THE ROLE OF LEARNING IN THE DEVELOPMENT AND MAINTENANCE OF HIGH-PERCEPTION PSYCHOPHYSIOLOGICAL DISORDERS

by

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Table of Contents

List of Tables

Introduction

Early conceptualizations of psychophysiologic disorders have emphasized specific aspects of the person as causal factors in the development of certain illnesses (Alexander, 1950; Dunbar, 1943; Graham, Lundy, Benjamin, Kabler, Lewis, Kunish, & Graham, 1962). Although single-factor etiological conceptualizations have had some initial support, they have not been established empirically. Furthermore, these approaches have been unsuccessful in developing effective treatments for psychophysiologic disorders (Whitehead, Fedoravicus, Blackwell, & Wooley, 1979). Research should move from thinking of the development and maintenance of illness as unidimensional and begin viewing illness as multidimensional, that is, subject to the influences of genetic, biological, psychological, sociocultural, and ecological factors (Gentry, 1984). Recent conceptualizations of the development and maintenance of psychophysiologic disorders have considered the influences of stress and learning.

Stress and Illness

Theories of stress have received much attention in recent years and provide a model for conceptualizing the development and maintenance of psychophysiologic disorders.

However, not all researchers agree on what stress is and how it affects illness (Elliot & Eisdorfer, 1982). Three main variations on the concept of stress appear to be stimulus, response, and relational. The view of stress as a stimulus emphasizes aspects of the environment that generate reactive change of some sort; an individual's risk for illness is defined in terms of the amount of exposure to environmental stressors. The research links life events and illness (Holmes & Masuda, 1974; Dohrenwend & Dohrenwend, 1974); however, the stimulus definition of stress does not account for individual differences in vulnerability to stressors. Stressful life events do not affect all persons in the same manner, suggesting that properties of the person provide stimuli meaning and effect.

Stress also has been viewed as a response or a reaction of an organism to demands. In this view, stress is thought to be a set of physiological responses (Selye, 1974). However, this definition does not allow for reliable identification of the stressor. For example, an increase in heart rate cannot be identified as a stress reaction without reference to the stimulus (e.g., climbing a flight of stairs versus being confronted by an angry boss). The psychosocial context appears to have a role in what is

considered stressful.

The relational or transactional definition views stress as a relationship between the person and the environment. Lazarus and Folkman (1984) proposed a relational definition of stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being." (p. 19) They argued that many factors in the environment and the person combine to create stress and its outcomes. The stressor alone is not a sufficient cause of illness but must be united with a vulnerable organism (e.g., inadequate coping processes). The primary task of this research is to examine the variables and processes that mediate the stress-illness relationship.

Learning and Illness

Whitehead and his colleagues (1979) have suggested that the relational stress model is useful in conceptualizing the development and maintenance of some psychophysiologic disorders, however, other disorders do not fit the model as well. Whitehead proposed that learning factors influence certain disorders. They distinguished between two different types of situations that can affect physiological response. In one situation, aspects of the

environment are considered aversive to most people, regardless of their past learning history. For example, working long hours under continual time or performance pressure (e.g., air traffic controllers) is probably considered aversive to most people. A physiological response would not be unusual for people in this situation.

In the other situation, aspects of the environment are considered aversive only for people with a specific past learning history. For example, driving in a car is not usually aversive to most people. However, a person with irritable bowel syndrome who experiences a severe attack of stomach pain and diarrhea while driving in the country might consider driving longer distances aversive and respond physiologically. In this case, the interaction of the individual's learning history with the "stressor" has obscured the primary role of stress and learning factors have taken a role in the maintenance of the symptoms.

This distinction has diagnostic implications. Psychophysiologic symptoms can be considered a primary stress response when: 1) symptoms covary with the presence or absence of prolonged or intense environmental conditions, and 2) when these conditions are considered aversive to most people. There is some evidence that the development and maintenance of hypertension and peptic

ulcers are primarily related to stress. A survey by Cobb and Rose (1973) reported these disorders to be the most common among air traffic controllers, who have been known to work long hours under pressure. Duodenal ulcers also have been known to be associated with the stress of military basic training and first-line supervisory positions (See Cobb & Rose, 1973).

Other psychophysiologic symptoms occur in situations not considered aversive and symptoms cannot be attributed to prolonged or intense environmental conditions. The role of stress in these disorders is less clear and other explanations need to be considered.

Classical conditioning. In a classical conditioning paradigm, symptoms that do not covary with aversive situations can be considered conditioned stimuli (CS) that elicit a conditioned physiological response. Symptoms with an abrupt onset, such as asthma and irritable bowel syndrome (IBS), allow for a temporal relationship to develop between an unconditioned stimulus and a conditioned stimulus. To illustrate, pollen from flowers is an unconditioned stimulus (UCS) for asthmatics. Exposure to this pollen elicits an unconditioned response (UCR) (i.e., an asthmatic attack). The contiguity of flowers (CS) and pollen (UCS) conditions aspects of the flowers to the

asthma attack (CR). Moore (1965) demonstrated this conditioning by eliciting a CR from asthmatics by having them sniff artificial flowers. Chaudhary and Truelove (1962) reported that many of the symptoms of their irritable colon patients began when they had an attack of dysentery and continued after the amoebas were eliminated from the bowels, suggesting that the symptoms became conditioned to some aspects of the person's internal or external environment.

Operant conditioning. Another important influence in the development and maintenance of certain psychophysiologic disorders appears to be instrumental conditioning. Instrumental learning involves a contingency between a response and a reinforcer. In this type of conditioning, behavior that results in a satisfying event will be strengthened, and behavior that results in an annoying event will be weakened. From this model, reinforcement for illness can influence a person's behavior, physiological response, or both. Two types of operant experiences potentially can lead to increased illness behavior, pathophysiological response, or both: 1) when a person is positively reinforced by receiving special attention when sick; and 2) when a person is negatively reinforced by being able to avoid some responsibility

considered aversive. The ability to accurately detect changes in the physiological response (i.e., to perceive the symptoms of an illness and accurately report it) increases the likelihood that social consequences will become associated with an increase in the frequency of the pathophysiological response.

One of the ways in which operant conditioning can influence the chronicity of a disorder and the extent to which the disorder interferes with usual activities is by reinforcement of the cognitive and behavioral aspects of an illness. Mechanic (1962) used the term "illness behavior" to describe the ways in which given symptoms may be differentially perceived, evaluated, and acted (or not acted) upon by different kinds of persons. The role of learning in the development of illness behavior has some correlational support in the literature. In a 16-year follow-up of 350 children, Mechanic (1978) found that adult illness behavior was related to: parental reports 16 years earlier that they had limited their usual work obligations when they had various symptoms; the number of days the child was absent from school; and mothers' low sense of personal control over illness. Although the results of the above study are complex, the predictors provide some support for the assumption that illness behavior may be

learned partly in family contexts during childhood (Mechanic, 1982). These data are consistent with the assumption that illness behavior is related to a desire to avoid aversive life situations. In the above study, not only were the parents providing a model of avoidance, but the children also were negatively reinforced by being able to avoid school responsibilities.

