50 SD = 19.95) was not significantly higher than that reported by Hathaway and McKinley (1989) (M = 55, SD = 10) (z = 1.645, p < .05).

Examination of Table 4.2 shows that the comparison means for females for the MMPI-2 of the present sample with normative data for females for the MMPI-2 were similar to that found for males. Specifically, on Scale 1 (Hs), the mean for females in the present sample (M = 68.14 SD = 10.63) was significantly higher than the reported mean for the general population (M = 55 SD = 10) (z = 1.645, p < .05). The effect size for this comparison was large, 1.31. This large effect size indicates a large difference between females of the present sample and females in the general population. The mean for Scale 2 (D) for females for the current sample (M = 58.62 SD = 12.99) was also significantly higher than that reported by Hathaway and McKinley (1989) (M = 55 SD = 10) (z = 1.645, p < .05). The effect size for this comparison was small, indicating a small difference between females in the present sample and females in the general population. The mean for the present sample for females for Scale 3 (M = 65.86 SD = 11.25) was significantly higher than the mean reported by Hathaway and McKinley (1989), (M = 55
The effect size for this comparison was large, 1.09, again indicating a large difference between females of the present sample and females in the general population. There were no significant differences found for females for Scale A (Anxiety).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable (n = 8)</th>
<th>M</th>
<th>SD</th>
<th>z</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 1 (Hs)</td>
<td></td>
<td>68.50</td>
<td>16.72</td>
<td>9.06*</td>
<td>1.35</td>
</tr>
<tr>
<td>Scale 2 (D)</td>
<td></td>
<td>60.50</td>
<td>13.83</td>
<td>3.69*</td>
<td>.55</td>
</tr>
<tr>
<td>Scale 3 (Hy)</td>
<td></td>
<td>67.88</td>
<td>17.25</td>
<td>8.64*</td>
<td>1.29</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>56.50</td>
<td>19.95</td>
<td>1.01</td>
<td>.15</td>
</tr>
</tbody>
</table>

Note. *indicates p \(< .05.

Table 4.1: Means, Standard Deviations, and Comparisons for Males for Different Clinical and Supplementary Scales of the MMPI-2: Scale 1, Scale 2, Scale 3, and A (Anxiety).
Table 4.2: Means, Standard Deviations, and Comparisons for Females for Different Clinical and Supplementary Scales of the MMPI-2: Scale 1 (Hs), Scale 2 (D), Scale 3 (Hy), and A (Anxiety).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Females (n = 37)</th>
<th>Effect</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>z</td>
</tr>
<tr>
<td>Scale 1 (Hs)</td>
<td>68.14</td>
<td>10.63</td>
<td>8.81*</td>
</tr>
<tr>
<td>Scale 2 (D)</td>
<td>58.62</td>
<td>12.99</td>
<td>2.43*</td>
</tr>
<tr>
<td>Scale 3 (Hy)</td>
<td>65.86</td>
<td>11.25</td>
<td>7.29*</td>
</tr>
<tr>
<td>A</td>
<td>52.16</td>
<td>10.78</td>
<td>-1.91</td>
</tr>
</tbody>
</table>

Note. *indicates p ≤ .05.

Paradoxical Vocal Cord Dysfunction (PVCD) appears to be a conversion disorder. In the present study, patients diagnosed with PVCD exhibited “Conversion-V” Profiles on the MMPI-2, where Scales 1 and 3 were significantly elevated in comparison to the general population, and Scale 2 was also significantly elevated, but at a lower level than Scales 1 and 3 to produce the classic “Conversion-V” Profile. See Figure 4.1 below.
Figure 4.1: Graph of the Elevations on Scale 1 (Hs), Scale 2 (D), and Scale 3 (Hy), illustrating the Classic “Conversion-V” for Males and Females.

Comparison means for the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) are displayed in Tables 4.3 and 4.4, with comparison means for males in Table 4.3 and comparison means for females in Table 4.4. Comparison means for males for the LES of the present sample with normative data for males for Positive Scores
(Sarason, Johnson, & Siegel, 1978) show that the mean for males in the present sample for Positive Score (M = 2.25 SD = 2.05) was significantly lower than the mean reported by Sarason et al., 1978 (M = 6.87 SD = 5.97) (z = -5.19 p < .05). The effect size for this comparison was large, .77. This large effect size indicates a large difference between males of the present sample and males of the normative sample. Specifically, males of the present sample report significantly lower levels of positive stress than males in the normative sample. The mean for Negative Scores for the current sample (M = 2.13 SD = 2.64) was also significantly lower than that reported by Sarason et al., (1978) (M = 4.66 SD = 4.36) (z = -3.89 p < .05). The effect size for this comparison was moderate to large, indicating a moderate to large difference between males of the current sample and males in the normative sample, where males of the present sample reported significantly lower levels of negative stress than males in the normative sample. Regarding Total Scores, the mean for the present sample (M = 4.38 SD = 3.74) was also significantly lower than the mean reported by Sarason et al. (1978). (M = 11.53 SD = 8.01) (z = -6.01 p < .05). The effect size for this comparison was large, which indicates a large difference for males of the present sample and males in the normative sample, where males of the present sample reported significantly lower levels of total stress than males in the normative sample.

Examination of Table 4.4 shows significant differences between females of the present sample and females in the normative data for both Positive and Negative Scores. Specifically, the mean for females for Positive scores (M = 4.87 SD = 4.72) were significantly less than the mean for Positive scores for the normative sample (M = 6.71 SD = 5.51) (z = -2.24, p < .05), where females reported significantly lower levels of positive stress than females in the normative sample. The effect size for this comparison
was small, .33. This small effect size indicates a small difference between females of the present sample and females in the normative sample. Conversely, comparison means for Negative Scores for females in the present sample (M = 8.19 SD = 10.71) was significantly higher than the reported mean for the normative sample (M = 5.64 SD = 6.43) (z = 2.66, p < .05) (Sarason, et al., 1978). The effect size for this comparison was moderate, .40, which indicates a moderate difference between females in the present sample and females in the normative sample. There were no significant differences between females in the present study and females in the normative sample for Total scores.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males (n = 8)</th>
<th>Effect</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Score</td>
<td>2.25</td>
<td>-5.19*</td>
<td>.77</td>
</tr>
<tr>
<td>Negative Score</td>
<td>2.13</td>
<td>-3.89*</td>
<td>.58</td>
</tr>
<tr>
<td>Total Score</td>
<td>4.38</td>
<td>-6.01*</td>
<td>.89</td>
</tr>
</tbody>
</table>

Note. *indicates p ≤ .05.

Table 4.3: Means, Standard Deviations, and Comparisons for Males for the Different Subscales of the LES: Positive Score, Negative Score, and Total Score.
Table 4.4: Means, Standard Deviations, and Comparisons for Females for the different subscales of the LES: positive score, negative score, and total score.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Females (n = 37)</th>
<th>Effect</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>z</td>
</tr>
<tr>
<td>Positive Score</td>
<td>4.87</td>
<td>4.72</td>
<td>-2.24*</td>
</tr>
<tr>
<td>Negative Score</td>
<td>8.19</td>
<td>10.71</td>
<td>2.66*</td>
</tr>
<tr>
<td>Total Score</td>
<td>13.03</td>
<td>13.06</td>
<td>.52</td>
</tr>
</tbody>
</table>

Note. *indicates p ≤ .05.

In summary, the results for the LES show that males diagnosed with PVCD report significantly lower amounts of positive stress, negative stress, and total stress than those in the normative sample. Additionally, the results show females diagnosed with PVCD report significantly lower levels of positive stress, and significantly higher levels of negative stress than those in the normative sample.

Differences Between Subgroups of Patients

To examine the possible differences between different subgroups of patients, a Two-way ANOVA was performed. Multiple comparisons were made to ascertain whether there were significant differences between different subgroups of patients on Scales 1, 2, 3, and A of the MMPI-2. Patients were grouped according to information they reported on their medical intake questionnaires when referred to the swallowing and voice disorders clinic. Questionnaires were evaluated in order to separate patients into...
different subgroups according to their medical and psychological histories. Specifically, patients’ charts were examined for indications of an evaluation for asthma or gastroesophageal reflux disease (GERD), as well as a possible psychological history. A two-way ANOVA with 2 factors was performed. Factor 1 had two levels: medical and non-medical, and factor 2 had 2 levels: psychological and non-psychological. Patients were categorized into one of four groups: 1) Medical: patients with a history of asthma, GERD, or a comorbid condition of both, 35 (77.78%); 2) Non-medical: patients without a history of asthma, GERD, or both, 10 (22.22%); 3) Psychological: patients with a psychological history, 18 (40.00%); and 4) Non-psychological: patients without a psychological history, 27 (60.00%). Patients were determined to have a psychological history if they currently reported being on medication that has psychopharmaceutical effects, including anti-depressants and anti-anxiolytics. Results of the Univariate Analysis of Variance (ANOVA) as well as Cohen’s F-squared effect size are presented in Tables 4.5, 4.6, 4.7, and 4.8. Cohen (1977) suggested that in assessing the effect size for the F statistic, .02 is small, .15 is medium, and .35 indicates a large effect. Effect size is a measure of practical significance that is relatively independent of the particular sample used. Additionally, to further illustrate the results for each scale, the results of the two-way ANOVA have been graphed and are presented following each Table in Figures 4.2-4.5.

Table 4.5 and Figure 4.2 present the results of the ANOVA for Scale 1. Examination of this table reveals no interaction effect and only a main effect for the medical group. The results indicate a significant difference between the means on Scale 1 for those that have a medical history of asthma, GERD, or both and those that did not.
Specifically, those in the medical group ($M = 70.57$, $SD = 11.91$) had a significantly higher mean than those in the non-medical group ($M = 59.9$, $SD = 5.91$) ($F = 8.328$, $p < .05$). The effect size for this comparison was medium, .16. This effect size indicates a moderate difference between those that have a medical history and those that do not.

There was no main effect for the psychological subgroup, meaning there were no significant differences found between those with a psychological history and those without one.

Table 4.5: Univariate Analysis of Variance for Scale 1 (Hs) for the Different Subgroups of Patients: Medical, Psychological, and Medical and Psychological.

<table>
<thead>
<tr>
<th>Variable</th>
<th>SS</th>
<th>df</th>
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<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>990.39</td>
<td>1</td>
<td>990.39</td>
<td>8.32*</td>
<td>.16</td>
</tr>
<tr>
<td>Psychological</td>
<td>136.84</td>
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<td>136.84</td>
<td>1.15</td>
<td>.00</td>
</tr>
<tr>
<td>Med x Psych</td>
<td>11.53</td>
<td>1</td>
<td>11.53</td>
<td>.10</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. *indicates $p \leq .05$. 
The results of the ANOVA for Scale 2 are presented in Table 4.6 and Figure 4.3. Examination of these results reveal no interaction effects between the medical and psychological subgroups, but does reveal a main effect for the psychological subgroups. The results indicate a significant difference between the means on Scale 2 for those that had a psychological history and those that did not. Specifically, the mean the psychological subgroup (M = 65.39, SD = 13.47) was significantly higher than the mean for the non-psychological subgroup (M = 54.67 SD = 10.94) (F = 7.58, p < .05). The effect size for this comparison was medium, .14, indicating a medium difference between those with a psychological history and those without. There was no main effect for the
medical subgroup, meaning there were no significant differences found between those with a medical history of asthma, GERD, or both and those without.

Table 4.6: Univariate Analysis of Variance for Scale 2 (D) for the Different Subgroups of Patients: Medical, Psychological, and Medical and Psychological.

<table>
<thead>
<tr>
<th>Variable</th>
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</thead>
<tbody>
<tr>
<td>Medical</td>
<td>270.74</td>
<td>1</td>
<td>270.74</td>
<td>1.88</td>
<td>.02</td>
</tr>
<tr>
<td>Psychological</td>
<td>1092.78</td>
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<td>1092.78</td>
<td>7.58*</td>
<td>.14</td>
</tr>
<tr>
<td>Med x Psych</td>
<td>12.04</td>
<td>1</td>
<td>12.04</td>
<td>.08</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. *indicates p ≤ .05.
Table 4.7 and Figure 4.4 reveal the results of the ANOVA for Scale 3 (Hy). Examination of these results reveal no interaction effects between the medical and psychological subgroups, as well as no main effects for both the medical and psychological groups. The absence of any main effects signifies no significant differences between patients with a medical history and those without, and no significant differences between patients with a psychological history and those without.

Figure 4.3: Graph of the Univariate Analysis of Variance for Scale 2 (D) for the Different Subgroups of Patients: Medical, Non-medical, Psychological, and Non-psychological.
<table>
<thead>
<tr>
<th>Variable</th>
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<th>F</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>163.91</td>
<td>1</td>
<td>163.91</td>
<td>1.11</td>
<td>.00</td>
</tr>
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<td>.61</td>
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</table>

Note. *indicates p ≤ .05.

Table 4.7: Univariate Analysis of Variance for Scale 3 (Hy) for the Different Subgroups of Patients: Medical, Psychological, and Medical and Psychological.
The results of the ANOVA for Scale A (Anxiety) are presented in Table 4.8 and Figure 4.5. Examination of these results show no interaction effect, and only a main effect for the psychological subgroups, meaning the results indicate a significant difference between the means on Scale A for those that have a psychological history and those that did not. Specifically, the mean for the psychological subgroup ($\bar{M} = 59.66$, $SD = 12.69$) was significantly higher than the mean for the non-psychological subgroup ($\bar{M} = 47.86$, $SD = 10.13$) ($F = 7.31$, $p < .05$). The effect size for this comparison was medium, $.15$, indicating a moderate difference between those with a psychological history and those without. There was no main effect for the medical subgroup, meaning there
were no significant differences found between those with a medical history of asthma, GERD, or both and those without.

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</table>

Note. *indicates p \leq .05.

Table 4.8: Univariate Analysis of Variance for Scale A (Anxiety) for the Different Subgroups of Patients: Medical, Psychological, and Medical and Psychological.
Figure 4.5: Graph of the Univariate Analysis of Variance for Scale A (Anxiety) for the Different Subgroups of Patients: Medical, Non-medical, Psychological, and Non-psychological.

The results support a difference between different subgroups of patients, where patients with a medical history of asthma, GERD, or a comorbid condition of both have significantly higher scores on Scale 1 than those that do not have a medical history of these conditions. Further, patients with a previous psychological history have significantly higher scores on Scale 2 and Scale A than those patients without a psychological history.
CHAPTER 5
DISCUSSION

The purpose of the present study was to gain a better understanding of paradoxical vocal cord dysfunction (PVCD) and investigate PVCD as a psychological disorder. Specifically, this study sought to better understand PVCD by utilizing psychometrically sound psychological assessment instruments in examining PVCD as a psychological disorder. PVCD was examined specifically as a certain kind of somatoform disorder, a conversion disorder. The results of the investigation revealed several interesting and significant findings, which supported the aforementioned hypothesis postulating that PVCD can be classified as a psychological disorder, specifically a conversion disorder. Other findings did not support the aforementioned hypothesis that individuals diagnosed with PVCD report higher levels of anxiety and stress than individuals in the general population.