Turkat and Noskin (1983) examined the relationship between vicarious and operant experiences and illness behavior in healthy individuals. In a telephone survey, individuals were assigned to either an avoidant model (AM) (i.e, parents reported to have avoided work, chores, etc. when ill) or a non-avoidant model. Subjects were asked questions regarding current and childhood negative and positive reinforcement experiences. Results indicated that subjects in the AM group reported more negative and positive reinforcement when ill currently and as a child compared to the NAM subjects. This study provided some indirect evidence of the process by which individuals learn to respond to illness and suggests the role of vicarious and operant experiences in the etiology of illness behavior.

There is some empirical support for the role of operant conditioning in illness behavior. Using a learning

theory model of chronic illness behavior, Wooley, Blackwell, and Winget (1978) designed a treatment that included teaching the families of chronically ill patients to restructure the social contingencies that support illness. Treatment outcomes of 66 chronically ill patients with a variety of disorders from an inpatient psychosomatic service revealed that patients who participated in family therapy improved more than those who did not. However, because there were other components to their treatment program (e.g., relaxation training, biofeedback, self-contol programs), it is unclear which component was responsible for improvement.

The role of learning is clearer in the development of illness behavior than in the development of a pathophysiological response. The idea that physiological responses can be controlled operantly is supported in the biofeedback literature (Blanchard & Epstein, 1978). However, a search of the literature failed to find any studies that have specifically examined or demonstrated the effect of learning on a pathophysiological response.

Other learning influences. The type of symptoms experienced also may be influenced by learning factors. Langner and Michael (1963) reported that people tended to develop the same psychophysiologic symptoms as their

parents. This tendency was greater for symptoms such as asthma, colitis, hay fever, and skin problems (easily perceived symptoms) than for symptoms such as stomach ulcers and high blood pressure. Excluding heritability, these findings support the role of learning factors, such as modeling and/or differential reinforcement. A follow-up study of children with recurrent abdominal pain (RAP; thought to be the juvenile equivalent to adult IBS; Whitehead et al., 1978) showed that the children of parents with current abdominal symptoms were more likely to suffer from abdominal pains than the children of parents with no current symptoms (Christensen and Mortensen, 1975). Furthermore, children of parents with a history of RAP during childhood apparently did not suffer from abdominal pain more frequently than children of parents who did not have RAP during childhood. These results indicate that other mechanisms, such as modeling or differential reinforcement, may influence symptom selection, as opposed to heritability.

Symptom Perception

Disorders then can be distinguished by their likelihood to come under the influence of reinforcing social consequences or operant conditioning. Those disorders in which there is a high degree of symptom

perception, such as IBS, asthma, or migraine headaches, may be more susceptible to social reinforcement. The role of stress in the development of these high-perception disorders becomes obscured as the symptoms are elicited by environmental conditions not considered aversive to most people.

Another class of disorders are those with physiological symptoms not readily perceived. For example, people are not able to discriminate changes in their blood pressure (Greenstadt, Shapiro, & Whitehead, 1986), stomach secretions (peptic ulcer disease), or the symptoms of coronary heart disease (Whitehead et al., 1979). These symptoms tend not to be conditioned as easily because associations are not likely to be made if the person or others in the environment are unaware of symptom onset. One would expect these low-perception disorders to be primarily a response to prolonged or intense stress.

Whitehead and his colleagues (1982) provided some support for the distinction of disorders based on perceptibility of the symptoms. In their telephone survey of randomly selected adults, they looked at specific elements of illness behavior and early social reinforcement in two subgroups of people who reported either symptoms of IBS (high-perception symptoms) or peptic ulcer disease

(PUD; low-perception symptoms). In their sample, people with IBS reported significantly more chronic illnesses, acute physical illnesses, visits to doctors, hospitalizations, and preoccupations with illness than did people with PUD. In addition, they attempted to show that this pattern of illness behavior was related to early childhood learning experiences. People with IBS were significantly more likely than people with PUD to report direct reinforcement for somatic complaints.

This study has some limitations. First, the study was retrospective. All retrospective studies must be interpreted cautiously for two reasons: 1) they can be unreliable because of the time between the event in question and recall, and 2) errors in logic can be made when inferring causality. While it may be true that all people in a particular sample have had a particular experience, it does not logically follow that all people who have had such an experience belong to the same population as one's sample (or that the experience caused the person to belong to that population). Retrospective studies are limited and at best provide indirect evidence. Second, the study is based on a self-report telephone interview. Self-report often has a degree of unreliability. Inclusion of other more objective evidence may increase

reliability. Third, assessment of early childhood reinforcement for illness behavior was made on the basis of the answer to a single yes/no question about whether, as children, they received special treatment when they were sick.

Although the above study provides indirect evidence for the role of early learning experiences in the development and maintenance of a high-perception disorder (IBS), there have been no studies comparing the influence of early learning experiences of a cross-section of disorders that are considered to have highly perceivable symptoms with a no symptoms group.

In Cobb and Rose's (1973) survey of air traffic controllers, peptic ulcers and hypertension (low perception disorders) were the most commonly reported disorders associated with this high-stress profession. In their survey, other chronic disorders such as headaches or irritable bowel syndrome occurred too infrequently to be reported. In air traffic controllers, these low perception disorders can be considered unconditioned responses to unconditioned stimuli. Adverse working conditions (i.e., environmental stress) lead to prolonged, heightened arousal while on the job, which, in turn, leads to a pathophysiological response (i.e., excess gastric

secretions; elevated blood pressure levels). Disorders experienced under these conditions are considered primarily a result of stress.

Other disorders with high-perception symptoms (e.g., headaches, irritable bowel syndrome) also may develop from unconditioned stimuli, such as environmental stress or physical illness brought on by bacteria, a virus, parasites, or some pre-existing physical condition. However, because the symptoms are highly perceivable, associations may develop between some aspect of a person's internal or external environment (CS) and the symptoms (CR). In this situation, classical conditioning plays a role in the maintenance of the symptoms. In addition, if the symptoms are readily perceived by the individual and others in the environment, and if the behavior resulting from an UCS is reinforced, then, according to learning theory, the behavior would be more likely to persist. In this case, operant learning plays a role in the disorder and the primary role of stress can become obscured as symptoms begin to occur in new situations not considered stressful.