Is PVCD a psychological disorder, specifically a conversion disorder?

It was hypothesized that individuals diagnosed with PVCD would report symptoms requisite of a conversion disorder as defined by the Diagnostic and Statistical Manual for mental disorders (DSM-IV-TR; 1994) and as measured by the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Hathaway & Mckinley, 1989). A conversion disorder is a specific somatoform disorder. Somatoform disorders are
psychological difficulties in which there are symptoms of a physical disorder without a physical cause. A conversion disorder is defined as a deficit in voluntary motor or sensory functioning other than pain, with symptoms that are not intentionally produced. These symptoms cause significant impairment in daily functioning or warrant medical evaluation. Further, after appropriate investigation, these symptoms cannot be fully explained by a general medical condition, effects of a substance, or a culturally sanctioned behavior or experience. In addition, a conversion disorder helps reduce stress by allowing the person to avoid unpleasant or frightening situations (DSM-IV, 1994).

PVCD was examined using two different scales: the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) and the Life Experiences Survey (LES). The first hypothesis presented was that individuals formally diagnosed with PVCD would report symptoms requisite of a conversion disorder as measured by the MMPI-2, where scales 1 and 3 would be significantly elevated, and scale 2 would be slightly elevated, which, in fact, they were. This finding is consistent with the literature that suggests that PVCD is a psychological disorder, specifically a conversion disorder. Specifically, the literature suggests that among patients diagnosed with PVCD, psychiatric diagnoses are varied, with conversion disorder being the most common diagnosis. This study confirmed that supposition.

PVCD appears to be, on average, associated with a psychological conversion disorder where the abnormal laryngeal movement may serve the purpose of allowing the individual to avoid an unpleasant life situation or emotion. For example, the respiratory distress and other associated difficulties with speaking may serve the function of primary gain in temporarily resolving the conflicts of otherwise having to express anger or
another unpleasant emotional state as was suggested by Leo and Konakanchi (1999). In addition, it seems that PVCD may give the patient secondary gain through attention and sympathy, as also suggested in the literature (Christopher, Wood, Eckert, Blager, Raney, & Souhrada, 1983). Where PVCD is classified as a conversion disorder, it suggests that patients suffering from PVCD do not consciously produce their symptoms and probably are generally unaware of the psychological concerns underlying their symptoms. The symptoms of conversion disorders usually have some particular relevance to the individual patient. This may be the case for PVCD patients. As suggested in the literature, individuals may have witnessed a traumatic respiratory event, (e.g. there may be someone close to the patient who is ill with asthma). There may also be a more symbolic meaning, such as a patient who has suffered from forced oral sex or sexual abuse (Newman, Mason, & Schmaling, 1995; Nelson, 2002; Brown, Merritt, & Evans, 1988; Freedman, Rosenberg, & Schmaling, 1991). This may be a probable possibility, where 37.8% of patients reported being victims of abuse.

The “conversion V” code type is more common among women and older persons than among men and younger persons (Graham, 1990). The findings of the current study are consistent with the literature on PVCD, where PVCD has been found to have a higher preponderance among women. For example, with the sample of individuals in this study diagnosed with PVCD, 80.9% were female. There also seems to be a higher prevalence of PVCD among older persons, where in the current sample, 60% were over the age of 50, and 31% were over the age of 60.

There were variations among individual results on the MMPI-2. While 18 patients individually achieved the conversion disorder code type, an additional 14 patients
demonstrated somatoform and/or conversion features but did not meet the strict MMPI-2
criteria for a coded profile of conversion disorder. These individuals may still qualify for
a diagnosis of conversion disorder, but this would require additional assessment and
evaluation by a psychologist or psychiatrist. Of interest, 11 patients had normal results
on the MMPI-2, suggesting there is a subset of patients in whom the disorder is not
associated with symptoms of psychopathology. In these patients, PVCD attacks may be
associated with laryngopharyngeal reflux, intermittent bronchospasm, or some other
physiologic factor that has yet to be elucidated.

On average, significant levels of anxiety and depression were not reported by
these individuals, which may suggest that they probably were not experiencing any
disabling emotional turmoil. This is also consistent with individuals that score a similar
13/31 profile on the MMPI-2 (Graham, 1990). These individuals probably continue to
function relatively well, despite their PVCD symptoms. For example, these individuals
likely perform at a reduced level of efficiency, rather than at a grossly incapacitating
level of functioning. In reviewing patients’ demographic data, it is interesting to note that
93% of patients reported more than five weeks had passed since their breathing problems
began, yet 65% reported it had been less than five weeks since receiving a diagnosis of
PVCD. Further, 47% of patients had been to the emergency room or a primary care
physician for their symptoms of PVCD in the past year, with the average number of visits
for all participants being 2.4. Thus, it can be seen that PVCD can be a disabling disorder
and can adversely affect the quality of life for many individuals.

Graham (1990) reports that individuals that score a 13/31 code type, typically have
physical symptoms that increase during times of stress, and that there is often a clear
secondary gain associated with the symptoms. He further reports that individuals with this code type may present themselves as psychologically normal, without fault, and responsible. They may excessively activate their defenses of denial, projection, and rationalization. Further, they may blame others for their difficulties. Additionally, they appear to prefer medical explanations for their symptoms, and may lack insight into the psychological underpinnings of their symptoms. As is consistent with a diagnosis of conversion disorder, they do not show appropriate concern about their symptoms and problems, and may even present an overly optimistic view of their situation.

Diagnosticians report that this is consistent with many PVCD patients, in that one of the most difficult aspects of treatment is helping patients gain an understanding that alleviation of their symptoms involves modifying their cognitions and behavior rather than medication or surgery.

Some of the personality traits associated with individuals who score high on scales 1 and 3 include being selfish, egocentric, histrionic, and they have a tendency to be immature (Graham, 1990). Additionally, they may show traits of insecurity, and have a strong need for attention, affection, and sympathy. They may be dependent, but may also be uncomfortable with the dependency. As a result, conflict may be created from these emotions (Graham, 1990). Additionally, 13/31 code types tend to harbor resentment and hostility toward other people, particularly those people who are perceived as not fulfilling their needs for attention, yet they feel it is important to behave in a socially acceptable manner. In the current study, many participants expressed being very eager to help researchers gain a better understanding of this disorder, and seemed happy to answer questions and discuss their symptomatology.
Do patients diagnosed with PVCD exhibit elevated levels of anxiety?

It was further postulated that individuals diagnosed with PVCD would report higher levels of anxiety. The results were inconsistent with this hypothesis. Specifically, the second hypothesis was that individuals formally diagnosed with PVCD would report higher levels of anxiety, as measured by the MMPI-2, than the general population. This was not the case. These results are also inconsistent with previous suppositions in the literature that individuals with PVCD suffer from anxiety and specific anxiety-related disorders (Anbar & Hahir, 2000). In Leo and Konakanchi’s (1999) literature review of 170 cases from the years 1966 to 1998, psychological or psychiatric evaluation was requested in 84 cases (49.1%), and the psychiatric diagnoses were varied. Some of these included conversion reactions (12%), anxiety disorders (11%), histrionic and other personality disorders (6%), family/school conflicts (4%), depression (4%), psychosomatic disorder (2%), factitious disorder (2%), and somatization disorder (1%).

One possibility for individuals in the present sample to not report significantly higher levels of anxiety than the general population could be due to the absence of those 8 participants that declined participation in the study as a result of excessive worry and suspiciousness of the research process and how their information would be used. These patients were described by diagnosticians as nervous and anxious individuals. The results of the reported levels of anxiety might look different, had these individuals participated in the study. In addition, patients that participated in this study may not be consciously aware of their anxiety, and consequently would not endorse items that would elevate the Anxiety scale.
Since scale 2, which measures depressive symptoms, was mildly elevated in these patients, a post-hoc test was performed on the DEP (depression) content scale. High scores on this scale characterize individuals with significant depressive thoughts. Further, they report feeling blue, uncertain of their future, and uninterested in their lives. They are likely to brood, be unhappy, cry frequently, feel hopeless or empty, and may report thoughts of suicide or wishes that they were dead (Hathaway & McKinley, 1989). This scale was not significantly elevated in these patients, suggesting that these patients do not suffer from depression, which is inconsistent with suggestions in the literature that PVCD is a depressive disorder.

Do patients diagnosed with PVCD report significantly higher levels of stress than individuals in the general population?

It was further postulated that individuals with PVCD experience significantly high levels of stress. Specifically, the third hypothesis stated that individuals with PVCD would report higher levels of stress than the general population. The results were surprising and inconsistent for males and females. Overall, the results were inconsistent with the third hypothesis that individuals would report higher levels of total stress than the general population.

Males in the present sample reported significantly lower levels of positive, negative, and total stress than those in the general population. Females in the current sample reported significantly higher levels of negative stress, significantly lower levels of positive stress, and no significant difference in total stress. This finding for the female participants supports the literature that suggests there seems to be an association between patients diagnosed with PVCD and high levels of stress. Specifically, the results for
females in the present sample suggest that female PVCD patients overall do not experience any more total stress than those in the general population, however, the stress they do experience is more negative.

Some clinicians have noted that stress serves to exacerbate or imitate the symptoms of PVCD and can render the patient noncompliant to treatment (Leo & Konakanchi, 1999). Many in the literature also consider PVCD to be a psychological disorder that is triggered by emotional and possibly physical stress (Selner, Staudenmayer, Koepke et al., 1987; Christopher, Wood, Eckert, et al., 1983; Brown, Merritt, & Evans, 1988). In the current sample, there were many participants who, when given instructions about the Life Experiences Survey (LES) verbally reported that they did indeed suffer from extreme amounts of stress.

Conversion disorders also tend to appear when a person is under severe stress (DSM-IV-TR, 1994). The DSM-IV-TR (1994) criteria state that the symptoms or deficits of the disorder are judged to be psychological because they are usually preceded by conflict or other stressors that initiate or exacerbate the symptoms. The disorder helps to reduce stress by allowing the person to avoid unpleasant or threatening situations.

Where males in the present sample report lower levels of positive, negative, and total stress, suggests that male PVCD patients may experience less busy, eventful, or “chaotic” lives than other males in the population. One possible explanation for the failure of the results for males to support the belief that individuals diagnosed with PVCD suffer from higher levels of stress could be the small sample size for males. For example, there were only 8 males in the present sample. Another explanation could be that while males do not report experiencing higher levels of negative or total stress, they may have greater
difficulty coping with these levels of stress in their lives. In other words, they may experience similar levels of negative and total stress as other males in the general population, but lack effective coping mechanisms to manage the tension and strain resulting from the events in their lives. Additionally, males reported significantly lower levels of positive stress which include events that have a positive impact and increase well-being. Their PVCD symptoms may be a result of their inability to effectively cope with the stress in their lives.

Is there a difference between PVCD patients that have medical histories, psychological histories, and those that do not?

Some researchers in the literature propose that PVCD has a multifactorial etiology due to the presence of asthma and GERD in many of these patients (Newman, Mason, & Schmaling, 1995). When Altman, Mirza, Ruiz, and Sataloff (2000) conducted a retrospective review of patients, they addressed the association between psychiatric pathology, including personality disorders, anxiety, depression, and stress disorders, as well as gastroesophageal reflux (GER), and asthma. Although they did not define how psychiatric categories were assessed or diagnosed, they reported that 7 out of 10 had psychiatric disorders, and 8 out of 10 had GER.

In the current study, patients were subdivided into different categories according to their medical and psychological histories on the intake questionnaire to further investigate any differences between different subgroups of patients on the MMPI-2 scales of interest. While the majority (60%) did not have a psychological history, 40% did, which suggests that other psychological diagnoses may be common comorbidities among patients with PVCD. In addition, 78% of patients in the present sample had a history of
GERD, asthma, or both, indicating these medical conditions are common comorbidities in patients with PVCD.

The two-way Analysis of Variance (ANOVA) revealed no interaction effects for any of the MMPI-2 scales. This means that the difference between patients at each level of the medical group (those with medical histories of asthma and/or GERD, and those without) is similar to the difference between those patients at each level of the psychological group (those with a psychological history and those without) on all scales. In other words, the medical subgroups (those with a medical history of asthma and/or GERD) perform similarly at each level of the psychological subgroups (those with a psychological history and those without). This finding is somewhat surprising, suggesting that status on one of the grouping variables does not affect status on the other. For example having a medical history of asthma and/or GERD does not affect one’s psychological status.

While there was a lack of interaction effects, main effects were noted on three scales of the MMPI-2. Specifically, for Scale 1 (Hs), patients with a medical history of asthma, GERD, or both, scored significantly higher than those that did not. Thus, patients with a medical history scored higher on Scale 1, regardless of their psychological status. Individuals that score high on Scale 1 tend to exhibit excessive concern about their health and tend to present to medical settings with a variety of somatic complaints with little or no organic basis (Graham, 1990). Additionally, in the normative sample for the MMPI-2, individuals who scored high on this scale rejected repeated assurances that there was nothing physically wrong with them (Hathaway & McKinley, 1989). This main effect suggests that PVCD patients with asthma, GERD, or both may complain
more about their physical symptoms than those without these common comorbidities. Additionally, these patients may visit physicians more which may naturally lead to more diagnoses and more extensive medical histories (i.e. reflux, asthma).

The results also revealed two more main effects for Scale 2 (D) and Scale A (Anxiety). Specifically, for Scale 2, patients with a psychological history scored significantly higher on this scale than those that did not. Individuals that score high on Scale 2 report various symptoms of depression, including feelings of discouragement, pessimism, and hopelessness. In addition, individuals that score high on this scale report basic personality features of hyper-responsibility, high personal standards, and “intrapunitiveness” (Hathaway & McKinley, 1989). The main effect signifies that patients in the current sample with a psychological history scored higher on Scale 2 in spite of their medical status. This suggests that patients with a psychological history experience more depressive symptoms than those patients without a psychological history.

Individuals with a psychological history also reported significantly higher scores on Scale A than those without a psychological history, despite their medical status. High scores on Scale A indicate feelings of distress, anxiety, discomfort, and general emotional upset (Hathaway & McKinley, 1989). Individuals that score high on Scale A tend to be inhibited and overcontrolled, conforming, and easily upset in social situations. The main effect suggests that PVCD patients with a psychological history experience more symptoms of anxiety, regardless of their medical status.
Directions for Future Research

PVCD has been shown to be a complex disorder with many proposed and varied etiologies, including a psychological etiology. In the present study, PVCD has been found to have a psychological etiology, specifically it has been found to show criteria requisite to be considered a conversion disorder, as measured by the MMPI-2. While PVCD did not seem to be associated with high levels of anxiety or high levels of total stress in the current study, stress has been implicated as a factor that contributes to the exacerbation or onset of conversion symptoms (Graham, 1990). This being the first study examining PVCD as a psychological disorder utilizing psychometrically sound psychological instruments, future research could attempt to replicate this study in an effort to see if similar results are found. In addition, future research could further examine PVCD as a psychological disorder utilizing a different patient base. For example, in this particular study, patients were recruited from a specialized voice and swallowing disorders medical outpatient clinic. The results may look different from a different patient referral, such as those patients referred from a Primary Care Setting, or psychiatric referral base.