Diagnostic Implications

The hypothesis that learning has a role in the etiology of psychophysiologic disorders and the distinction

of disorders according to the degree of symptom perception has diagnostic and treatment implications. Low-perception disorders are less likely to be influenced by operant conditioning and are more likely to be either primary stress reactions or classically conditioned responses. When the symptoms covary with the presence or absence of environmental conditions aversive to most people, then a diagnosis of primary stress reaction can be made. When conditions not aversive to most elicit the symptoms, then symptoms may be maintained by classical conditioning. High-perception disorders are more likely to be maintained by operant reinforcers if it can be shown that the symptoms result in reinforcing social consequences. These diagnostic distinctions suggest different treatment approaches. Treatments that target the mediators of stress would be most effective for a primary stress response, whereas extinction procedures, such as flooding and desensitization, could be useful in treating those disorders that have come under the influence of classical conditioning. When symptoms appear to be maintained by operant conditioning, treatment could include alteration of contingencies (Wooley et al., 1978).

Overview of Proposal

The role of learning in the development of

psychophysiological disorders has been postulated by a number of researchers (Whitehead et al, 1978; Latimer, 1983); however, few studies have empirically examined its role. The present study examined the relationship between psychophysiological disorders with easily perceived symptoms (e.g., headaches, recurrent abdominal pain, asthma) and learning factors. It was hypothesized that learning influences the development and maintenance of many psychophysiological disorders. Childhood and current learning experiences (e.g., positive and negative reinforcement, differential reinforcement) and family prevalence of disorders in subjects with and without childhood and current high-perception disorders were assessed. Assessment of other influences on the development and maintenance of high-perception disorders included: illness behavior, childhood and current environmental variables (e.g., stress, family), and person variables (e.g., depression, anxiety).

Hypotheses

1) Subjects reporting a high-perception disorder in childhood will report greater childhood reinforcement for illness than will subjects reporting no disorders in childhood as measured by the Childhood Health Questionnaire.

2) Subjects reporting a current high-perception disorder will report more current reinforcement for illness than will subjects reporting no current disorders as measured by the Current Health Questionnaire.

3) Subjects reporting a high-perception disorder in childhood will report more negative reinforcement for their specific symptoms than for other high-perception symptoms as indicated by their response to questions on the Childhood Health Questionnaire.

4) Subjects reporting a childhood high-perception disorder will have greater family prevalence for that particular disorder than will subjects reporting no disorder as indicated by the Family Prevalence Sheet.

5) The amount of childhood and current reinforcement will significantly correlate positively with the amount of current illness behavior as measured by the Illness Behavior Questionnaire.

6) Subjects reporting a childhood high-perception disorder will have greater childhood stress, as measured by the Childhood Stress Questionnaire, and decreased family relationship variables than will subjects without a childhood disorder as measures by the Family Environment Scale.

7) Subjects reporting a current high-perception

disorder will have greater current negative life stressors than will subjects with no disorders as measured by the Life Experiences Survey.

8) Subjects with a current high-perception disorder will have more psychological distress than will subjects with no disorders as measured by the Beck Depression Inventory and the State-Trait Anxiety Inventory.

9) There will be a positive relationship between the number of symptoms reported currently, as measured by the Psychosomatic Symptoms Checklist, and learning, environmental, and person variables.

Method

Subjects

Subjects (n = 153) from the undergraduate research pool at Virginia Polytechnic Institute and State University voluntarily signed up for a study described as a health and learning survey. Subjects gave informed consent (see Appendix A) and were given extra credit toward their undergraduate psychology courses. Two subjects did not complete the protocol and therefore were dropped from the analysis, leaving a total of 151.

Demographic characteristics of the sample are listed in Table 1. The sample could be characterized as young, predominantly white, upper-middle-class, from educated homes, and within their first three years of college. Analysis of variance showed no age differences between groups and chi-square analysis showed no sex differences between groups.

Procedures

Subjects were tested in groups of no more than 30. Subjects were tested in two sessions scheduled one week apart. The first and second sessions took place at the same place and time. A list of questionnaires administered during each session are presented in Appendix B. Instructions were read aloud to each group (see Appendix

Table 1

Subject Characteristics

		Group [1]			
	Total	1	2	3	4
Sex					
Female	105	10	11	10	18
Male	46	4	1	3	14
Race					
White	139	14	9	11	31
Other	12	0	3	2	1
Education					
Freshman	73	10	7	3	14
Sophomore	52	3	3	9	11
Junior	20	0	2	1	6
Senior	6	1	0	0	1
Family Income					
< 30,000	22	4	3	2	4
30-40,000	27	2	4	4	1
40-50,000	33	3	2	2	7
> 50,000	63	5	3	5	19
missing	6	0	0	0	1
Age					
Mean	19.0	18.5	18.7	19.8	19.1
SD	2.1	1.1	.9	4.6	1.7

[1] Group 1: Childhood and current high-perception disorder
Group 2: No childhood disorder/ Current disorder
Group 3: Childhood disorder/No current disorder
Group 4: No disorders or high-perception symptoms

C). Questionnaires were distributed to the groups one at a time. When all subjects had completed the questionnaire they were collected and the next questionnaire was administered. After approximately 90 subjects had been run the order the tests were administered was reversed. Four questionnaires designed specifically for this study were administered in both sessions. Test-retest reliabilities were computed and are reported below.

Assessment

In order to select a sample of people with a chronic high-perception disorder in childhood, currently, or both, subjects were assessed for specific diagnostic criteria. The following high-perception disorders were evaluated: recurrent abdominal pain (in childhood) or irritable bowel syndrome (in adulthood), headaches, and asthma. Subjects reporting at least one of these three disorders were considered to have a high-perception disorder. In addition, the total number of high-perception symptoms experienced in childhood and currently were assessed.

Recurrent abdominal pain. Recurrent abdominal pain (RAP) syndrome in children is similar to adult IBS. Apley's (1975) operational definition, which is widely accepted in the research literature, describes RAP as 1) paroxysmal in nature (appearance of pain is unpredictable, unexpecting and

self-limiting, usually lasting less than one hour); 2) occurs frequently over an extended time period (greater than three episodes over three months); and 3) is severe enough to result in a change in activity. Stone and Barbero (1970) report that RAP occurs with constipation in 31% of the cases and diarrhea in 18% of the cases. Incidence of RAP has been reported in 10 to 14% (Apley and Naish, 1958; Oster, 1972) of children between 6 and 17 years of age. The pain is generally periumbilical. Although there are many conditions that may present unexplained abdominal pain, it has been reported that only 2 to 6% of patients develop subsequent organic diseases (Christensen & Mortensen, 1975; Stickler & Murphy, 1979). The symptoms of RAP are thought to be the result of spasms of the colon (Holzl & Whitehead, 1983) and are easily perceivable. Apley's criteria for inclusion of RAP into the childhood high-perception group were employed.

Irritable bowel syndrome. IBS is a common gastrointestinal disorder which is usually defined as abdominal pain and a change in bowel habit (either constipation or diarrhea) in the absence of any organic abnormalities (Latimer, 1983). It is typically diagnosed by exclusion, that is, after appropriate physical and laboratory investigations reveal no organic pathology. It is estimated that 8 to 14% of the general adult population

suffer from IBS in a given year (Thompson & Heaton, 1980; Drossman, Sandler, McKee & Lavitz, 1982). Like those of RAP, the symptoms of IBS are thought to result from spasms of the colon and are easily perceivable. The criteria for inclusion of IBS as a current high-perception disorder were: 1) abdominal pain, 2) change in bowel habits (either constipation or diarrhea), 3) symptoms present for at least six months.

Headaches. Muscle contraction headaches have been described as "generalized pain over the entire head, usually starting in the occipital or neck region. The pain is characterized as a dull ache and is frequently described as a band or cap-like pressure or tightness" (Blanchard, 1978). Headaches of this type are common and are believed to be a result of sustained muscle tension or anxiety. Migraine headaches are recurrent in nature and vary in intensity, frequency, and duration. Onset of migraines is typically unilateral and described as throbbing or pulsating. It can be accompanied by nausea, paresthesias, and other symptomatology. Migraines are thought to result from a two-phase process: 1) vasoconstriction of cranial and cerebral arteries; and, during the headache phase, 2) vasodilation of these arteries. The resulting inflammation of the arterial wall and vascular edema lead to the

throbbing pain. It is also possible for a person to suffer from a combined migraine and muscle contraction headache. Both muscle contraction and migraine headache symptoms are characterized by highly perceivable symptoms.

Recurrent pain due to headaches is a common disorder among children and adults. Oster (1972) reported a prevalence of headaches in children to be 20.6%. Adult prevalence ranges from around 12% for migraines to 31% (two or more per month; Harper & Steger, 1978) for muscle contraction headaches.

The present study's criterion for inclusion of headaches as a childhood high-perception disorder was the reported occurrence of at least three headaches per month over a one-year period. A diagnosis of migraine headaches requires a frequency of at least one headache a month. A diagnosis of tension headaches requires a frequency of at least three headache a week.

Asthma. Bronchial asthma is a syndrome characterized by acute episodes of obstruction of adequate exchanges of air to the lungs. Symptoms can include: wheezing, dyspnea, cough, and excessive mucus production. Estimates of the incidence of asthma in the general population range between 5% and 15%, with a more realistic estimate around 7% (Creer, Renne, & Chai, 1982). Of these, approximately 60% are below

17 years of age. There are two forms of asthma: extrinsic and intrinsic. Extrinsic asthma is caused by external agents such as dust, pollens, food items, and other allergens. This form of asthma is most common in children and young adults. Intrinsic asthma is more difficult to understand because a specific cause frequently cannot be identified. Often the precipitating factor is predominantly infection. This form of asthma develops most often after age 40. The changes in the bronchioles, which cause the obstructed air exchange, include mucosal edema, hypersecretion of thick mucus, and contraction of the bronchial smooth muscles. Secondary psychosocial factors may profoundly influence the frequency and severity of both forms of asthma (Alexander, 1981). The criterion for inclusion of asthma as a high perception disorder in this present study is self-report of a physician's diagnosis.

No disorders. This group consisted of subjects who reported no recurrent high perception disorders and no recurrent high-perception symptomatology during childhood, as well as currently. Inclusion was based on answering no to all the high-perception questions on the Health Screening Questionnaire.

Table 2 summarizes the inclusion criteria for high-perception disorders.

Table 2

Criteria for High-Perception Disorders

Recurrent Childhood Headaches:

1) at least 3 headaches a month for a one year period

Recurrent Abdominal Pain:

1) pain usually a sudden severe attack
2) stomach pains more than three times a month
3) pains usually resulted in a change of activity

Childhood Asthma:

1) physician's diagnosis

Recurrent Adult Headaches:

1) migraine: physician diagnosis or all of the following:
   a) pain typically throbbing or pulsating
   b) at least 2 headaches in the last month, but not more than 3 per week
   c) accompanied by nausea and/or vomiting, or unilateral onset
2) muscle contraction: physician diagnosis or all of the following:
   a) pain described as tightness or external pressure, or as a continual dull ache
   b) at least three headaches a week
   c) bilateral onset beginning in the back of the head

Irritable Bowel Syndrome:

1) recurrent stomach pain
2) accompanied by diarrhea and/or constipation
3) symptoms at least once per month for the last 6 months

Adult Asthma:

1) physician diagnosis

Screening for disorders and illness. Subjects filled out the following two questionnaires to assess childhood and current disorders and illness. The Health Screening Questionnaire (see Appendix D) was designed to assess the occurrence of a wide variety of symptoms in childhood (less than 16 years of age) and currently (within the last year) including: criteria for the three high-perception disorders, other recurrent high and low perception symptoms, and chronic and serious illness. Table 3 shows frequencies of each high-perception disorder in the sample and test-retest reliability for classification. Due to the poor reliability for classification of some disorders, subjects had to meet the specific criteria for a disorder upon first testing and at least indicate that they had the same recurrent disorder upon second testing in order to be included as a high-perception disorder.

The Childhood Medical Checklist (see Appendix E) lists serious childhood illnesses adapted from a list of major causes of infant deaths (Marlow, 1977). The illnesses were divided into chronic and acute illness on the basis of their symptom course. Subjects were instructed to check if they had any of the illnesses before 16 years of age. The checks were summed to yield a total number of acute and chronic

Table 3

Health Screening Questionnaire: Frequency of Disorders and Test Retest Correlations

	Frequency	Test-Retest
Childhood High-Perception		
Recurrent Childhood Headaches	16	.82
Recurrent Abdominal Pain	5	.56
Childhood Asthma	10	.80
Current Disorders		
Recurrent Adult Headaches	14	.53
Irritable Bowel Syndrome	8	.68
Adult Asthma	7	.86

illness in childhood for each subject. Test-retest reliability was .80 for acute illnesses an .75 for chronic illnesses.

The SUNYA revision of Psychosomatic Symptom Checklist (PSC) was used as an additional measure of current disorders and illness. Subjects rated 17 common psychophysiologic complaints for frequency and intensity of occurrence using a five-point scale. The cross-products of these were summed to yield a composite score. The PSC has been normed to college populations (Attanasio, Andrasik, Blanchard, & Arena, 1984) and test-retest correlations were greater than .80. Individual item correlations varied but the majority of correlations were greater than .50. The PSC has been shown to be sensitive to the presence of psychophysiologic disorders and also to an overall generalized reduction in distress associated with psychophysiologic complaints (Cox, Freundlich, & Meyer, 1975; Holroyd & Andrasik, 1978).