It would also be interesting to investigate this disorder as a psychological disorder among the pediatric population to see if the etiology of PVCD differs for this population, and if the psychological presentation is similar. The “conversion V” code type is more common among women and older persons than among men and younger persons, as was found in the current study. It would be interesting to see if individuals diagnosed with PVCD in the pediatric population show similar results on the MMPI-A, which is the form of the Minnesota Multiphasic Personality Inventory normed for adolescence and children.
Where 37.8% of patients reported being victims of abuse, and various researchers have suggested abuse being an important factor to investigate in relation to this disorder, (Newman, Mason, & Schmaling, 1995; Nelson, 2002; Brown, Merritt, & Evans, 1988; Freedman, Rosenberg, & Schmaling, 1991), it might be beneficial to further investigate prior abuse as a possible contributor to symptoms of PVCD. In the current study, the type of abuse suffered by the patient was not specified in the majority of cases. Thus, a further investigation into prior abuse, as well as the kind of abuse suffered by the patient might be helpful in gaining a better understanding of this possible contributing factor.

Further, having found that PVCD does have a psychological etiology, it would be beneficial to investigate different psychological treatment options for this population. There has been a wide array of treatment options suggested for the treatment of PVCD, partly as a result of the confusion in regard to the etiology of this disorder. As a result, there continues to be somewhat of a debate in regard to the best treatment options for patients with PVCD, including medical treatments, such as helium-oxygen therapy, and psychological treatments. The literature suggests that the most effective treatments for PVCD include those that focus on the patients’ mental control of their breathing in order to help resolve their symptoms of PVCD, including breathing exercises, relaxation techniques, voice therapy, and visual laryngoscopic biofeedback (Wood & Milgrom, 1996). Further, psychotherapy, including cognitive-behavioral therapy, personal construct therapy, and patient education has been shown to be effective treatment methods for the treatment of PVCD (Gallivan, Hoffman, & Gallivan, 1996; Geist & Tallet, 1990; Christopher et al., 1983).
In considering PVCD as a conversion reaction, it would be helpful to investigate treatment options that have been shown to be effective for somatoform disorders. For example, behavioral treatment, relaxation techniques, and hypnosis have been found to be helpful in treating somatoform disorders, specifically conversion disorders and pain disorders (Brugman & Newman, 1993). Studies investigating the most effective psychological treatment options would be beneficial for clinicians and patients working with these disorders. Utilizing the available literature on the MMPI-2 13/31 profiles and the information that is available pertaining to counseling and psychological treatment of individuals that code for these profiles could be applied to treatment possibilities to best help treat individuals diagnosed with PVCD. It might be that the right combination of speech therapy (performed by a speech pathologist) and psychotherapy (performed by a mental health professional) will be the most effective treatment for PVCD.

Limitations of the Present Study

The current study was conducted in a large, Predominately White, Midwestern City through a medical outpatient clinic that specializes in swallowing and voice disorders. Further, the participants for this study were only those that received a definitive diagnosis of PVCD that were over the age of 18. This precludes us from generalizing these results beyond the adult population, as well as to other patient referral settings. The psychological profiles might look different in other populations, including the pediatric population and different cultural groups, as well as different referral settings, including a psychiatric referral base.

In addition, the present sample could be a biased sample in regard to the types of patients that chose to participate in the study. The patients that choose to participate in
the research could be those that want to talk about their disorder, and may be more willing to admit a psychological component to their disorder than others. In addition, the patients that declined participation in the study, could be those that do display higher levels of anxiety or other forms of psychopathology whose results were not included in the current results. Thus, results may look different given different sampling procedures.

Finally, the present study was conducted using self-report measures. With any self-report measure, there is always the risk that respondents may report answers in a way that potentially could distort the results. While the validity scales were utilized to interpret and determine the acceptability of each MMPI-2 profile, some clinical judgment was also used in interpreting the validity scales. In addition, the LES did not have any validity indicators, and was given as the last assessment instrument. Fatigue, as well as fake responding could also alter the results of this assessment.

**Implications for Counseling**

Many clients do not seek counseling until they reach a debilitating level of functioning that significantly interferes with their daily life. As has been established, psychological problems can exhibit themselves as physical symptoms (Ellerston, Vaeroy, Endersen, & Forre, 1991). Consequently, individuals seek help for their problems through medical means. As we gain a better understanding of somatoform disorders that are presenting to medical settings, patients can best be helped by being treated for the psychological underpinnings of their physical symptoms.

We have data supporting treatment outcomes for individuals scoring a 13/31 code type on the MMPI-2, which is what has been shown to be the MMPI-2 profiles for patients diagnosed with PVCD in the current study. We can utilize the knowledge that
we have gained from the MMPI-2 and apply it to PVCD patients coding a similar profile by incorporating this information to formulate effective treatment interventions for them. For example, we have learned from research on defined code types, such as the 13/31 code type, that these individuals are resistant and often unwilling to acknowledge psychological factors underlying their symptoms. In addition, individuals with this code type are difficult to motivate for traditional psychotherapy (Graham, 1990). Since patients with PVCD also exhibit a 13/31 code type, they may also be resistant to a psychological explanation for their physical complaints, and may react similarly. Counseling could entail helping patients become aware of, as well as accepting of possible psychological factors, that may be contributing to their PVCD symptoms.

Graham (1990) also points out that while individuals with a 13/31 code type are reluctant to discuss psychological factors that might be related to their somatic symptoms, they are likely to terminate therapy prematurely if therapists insist on doing so. It might be beneficial to get PVCD patients to discuss their problems without a direct link to their symptomatology. Additionally, in therapy, they may expect therapists to provide definite answers and solutions to their problems, and they may terminate therapy when their therapist does not respond to their demands. Research shows that 13/31 code types do tend to be suggestible, so patients may attempt activities that are suggested by their therapist (Graham, 1990). Incorporating some cognitive-behavioral techniques and activities might be helpful for these patients.

Research on 13/31 code types also shows that these individuals tend to harbor bitterness and anger toward other people, particularly those people who are perceived as not fulfilling their needs for attention (Graham, 1990). These feelings of resentment and
hostility may be directed at individuals of their immediate family, close friends, or may even include their treating physician or mental health provider. These might be important emotions to address in counseling, as they may be interfering with their interpersonal relationships, as well as their progress in therapy.

Having an understanding that PVCD is a conversion disorder also provides information regarding patients’ lack of awareness of the psychological concerns underlying their symptoms, and allows for an understanding that patients do not consciously produce their symptoms. While patients may not consciously be aware of the psychological underpinnings of their disorder, they may be conscious of external factors that contribute to their current levels of stress. Patients may be willing to seek ways to lessen the stress in their lives. As we are sometimes unable to remove or substantially reduce the amount of stress in our lives, counselors could help these individuals by teaching them skills of how to cope or better handle the stress in their lives. If the inability to cope effectively with stress contributes to PVCD symptoms, exploring treatment options that involve teaching these patients effective coping methods might be worth exploring.

Graham (1990) reports that individuals that score a 13/31 code type typically have physical symptoms that increase during times of stress, and that there is often a clear secondary gain associated with the symptoms. These issues seem important to explore and something for counselors to investigate and collaborate with patients on, as the underlying issue contributing to their disorder unfolds.