Learning experiences. The Childhood Health Questionnaire (See Appendix F) consisted of 44 items and a family health sheet. This questionnaire was designed to assess childhood learning experiences. Five factor-based scales make up the learning experiences portion. These included positive reinforcement for serious illnesses and accidents, positive non-illness related reinforcement,

negative reinforcement for mild illnesses, positive reinforcement for mild illnesses, and amount of time sick. Positive reinforcement questions included reported material care (e.g., special foods, toys, gifts, etc.), attention (e.g, talking, listening, being with you), affection (verbal comfort, physical affection, expressions of love, etc.). Negative reinforcement questions assessed avoidance behavior. For example, how likely it would be for a person to stay home from some activity (e.g., school) with a particular illness. The items on each of these scales were selected a priori based upon learning theory. Factor analysis was used in a confirmatory manner using principal components extraction technique. The resulting factors with eigen values greater than 1 were rotated to simple structure according to Kaiser's varimax criteria. Items that did not substantially load (< .2) on any factor were excluded. Responses were recorded on a 9 point Likert-type scale. Individual items of each factor were summed for a composite score. Test-retest correlations ranged from .64 to .94 for the individual items and from .78 to .93 for the factors. Table 4 shows the factor loadings and the test-retest correlations for the individual items and factors.

Differential reinforcement questions (i.e., questions 34, 35, and 37) assessed negative reinforcement for

Table 4

Childhood Health Questionnaire: Factor Loadings and Test-Retest Correlations

Factors	Item	Factor Loading	r
Serious Illness Reinforcement			.78
Attention: illness	11	.88	.64
Attention: accident	10	.86	.68
Material care: illness	4	.81	.68
Affection: accident	17	.80	.73
Affection: illness	18	.79	.71
Material care: accident	3	.74	.66
General Reinforcement			.87
Attention: extracurricular	14	.86	.82
Affection: extracurricular	21	.85	.82
Attention: academic	13	.84	.79
Affection: academic	20	.83	.79
Affection: general	15	.70	.83
Material care: extracurricular	7	.67	.69
Material care: academic	6	.64	.73
Attention: general	8	.64	.78

Table 4 (continued)

Childhood Health Questionnaire: Factor Loadings and Test-Retest Correlations

Factors	Item	Factor Loading	r
Negative Reinforcement			.85
Stay home (school): no signs	22	.78	.83
Stomachache	35	.67	.76
Cold	32	.66	.80
Headache	34	.63	.74
Enjoyable: stay home	28	.61	.73
Stay home (non-school): no signs	24	.55	.69
Flu	33	.53	.69
Positive Reinforcement			.80
Material care: stomachache or headache	5	.86	.66
Material care: cold or flu	2	.71	.67
Attention: stomachache or headache	12	.67	.75
Affection: stomachache or headache	19	.60	.72
Attention: cold or flu	9	.35	.72
Affection: cold or Flu	16	.28	.74
Amount Sick			.94
School missed	39	.77	.94
Amount sick	38	.75	.82

stomachaches and headaches on a 9-point Likert-type scale.

Current learning experiences were assessed using the Current Health Questionnaire (See Appendix C). This questionnaire consisted of 34 items. This questionnaire is essentially the same as the Childhood Health Questionnaire except it assessed reinforcement over the past year. Five factor-based scales make up the learning experiences portion. These included positive reinforcement for serious illnesses and accidents, positive reinforcement for mild illnesses, negative reinforcement for mild illnesses, positive non-illness reinforcement, and positive reinforcement in general. Composite score for each factor were obtained by summing the appropriate items. Test-retest correlations ranged from .58 to .77 for the individual items and from .70 to .82 for the factors. Table 5 shows the factor loadings and the test-retest correlations for the individual items and factors.

Illness behavior. The Illness Behavior Questionnaire (IBQ) (Pilowsky, 1975) is a self-report measure which consists of 62 yes/no items. This questionnaire is not concerned with the presence or absence of physical symptoms, but rather, the subjects' attitudes, and feelings about their illness, their perception of the reaction of others in their environment to themselves and their illness, and the

Table 5

Current Health Questionnaire: Factor Loadings and Test-Retest Correlations

Factors	Item	Factor Loading	r
Serious illness reinforcement			.70
Affection: accident	18	.87	.65
Attention: accident	11	.84	.58
Affection: illness	10	.84	.59
Affection: accident	17	.84	.64
Material care: accident	4	.66	.58
Material care: illness	3	.61	.63
Positive reinforcement			.77
Attention: stomachache or headache	12	.88	.69
Affection: stomachache or headache	19	.79	.68
Attention: cold or flu	9	.74	.68
Affection: cold or flu	16	.68	.67
Material care: stomachache or headache	5	.48	.65
Material care: cold or flu	2	.46	.66

Table 5 (continued)

Current Health Questionnaire: Factor Loadings and Test-Retest Correlations

Factors	Item	Factor Loading	r
Negative reinforcement			.74
Headache	29	.87	.65
Stomachache	30	.87	.67
Cold	27	.84	.65
Flu	28	.68	.64
Non-illness reinforcement			.82
Affection: academic	20	.84	.77
Material care: academic	6	.79	.74
Attention: academic	13	.70	.70
Material care: extracurricular	7	.56	.70
Affection: extracurricular	21	.55	.75
Attention: extracurricular	14	.33	.73
General reinforcement			.76
Material care	1	.84	.62
Attention	8	.53	.68
Affection	15	.49	.76

subjects' view of their current psychosocial situation. Scoring is weighted in the direction of abnormal or maladaptive illness behavior. High scores are indicative of inappropriate ways of perceiving, evaluating or acting upon one's state of health. The primary use of the IBQ has been in attempts to discriminate pain patients from other types of patients. For example, Chapman, Sola, and Bonica (1979) found significant differences between 200 pain patients and 200 private practice patients matched for age and sex.

Family prevalence. Family prevalence for psychophysiologic disorders was assessed by having the subjects check the disorders various family members living at home had while the subject was growing up (see appendix H). Test-retest point biserials for the individual disorders ranged from .61 to 1.0 for fathers, .56 to 1.0 for mothers, and from -.01 to 1.0 for other family members.

Environmental variables. The Family Environment Scale (FES; Moos & Moos, 1981 is a 90 item true-false self-report measure of the family social environment. It assesses three domains: the Relationship dimension, the Personal Growth dimension, and the Systems Maintenance dimension. Of interest to the present study is the Relationship dimension which has three subscales: Cohesion, Expressiveness, and Conflict. These subscales measure the

> degree of commitment, help, and support family members provide for one another; the extent to which family members are encouraged to act openly and to express their feeling directly; and the amount of openly expressed anger, aggression, and conflict among family members (Moos & Moos, 1981, pg 1).

Subjects were instructed to answer each question as being either true or false of the family they grew up with. Norms are available and high reliabilities have been reported (test-retest: .68 to .86). The FES was used in this present study as a measure of the childhood environment.

Childhood stress was assessed using 4 item scale (see Appendix I). One point was given for each affirmative response to three stressful life event questions and for indicating a 6 or greater on a 9 point scale indicating how stressful their household environment was while growing up. These points were summed for a total score. Test-retest correlation for total score was .64.

Current life stress was assessed using the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978). The LES has an advantage over other measures of life changes (e.g., Schedule of Recent Events; Holmes & Rahe, 1967) in that it distinguishes between desirable and undesirable

changes. The LES consists of a list of 47 events and a supplementary list of 10 events relevant to college populations. Subjects indicate for each item whether they experienced the event within 0 to 6 months or 7 to 12 months. In addition, subjects separately rate the desirability and impact of the events they have experienced. These ratings are on a 7- point scale ranging from -3 to +3. A -3 rating indicates a negative event that had an extreme impact on the subject. A +3 indicates a positive event that has an extreme impact. Positive, negative, and total change scores are obtained by summing the impact of each of these events. The negative change score has been shown to be correlated with a variety of health related problems. It is suggested that this negative change score should be used to determine the degree of life stress (Sarason, Levine, & Sarason, 1982).

Normative data are available for the LES. Test-retest of the LES shows that the negative and total change scores on the LES are moderately reliable (.56 to .88 and .63 to .64, respectively). The positive change score had lower reliability (.19 to .53). These reliabilities are most likely an underestimate; with a five to six week interval, subjects may actually experience a variety of events which would be reflected in their scores.

Person variables. The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is a measure of variables existing in depression. The inventory consists of 21 groups of statements. Subjects circle the statement that describes themselves. Circled items are summed to yield a composite depression rating. Test-retest reliability with undergraduate college students was reported at .75 (Rehm, 1976). Psychological functioning and distress have been reported for IBS and headache populations and it has been suggested that psychological factors play a role in the etiology and exacerbation of these symptoms (Blanchard, Radnitz, Evans, Schwartz, Neff, & Gerardi, in press). The present study used the BDI as one measure of psychological functioning.

The State-Trait Anxiety Inventory (STAI) is a measure of a transitory emotional state of anxiety (state scale) and of a relatively stable anxiety proneness (trait scale) (Spielberger, Gorsuch & Lushene, 1970). It consists of 20 statements per scale. The state scale asks subjects how they feel right now and the trait scale asks the subjects how they generally feel. Subjects rate each statement as it applies to them on a four point scale. The items are summed (about half are reverse scored) and can be converted to percentile ranks. Norms are available. The test-retest

correlations were reported to range from .73 to .86 on the trait scale and .16 to .54 on the state scale. Internal consistencies range from .83 to .92 on both scales. The STAI will be used in the present study as an additional measure of psychological functioning and distress.

Results

Learning Experiences

A two factor between subjects (current disorders X childhood disorders) multivariate analysis of variance (MANOVA) was conducted with the positive reinforcement score and negative reinforcement score as dependent measures. The general reinforcement score was positively correlated with the positive reinforcement score ($r = .60$; $p \leq .001$) and was therefore used as a covariate. Since there were unequal cell sizes, the regression approach to partitioning the sums of squares was used. Table 6 shows the means and standard deviations of each dependent variable for each group. No differences were found between subjects who reported a high-perception disorder in childhood and subjects who reported no childhood disorder on the reinforcement measures. Therefore, support for the first hypothesis was not provided. There was, however, a multivariate main effect for the current condition ($F(2,65) = 4.79$, $p = .011$). Subjects who reported a current high-perception disorder reported more reinforcement for mild illnesses in childhood than did subjects who reported no current disorder. Examination of the univariate F test with positive reinforcement as the dependent variable to be significant ($F(1,66) = 4.27$; $p = .042$) and the univariate F test with

Table 6

Means and Standard Deviations for Childhood Reinforcement

	M	SD	n
Negative Reinforcement			
Childhood HPD - Yes			
Current HPD-Yes	5.86	1.14	14
Current HPD-No	5.42	1.80	13
Childhood HPD - No			
Current HPD-Yes	5.83	1.77	12
Current HPD-No	5.40	1.57	32
Positive Reinforcement			
Childhood HPD - Yes			
Current HPD-Yes	6.73	1.47	
Current HPD-No	7.28	1.40	
Childhood HPD - No			
Current HPD-Yes	6.06	1.58	
Current HPD-No	6.47	1.44	

negative reinforcement as the dependent variable to be not significant ($F(1,66) = 2.65$; $p = .293$).

Hypothesis 2, that people with a current high-perception disorder would show more current reinforcement than would people without a current disorder, was tested with a one-way MANOVA. Positive and negative reinforcement scores were dependent measures. The general reinforcement score was significantly related to both the positive and negative reinforcement scores ($r = .75$; $p \leq .001$; and $r = .19$; $p \leq .01$, respectively). The non-illness reinforcement score was positively correlated with the positive reinforcement score ($r = .68$; $p \leq .001$). Therefore, these score were used as covariates. Table 7 shows the means and standard deviations for the dependent measures for each level. Results of the MANOVA were not significant.

Table 8 shows the means and standard deviations of ratings on questions related to negative reinforcement for specific symptoms for the headache and stomachache groups. T-tests showed no differences between reinforcement scores for headache and stomachache symptoms for either the headache or the stomachache group. These results do not support the differential reinforcement for specific symptoms hypothesis (hypothesis 3).

Table 7

Means and Standard Deviations for Current Reinforcement

		M	SD	n
Positive Reinforcement				
Current	HPD-Yes	6.12	2.04	26
Current	HPD-No	5.33	1.95	45
Negative Reinforcement				
Current	HPD-Yes	3.47	1.56	
Current	HPD-No	2.66	1.46	

Table 8

Differential Reinforcement: Means and Standard Deviations

	n	Mean	SD
Recurrent Headaches			
headaches	16	4.06	2.64
stomachaches	16	5.43	2.12
Recurrent Abdominal Pain			
headaches	5	4.20	3.27
stomachaches	5	5.20	3.11

Family Prevalence

Some support was shown for the Hypothesis 4. There was a significant relationship between whether subjects' parents were reported to have had a high-perception disorder and whether subjects themselves reported having a high-perception disorder currently (chi-square = 5.80, df = 1, p = .016) (Table 9 shows the observed frequencies). Subjects who reported having a current high-perception disorder were more likely to report having at least one parent with a high-perception disorder than were subjects who reported having no high-perception disorder. Chi-square analyses of family prevalence of each specific high-perception disorders revealed that whether subjects' parents had asthma was related to whether subjects themselves reported having asthma in childhood (chi-square = 16.17, df = 1, p < .0001), as well as currently (chi-square = 5.84, df = 1, p = .015). Subjects who reported having asthma were more likely to report having at least one parent with asthma than were subjects who reported no asthma.