In summary, as we continue to gain a greater understanding of PVCD and its psychological etiology, we can educate and help patients explore the psychological
underpinnings of their PVCD symptoms. As patients begin to view PVCD as a psychological disorder, they may be more open-minded and willing to seek counseling in order to help ameliorate their physical symptoms.

**Conclusion**

Paradoxical vocal cord dysfunction (PVCD) is a perplexing disorder that has many proposed etiologies throughout both the medical and psychological literature. While many researchers and clinicians have suggested that PVCD is a psychological disorder, no one has studied it as such. This is the first study to investigate PVCD as a psychological disorder using psychometrically sound psychological instruments. The results of the current study have found PVCD to have a psychological etiology, specifically meeting criteria for a conversion disorder. PVCD does not seem to be a mood disorder, namely an anxiety or depressive disorder. However, PVCD patients with a psychological history were found to demonstrate more depressive and anxious symptoms that those patients without a history of a psychological disorder. In addition, PVCD patients with a medical history of asthma and/or GERD were found to have a higher score on the hypochondriasis scale, suggesting that they are more likely to complain about their physical symptoms. While we know that there is some psychological component to PVCD, we know that it is not the whole story, and other contributing factors may play a role, including a history of asthma, and GERD (Gallivan, Hoffman, & Gallivan, 1996). Further, we have learned that PVCD patients do not have higher levels of stress than the general population. In fact, male PVCD patients have lower overall levels of stress, while females have more negative stress and less positive
stress. Thus, negative stress or an individual’s inability to effectively cope with stress may play a role.

PVCD seems to be more common among women (81%) and older individuals (60% being over the age of 50). Patients visited the emergency room or primary care setting for PVCD on average of 2.4 times within the past year. GERD, asthma, and other psychological conditions are common comorbidities with PVCD. In addition, a history of abuse is common (38%) and may play a role in patients’ symptomatology.

The findings of the current study have great implications for both patients and clinicians. Having a greater understanding of PVCD as a psychological disorder can be utilized to formulate better treatment procedures for these individuals, as well as to encourage patients to investigate the psychological underpinnings of their disorder. Future research is needed to better understand PVCD as a psychological disorder and other possible contributing factors. By having a stronger understanding of the psychological etiology of PVCD, we can better help clinicians refer and treat these patients, as well as help patients gain a better understanding of their symptoms.
LIST OF REFERENCES


HAVE YOU BEEN DIAGNOSED OR DO YOU SUSPECT THAT YOU HAVE PARADOXICAL VOCAL CORD DYSFUNCTION (PVCD)?

Are you willing to help researchers gain a better understanding of this disorder?

Researchers at the Ohio State University are examining possible contributors to this disorder and are looking for eligible participants to participate in their research study.

The research is being conducted conveniently at this clinic and will pay you $20.00 for your one-time, 1.5 to 2 hour, participation.

For further information please see attached page
• The research study will be taking place at The Ohio State University Voice and Swallowing Disorders Clinic where you will be coming for your scheduled appointments

• We are interested in learning more about this disorder by examining possible contributing factors and correlates that may help both researchers and clinicians gain a better understanding of this disorder in order to implement more effective intervention and treatment options

• If you choose to participate in this study, you will be asked to fill out some questionnaires related to your personal attitudes, personality characteristics, and levels of stress. These questionnaires will take you approximately 1.5 to 2 hours to complete and we will pay you $20.00 for your participation

• We recognize that some of you may be traveling a long distance for your appointment at the clinic, and will offer a time convenient for you, before or after your appointment at the clinic, to participate in this study. If this is the case, then you would need to plan on staying an additional 1.5 to 2 hours longer than your initial appointment time. We are also happy to schedule a separate appointment for you to participate in this study.

• We are happy to answer any further questions or concerns that you might have in regard to this study before deciding to participate

• For further information or to make an appointment, please contact:

  Tiffany Husein, M.A.
  Phone: (614)499-1254
  e-mail: husein.3@osu.edu
APPENDIX B

INITIAL SCRIPT READ TO PARTICIPANTS AT FIRST CONTACT WITH RESEARCHER

This study is being conducted by Tiffany Husein, under the direction of Dr. Don Dell, a faculty member in the department of psychology at The Ohio State University. We are interested in learning more about paradoxical vocal cord dysfunction by examining possible contributing factors and correlates of this disorder. The information that we hope to gain from this study may help both researchers and clinicians gain a better understanding of this disorder and may help to implement more effective intervention and treatment options. One way we hope to do this is by asking individuals who have been diagnosed with this disorder to complete questionnaires related to their symptom patterns, personal attitudes, personality characteristics, and levels of stress. These questionnaires will take approximately 1.5 to 2 hours to complete, and we will pay you $20.00 for your participation.

If you decide to participate in this study, no identifying information will be attached to your questionnaires to help maintain your confidentiality.

We recognize that you may be traveling a long distance for your appointment at the clinic and can set up an appointment congruent with your appointment time. If you choose to participate in this study the same day as your clinic appointment, you will need to plan on staying an additional 1.5 to 2 hours longer than your scheduled appointment. We also are happy to schedule an appointment with you on another day.

Do you have any further questions that I can answer for you?
APPENDIX C

EXPERIMENT INSTRUCTIONAL SCRIPT

The experimenter will read this verbatim before administration of the instruments.

“Welcome to our study. This study is being conducted by Tiffany Husein, under the direction of Dr. Don Dell, a faculty member in the department of psychology at The Ohio State University. Today we will ask you to complete a questionnaire related to your symptom patterns, personal attitudes, and personality characteristics. In addition you will be asked to complete a questionnaire related to the levels of stress you have experienced in the last year. These questionnaires will take you approximately 1.5 to 2 hours to complete. This study will be conducted using a paper and pencil format. If you have any questions, please fell free to ask me for assistance.

Remember that your participation is entirely voluntary. If at any point you choose not to continue your participation, you are free to leave.

Of course, we would prefer that you answer all of the questions, but you may choose not to do so. Please do not provide your name or any other identifying information on any of the questionnaires. Thus, your answers will remain confidential and will not be connected to you in any way.

When you complete the questionnaires, please come to the front of the room. I will give you a debriefing sheet, which will tell you more about our reasons for doing the study and give you some resources and names if you would like to further pursue matters related to this research. At this time you will also be paid $20.00 for your participation in this research. Thank you in advance for your participation. Your help is greatly appreciated.”
APPENDIX D

DEBRIEFING SHEET GIVEN TO PARTICIPANTS

Dear Participants:

Thank you for participating in our study. This study is intended to explore the personality characteristics and levels of stress that are associated with paradoxical vocal cord disorder (PVCD) and the affect this has on individuals diagnosed with this disorder. You have taken a few instruments designed to tell us about your personal attitudes, personality characteristics, behavior, current and past stress levels, and other important aspects of your life. We hypothesize that higher levels of stress, health concerns, and feelings of anxiety will contribute to symptoms of PVCD. We expect that personality variables may affect the presentation of PVCD.

What we hope to learn from this study is how your current and past stress levels, as well as different personality variables are associated with PVCD. We hope to use this information to better understand paradoxical vocal cord dysfunction from a psychosocial perspective so as to form appropriate and effective treatment interventions.