Illness Behavior

Current illness behavior as measured by the Illness Behavior Questionnaire was not found to be related to childhood or current positive and negative reinforcement. None of these reinforcement factors were significant

Table 9

Family Prevalence: Observed Frequencies

	Parents High-perception Disorder	
	No	Yes
Current High-Perception Disorder		
No	14	31
Yes	1	25

predictors in a multiple regression equation. Thus, Hypothesis 5 was not supported.

Environmental Variables

For childhood stress and the family relationship dimensions of the Family Environment Scale, t-tests showed no differences between people who reported a high-perception disorder in childhood and those who report no high-perception disorders in childhood.

For negative and positive stressful life events, t-tests showed no significant differences between people who reported a high-perception disorder currently and those who reported no disorders currently within the last six months and within the last year (see Table 10 for means and standard deviations).

Person Variables

Subjects who reported a current high-perception disorder showed more depression, trait anxiety, and state anxiety than did those who report no high-perception symptoms. Results for these measures are shown in Table 11. These results support Hypothesis 8.

Influences on Current Symptomatology.

Partial support was shown for Hypothesis 9. Multiple regression was used with current symptomatology, as measured by the Psychosomatic Symptoms Checklist, as the criterion

Table 10

Stress and Family Factors: Means and Standard Deviations

	M	SD	t-value	p
Childhood stress				
childhood disorder	2.81	1.17	1.16	.250
no disorder	1.86	1.04		
Negative life events (0-6)				
childhood disorder	6.15	6.11	1.53	.133
no disorder	4.06	4.13		
Positive life events (0-6)				
childhood disorder	7.26	6.61	0.60	.552
no disorder	6.31	6.29		
Negative life events (7-12)				
childhood disorder	4.15	5.81	1.73	.092
no disorder	2.00	3.33		
Positive life events (7-12)				
childhood disorder	3.50	3.93	1.23	.224
no disorder	2.37	3.24		
Family Cohesion				
childhood disorder	6.29	2.70	0.72	.457
no disorder	5.81	2.75		
Family Expressiveness				
childhood disorder	5.03	2.37	0.97	.334
no disorder	4.47	2.30		
Family Conflict				
childhood disorder	4.07	2.31	0.11	.913
no disorder	4.13	2.35		

Table 11

Depression and Anxiety: Group Differences

Measure	n	Mean	SD	*t*-value	*p*
BDI					
Current disorders	26	8.96	6.1	2.59	.013
No disorders	45	5.33	4.7		
STAI-state					
Current disorders		39.88	10.6	2.57	.013
No disorders		33.28	10.0		
STAI-trait					
Current disorders		42.96	9.6	3.00	.004
No disorders		35.75	9.9		

and childhood and current reinforcement for illness, childhood and current stress, current depression, and trait and state anxiety as predictors. Results showed depression, negative life events and trait anxiety to be positively related to the amount of current symptoms. Table 12 shows the correlation matrix and the summary table for the regression equation.

Summary. Analysis of reinforcement and childhood and current disorders showed that people who reported having a current high-perception disorder were reinforced for mild illness more in childhood than were those reporting no current disorder. Family prevalence analysis showed that people who reported a current disorder were more likely to have a parent with a high-perception disorder than were people who reported no current disorder. People who reported having asthma in childhood and currently were more likely to have a parent with asthma than were people who reported no asthma in childhood and currently. Analysis of environmental and person variables showed that people who reported a current disorder scored higher on negative life events, depression, and anxiety than people who reported no disorder.

Unfortunately, support was not provided for the hypothesis that people who reported having a childhood

high-perception disorder were reinforced for mild illness more in childhood than those reporting no childhood disorder. The hypothesis that people who reported having a current high-perception disorder were reinforced for mild illness more currently than those reporting no current disorder also was unsupported.

Table 12

Correlations and Regression Summary: Current Symptomatology:

	Reinforcement							
	Childhood		Current					
	Pos	Neg	Pos	Neg	LES	BDI	STAI-T	STAI-S
PSC r =	-.14	.02	.02	.04	.50	.55	.44	.31

Step	MultR	Rsq	F	SigF	RsqCh	Fch	SigCh	Variable
1	.5585	.3119	67.54	.000	.3119	67.54	.000	BDI
2	.6156	.3789	45.14	.000	.0670	15.96	.000	LES(neg)
3	.6365	.4051	33.36	.000	.0262	6.47	.012	STAI-tr

Discussion

The present study provided partial support for the role of learning experiences in the development and maintenance of high-perception psychophysiological disorders. Consistent with earlier research (Whitehead et al., 1982), chronic illness in adulthood was positively related to increased positive reinforcement for illness in childhood. Individuals who reported a high-perception disorder currently were more likely to report both positive reinforcement (e.g., "As a child, did you receiving special foods, toys, gifts, etc. when sick?") than were individuals who reported a low-perception disorder.

The present study expanded the assessment of learning influences by examining the relationship between chronic high-perception psychophysiological disorders in childhood and childhood and current reinforcement experiences. It was hypothesized that reinforcement for illness would manifest itself by increased childhood disorders because, according to learning theory, reinforcement increases the liklihood of illness behavior (or symptoms) to reoccur. However, this hypothesis was not supported.

These results raise some interesting issues regarding the role of learning in the development of chronic psychophysiological disorders. It appears from these results

that childhood operant experiences may contribute to the development of chronic disorders but that their effects are not shown until later in adulthood. This suggests that the development of these disorders may not be continuous, that is, the effects of learning may not be independently additive but rather interactive with other factors (i.e., stress, biology, etc.). For example, what may be learned in childhood is that illness is a socially appropriate way of avoiding certain situations or gaining social attention. In addition, this learning may increase a person's perception of somatic sensations and cause them to selectively attend to certain physiological changes. This illness behavior may be functional in childhood without necessarily resulting in chronic physiological responses. These learned responses may manifest themselves later in life when the person comes under some internal or external stress (e.g., social, psychological, biological). It may be that these early learning experiences make a person susceptible to developing a chronic disorder in adulthood.

An alternative explanation of the above findings is that the present results, as well as previous research findings, are a function of the method of assessment employed, specifically, retrospective self-report. It may be that issues related to illness in childhood are more salient

for people who are currently suffering from a chronic disorder and that the differences are the result of increased awareness or sensitivity to these illness issues. Furthermore, problems of reliability inherent in retrospective report may also obscure any differences in childhood reinforcement for those who are not experiencing a current disorder. Given the above, research employing retrospective report may be confounded and other methodologies are needed to further assess the question. For example, a study might assess children with high-perception disorders by using behavioral observation, psychophysiological measures, and parent and teacher report.