If in the course of this study you have developed concerns or uncertainties about your feelings, or if you feel any type of distress related to your responses, you may wish to talk about these with your treatment provider here at the clinic or seek outside counseling. Ask your treatment provider at the clinic for treatment referrals, or contact The Ohio Psychological Association for a referral service in your area, at http://www.ohpsych.org or call (614)224-0034. If you have any other questions about this study, please contact Dr. Don Dell at (614)688-8287 or dell.1@osu.edu or Tiffany Husein, M.A. at husein.3@osu.edu.

If you have any concerns about the way this study was conducted, please contact the Office of Responsible Research Practices (ORRP) at the Ohio State University at (614) 688-8457.

Again, thank you for assisting us in this research. We hope that the findings from this study will be used to benefit individuals diagnosed with PVCD.
The Ohio State University Consent to Participate in Research

<table>
<thead>
<tr>
<th>Study Title:</th>
<th>Paradoxical Vocal Cord Dysfunction: Gaining a better understanding of this disorder and its psychological correlates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher:</td>
<td>Dr. Don Dell</td>
</tr>
<tr>
<td>Sponsor:</td>
<td>N/A</td>
</tr>
</tbody>
</table>

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.

Please consider the information carefully. Feel free to ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose: to help researchers gain a better understanding of factors that may contribute to paradoxical vocal cord dysfunction.

Procedures/Tasks: If you decide to participate in this study, you will be asked to fill out two separate questionnaires. These questionnaires will ask you questions about symptom patterns, personal attitudes, and personality characteristics. In addition, you will be asked about the levels of stress that you have experienced in the past year.

Duration: 1.5 to 2 hours

You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.
Risks and Benefits: The risks of this study are minimal and include the sensitive nature of some of the questions asked in the questionnaires. While we would like you to answer all of the questions, you do not have to answer those questions that you do not wish to answer. The knowledge that may be gained from this study may help researchers and clinicians gain a better understanding of this disorder. This may result in the development of effective treatment interventions that may benefit individuals diagnosed with this disorder.

Confidentiality: Every effort will be made to keep your study-related information confidential. We will ask you not to put any identifying information on any of the questionnaires in order to help maintain your confidentiality.

Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

Incentives: You will be paid $20.00 for your participation in this study.

Participant Rights:

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

An Institutional Review Board responsible for human subjects’ research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.
Contacts and Questions:
For questions, concerns, or complaints about the study you may contact Dr. Don Dell, dell.1@osu.edu, (614) 688-8287 or Tiffany Husein, husein.3@osu.edu.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If you are injured as a result of participating in this study or for questions about a study-related injury, you may contact Dr. Don Dell, dell.1@osu.edu, (614) 688-8287 or Tiffany Husein, husein.3@osu.edu.
### Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

<table>
<thead>
<tr>
<th>Printed name of subject</th>
<th>Signature of subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM/PM Date and time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Printed name of person authorized to consent for subject (when applicable)</th>
<th>Signature of person authorized to consent for subject (when applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM/PM Date and time</td>
</tr>
</tbody>
</table>

**Investigator/Research Staff**

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

<table>
<thead>
<tr>
<th>Printed name of person obtaining consent</th>
<th>Signature of person obtaining consent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM/PM Date and time</td>
</tr>
</tbody>
</table>
Title of the Study: Gaining a better understanding of Paradoxical Vocal Cord Dysfunction

OSU Protocol Number: 2006B0156

Principal Investigator: Don Dell, Ph.D.

Subject Name: ___________________________________________________________

Before researchers use or share any health information about you as part of this study, The Ohio State University is required to obtain your authorization. This helps explain to you how this information will be used or shared with others involved in the study.

• The Ohio State University and its hospitals, clinics, health-care providers and researchers are required to protect the privacy of your health information.

• You should have received a Notice of Privacy Practices when you received health care services here. If not, let us know and a copy will be given to you. Please carefully review this information. Ask if you have any questions or do not understand any parts of this notice.

• If you agree to sign this form, your intake questionnaire and endoscopic examination report will be used and shared with others involved in this study.

Please read the information carefully before signing this form. Please ask if you have any questions about this authorization, the University’s Notice of Privacy Practices or the study before signing this form.

Initials/Date: _______________
Those Who May Use, Share And Receive Your Information As Part Of This Study

• Researchers and staff at The Ohio State University Voice and Swallowing Disorders clinic will use, share, and receive your intake questionnaire and endoscopic examination report for this research study. Other Ohio State University staff not involved in the study but who may become involved in your care for study-related treatment will have access to your information.
• Those who oversee the study will have access to your information, including:
  • Members and staff of the Ohio State University’s Institutional Review Boards, including the Western Institutional Review Board
  • The Office for Responsible Research Practices
  • University data safety monitoring committees
  • The Ohio State University Research Foundation

Authorization Period

This authorization will not expire unless you change your mind and revoke it in writing. There is no set date at which your information will be destroyed or no longer used. This is because the information used and created during the study may be analyzed for many years, and it is not possible to know when this will be complete.

Signing the Authorization

• You have the right to refuse to sign this authorization. Your health care outside of the study, payment for your health care, and your health care benefits will not be affected if you choose not to sign this form.
• You will still be able to take part in this study if you do not sign this form.
• If you sign this authorization, you may change your mind at any time. Researchers may continue to use information collected up until the time that you formally changed your mind. If you change your mind, your authorization must be revoked in writing. To revoke your authorization, please write to:

  Don Stredney  
  C/o The Ohio Supercomputer Center, 1224 Kinnear Road, Columbus, Ohio 43212-1163  
  Ph: (614) 292-9248

• Signing this authorization also means that you will not be able to see or copy your study-related information until the study is completed. This includes any portion of your medical records that describes study treatment.
Contacts for Questions

• If you have any questions relating to your privacy rights, please contact Margaret Johnson, HIPAA Privacy Officer, (614) 293-4477; johnson-49@medctr.osu.edu, the Ohio State University Medical Center, 140 Doan Hall, 410 W. Tenth Avenue, Columbus, Ohio 43210
• If you have any questions relating to the research, please contact Don Stredney, c/o The Ohio Supercomputer Center, 1224 Kinnear Road, Columbus, Ohio 43212-1163 Ph: (614) 292-9248; don@osc.edu.

Signature

I have read (or someone has read to me) this form and have been able to ask questions. All of my questions about this form have been answered to my satisfaction. By signing below, I permit Don Stredney and the others listed on this form to use and share my personal health information for this study.

I will be given a copy of this signed form.

Signature________________________________________________________
(Subject or Legally Authorized Representative)
Name___________________________________________________________
(Print name above)
(If legal representative, also print relationship to subject.)
Date___________ Time __________ AM / PM
APPENDIX G

DEMOGRAPHIC QUESTIONNAIRE

Please complete the following items about yourself. This information will only be used to make group comparisons and will not be used to attempt to identify you. Remember, do NOT put your name on any answer sheet.

1. Age
   a. 18-29
   b. 30-39
   c. 40-49
   d. 50-59
   e. over 60

2. Gender
   a. Male
   b. Female

3. Race/Ethnicity
   a. African American
   b. Asian American
   c. Caucasian
   d. Hispanic American
   e. Other: (specify) ______________

4. Number of years of education completed
   a. Some high school
   b. High school degree or GED
   c. Some college
   d. Two-year college degree
   e. 4 year college degree
   f. some graduate work
   g. graduate/professional degree

5. Current Occupational status
   a. unemployed
   b. Part-time
   c. Full-time
6. Do any of these categories apply to you? (Please circle all that apply)
   a. Student
   b. Student-athlete
   c. Disabled
   d. Homemaker

7. Marital Status
   a. Single
   b. Married/partnered
   c. Divorced
   d. Widowed

8. Number of weeks since breathing problems began?
   a. Less than 1
   b. 2 to 3
   c. 4 to 5
   d. more than 5

9. Number of weeks since receiving a diagnosis of PVCD
   a. Less than 1
   b. 2 to 3
   c. 4 to 5
   d. more than 5

10. Number of times you have been to Emergency Room or Primary Care Setting for symptoms of PVCD in the past year?
    a. One
    b. Two
    c. Three
    d. Four
    e. More than four

11. Have you ever sought the assistance of a psychologist or other mental health care provider?
    a. Yes
    b. No

12. If yes, have you ever received a formal diagnosis from a mental health provider?
    a. Yes
       i. Anxiety
       ii. Depression
       iii. Other (please specify) ___________________
APPENDIX H

FREQUENCIES OF DEMOGRAPHIC INFORMATION

1. **Age**
<table>
<thead>
<tr>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 18-29</td>
<td>5</td>
</tr>
<tr>
<td>b. 30-39</td>
<td>4</td>
</tr>
<tr>
<td>c. 40-49</td>
<td>9</td>
</tr>
<tr>
<td>d. 50-59</td>
<td>13</td>
</tr>
<tr>
<td>e. over 60</td>
<td>14</td>
</tr>
</tbody>
</table>

2. **Gender**
<table>
<thead>
<tr>
<th></th>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Male</td>
<td>8</td>
<td>19.1</td>
</tr>
<tr>
<td>b. Female</td>
<td>37</td>
<td>80.9</td>
</tr>
</tbody>
</table>

3. **Race/Ethnicity**
<table>
<thead>
<tr>
<th></th>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. African American</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>b. Asian American</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c. Caucasian</td>
<td>36</td>
<td>76.6</td>
</tr>
<tr>
<td>d. Hispanic American</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>e. Other: (specify) _______</td>
<td>2</td>
<td>4.2</td>
</tr>
</tbody>
</table>

4. **Number of years of education completed**
<table>
<thead>
<tr>
<th></th>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Some high school</td>
<td>13.3</td>
<td>6</td>
</tr>
<tr>
<td>b. High school degree or GED</td>
<td>9</td>
<td>20.0</td>
</tr>
<tr>
<td>c. Some college</td>
<td>15</td>
<td>33.3</td>
</tr>
<tr>
<td>d. Two-year college degree</td>
<td>4</td>
<td>8.9</td>
</tr>
<tr>
<td>e. 4 year college degree</td>
<td>4</td>
<td>8.9</td>
</tr>
<tr>
<td>f. some graduate work</td>
<td>3</td>
<td>6.7</td>
</tr>
<tr>
<td>g. graduate/professional degree</td>
<td>4</td>
<td>8.9</td>
</tr>
</tbody>
</table>

5. **Current Occupational status**
<table>
<thead>
<tr>
<th></th>
<th>Number of Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Unemployed</td>
<td>21</td>
<td>46.7</td>
</tr>
<tr>
<td>b. Part-time</td>
<td>7</td>
<td>15.6</td>
</tr>
<tr>
<td>c. Full-time</td>
<td>17</td>
<td>37.8</td>
</tr>
</tbody>
</table>
6. Marital Status
   a. Single               9         20.0
   b. Married/partnered     27         60.0
   c. Divorced              8         17.8
   d. Widowed               1         2.2

7. Number of weeks since breathing problems began?
   a. Less than 1          2         4.4
   b. 2 to 3               1         2.2
   c. 4 to 5               0         0.0
   d. more than 5         42         93.3

8. Number of weeks since receiving a diagnosis of PVCD
   a. Less than 1         5         11.1
   b. 2 to 3              14        31.1
   c. 4 to 5              10        22.2
   d. more than 5        15        33.3
   e. Did not answer     1          2.2

9. Number of times you have been to Emergency Room or Primary Care Setting for symptoms of PVCD in the past year?
   a. Zero               14        31.1
   b. One                10        22.2
   c. Two                 6        13.3
   d. Three               3        6.7
   e. Four                 1        2.2
   f. More than four       11       24.4

10. Have you ever sought the assistance of a psychologist or other mental health care provider?
    a. Yes                22        48.9
    b. No                 23        51.1

11. If yes, have you ever received a formal diagnosis from a mental health provider?
    a. Yes                14        63.6
       i. Anxiety            1        4.5
       ii. Depression        3        13.6
       iii. Anxiety and Depression     8        36.4
       iv. Other (please specify)  2        9.1
    b. No                  8        36.4
APPENDIX I

THE LIFE EXPERIENCES SURVEY

Listed below are a number of events which sometimes bring about change in the lives of those who experience them and which necessitate social readjustment. *Please check those events which you have experienced in the recent past and indicate the time period during which you have experienced each event.* Be sure that all check marks are directly across from the items they correspond to.

Also, for each item checked below, *please indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time that the event occurred.* That is, *indicate the type and extent of impact that the event had.* A rating of -3 would indicate an extremely negative impact. A rating of 0 suggests no impact either positive or negative. A rating of +3 would indicate an extremely positive impact.

<table>
<thead>
<tr>
<th>Event Description</th>
<th>0</th>
<th>7 mo</th>
<th>6 mo</th>
<th>1 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Marriage</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>2. Detention in jail or comparable institution</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>3. Death of spouse (much more or much less sleep)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>4. Major change in eating habits (much more or much less food intake)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>5. Foreclosure on mortgage or loan</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>6. Death of a close friend</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>7. Outstanding personal achievement</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>8. Minor law violations (traffic tickets, disturbing the peace, etc.)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>9. Male: Wife/girlfriend’s pregnancy</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>10. Female: Pregnancy</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>11. Changed work situation (different work responsibility, major change in working conditions, working hours, etc)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>12. New job</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>13. Serious illness or injury of close family member:</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>a. father</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>b. mother</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>7 mo</td>
<td>to</td>
<td>to</td>
</tr>
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<td>---</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. sexual difficulties</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>17. Trouble with employer (in danger of losing job, being suspended, demoted, etc)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>18. Trouble with in-laws</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>19. Major change in financial status (a lot better off or a lot worse off)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>20. Major change in closeness of family members (increase or decreased closeness)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>21. Gaining a new family member (through birth, adoption, family member moving in, etc.)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>22. Change of residence</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>23. Marital separation from mate (due to conflict)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>24. Major change in church activities (increase or decreased attendance)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>25. Marital reconciliation with mate</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>26. Major change in number of arguments with spouse (a lot more or a lot less arguments)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>27. Married male: change in wife's work outside the home (beginning or ceasing work, changing jobs, etc)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>28. Married female: change in husband's work (loss of job, beginning new job, retirement, etc.)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>29. Major change in usual type and/or amount of recreation</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>30. Borrowing more than $10,000 (buying home, business, etc.)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>31. Borrowing less than $10,000 (buying car, TV, school loan, etc.)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>32. Being fired from a job</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>33. Male: Wife/girlfriend having abortion</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>34. Female: Having abortion</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>35. Major personal illness of injury</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>36. Major change in social activities e.g. parties, movies, visiting (increased or decreased participation)</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
</tr>
</tbody>
</table>
37. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighborhood, etc.)

38. Divorce

39. Serious injury or illness of close friend

40. Retirement

41. Son or daughter leaving home (due to marriage, college, etc.)

42. Ending of formal schooling

43. Separation from spouse (due to travel, work, etc.)

44. Engagement

45. Breaking up with boyfriend/girlfriend

46. Leaving home for the first time

47. Reconciliation with boyfriend/girlfriend

Other recent experiences which have had an impact on your life. List and rate.

48. ____________________________

49. ____________________________

50. ____________________________