Current reinforcement experiences were also unrelated to current disorders or symptomatology (suggesting that current reinforcement does not have a role in the maintenance of current symptoms). These results are inconsistent with previous research (Wooley et al., 1978). However, there were problems with this previous research. As mentioned earlier in this paper, this treatment outcome study does not allow for a clear determination of the role of learning. The negative results of the present study may be a function of the assessment method. Are subjects aware of their illness behavior and do they accurately report it? Based on self-report, the present assessment is subject to

limitations of reliability and validity. In addition, the questions assessing current reinforcement were quite obvious and may have led subjects with a current disorder to respond defensively. Other methods of assessment (e.g., informant report, monitoring, attendance records) need to be employed in order to determine the role of learning in the maintenance of current symptoms.

The tendency for symptoms to run in families is often cited as evidence for genetic or biological contributions to specific disorders. However, the results of Christensen and Mortensen (1975) presented earlier in this paper provide some evidence to suggest that other mechanisms may be involved in symptom selection. Differential reinforcement and modeling of symptoms has been suggested as possible mechanisms (Langner & Michael, 1963; Latimer, 1981; Whitehead et al., 1978). It may be that parents respond differently to their child's somatic complaints. The role of differential reinforcement in symptom selection was not supported by the present study. Subjects who reported recurrent headaches in childhood did not report greater negative reinforcement for headache symptoms than for stomachache symptoms. Subjects who reported recurrent abdominal pain in childhood did not report greater negative reinforcement for stomachaches than for headache symptoms.

These results suggest that the role of differential reinforcement may be minimal, or perhaps secondary to some other factor, such as a genetic or biological vulnerability in the specific target area.

Parental modeling may also be a mechanism in symptom selection. Modeling of specific symptoms may teach children: 1) misconceptions of 'normal' health behavior (e.g., bowel habits); 2) that particular symptoms are a socially acceptable sign of distress; 3) that the symptoms are a socially acceptable way of avoiding certain aversive responsibilities; or 4) that the symptoms are a socially appropriate way of eliciting attention from people in their environment. In the present study, subjects who reported a current or childhood disorder did not report the same symptoms as their parents, with the exception of asthma. Previous research found similar findings with regards to asthma which may be due to a strong genetic component (Langner & Michael, 1963). These results do not generally support the role of modeling in the selection of specific symptoms. However, people who reported a current high-perception disorder did tend to report parents who also had some high-perception disorder. This suggests that parents may be modeling a response to illness in general. This learned response may interact with the specific

biological vulnerability of the person and manifest as specific symptoms. Based on the present and previous research, further assessment is needed to clarify the relative importance of genetics, biology, learning, and the environment.

Consistent with previous research (Sarason et al., 1982; Blanchard et al., in press) the present study revealed that negative life events and psychological distress were positively related to current psychophysiologic symptoms. The consistency of these findings implicate the importance of environmental and psychological variables in illness. However, since this relationship is correlational, it is difficult to determine the causal connection, if any, among the variables. These results are comparable to a previous survey which showed increased psychological distress for IBS and headache populations (Blanchard et al., in press). This indicates that the present sample is comparable to clinical populations.

Limitations of the Study

There are apparent limitations to the present study. The first limitation is the sample used. This study relied exclusively upon a relatively small sample of young college students, yeilding a small number of subjects per cell. With such a sample, generalizability is questionable. Second, the

study is based upon retrospective self-report of events and situations in childhood. Third, criteria for inclusion as a psychophysiological disorder was based on self-report. Test-retest reliabilities for classification of some disorders were low. This may have resulted in misclassification and biased the results in a conservative direction.

Conclusions and Future Directions

The primary hypothesis of interest, that learning experiences have a role in the development of psychophysiological disorders, was, at best, only partially supported. Report of childhood operant experiences was unrelated to childhood disorders. In addition, report of current operant experiences was unrelated to current disorders. However, consistent with previous research was the finding that early operant experiences were positively related to adult disorders.

Research suggests the complex problems of illness to be multidimensional in nature, that is subject to the additive or interactive influences of genetic, biological, psychological, sociocultural, and ecological factors. Rather than searching for unidimensional models to explain etiology, what is needed is a metatheoretical framework for integrating biological, psychological, and social approaches

to illness. This biopsychosocial model (Engel, 1977) spans the traditional boundaries between disciplines and suggests an interdisciplinary approach to illness. Examples of this approach are seen in the emerging fields of behavioral medicine, sociobiology, psychophysiology, and behavioral neurology. The challenge facing researchers is to make the principles of the biopsychosocial model explicit and to empirically test them (Schwartz, 1982).

This approach offers advantages over unidimensional approaches such as the medical "disease" model, the psychophysiological model, or the stress model. The disease model assumes the primary problem in disorders to be an underlying biological dysfunction and any psychological problems are assumed to arise secondarily. This approach is lacking because the evidence in support of a unique abnormality in many disorders is inconclusive (Latimer, 1981). The essential feature of the psychophysiological model is that symptoms are a result of physiological changes that accompany certain psychological states. Variations of this model have proposed that symptoms are a result of specific unconscious conflicts, personality profiles, or attitudes. The major problem with this model is the lack of consistent evidence demonstrating the relationship. The stress model has been useful in conceptualizing

psychophysiological disorders and has resulted in treatment strategies that are effective for some individuals with certain disorders. However, as mentioned at the onset, there is a certain class of disorders in which the role of stress is unclear. In contrast to a unidimensional approach, a multidimensional approach does not look for a specific "cause" but rather examines how many factors might contribute or interact to produce a disorder.

A multidimensional approach to the development of high-perception psychophysiological disorders requires a greater understanding of the many factors related to these disorders, as well as how these factors may interact. Research needs to continue examining the physiological aspects of these disorders. What appears to be consistent in the research is the increased psychological distress and stressful events in this population. Results of the present and previous research suggest that early learning experiences may play a role in later development of disorders with readily perceivable symptoms. Further research is needed to directly assess the influences of learning on the development and maintenance of these disorders. The challenge to researchers is to further clarify the factors related to these disorders and to examine how these factors might interact in their

development and maintenance.

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Appendices

Appendix A

Consent Form

Assigned Subject # _____

Consent Form

I understand that I am participating in a study designed to investigate factors in the development of certain illnesses. I will be asked to respond to questionnaires that assess various health, personality, and family dimensions. I understand that some of the questions may be of a personal nature. I understand that I may discontinue my participation in this study at any time. These tests will be completed in 2 different sessions and should take less than 3 hours to complete. I will be given 3 credits for my participation, which I will receive at the completion of both testing sessions.

There are no apparent risks associated with this study

I understand that every attempt will be made to maintain confidentiality. My name will only appear on this consent form. Everywhere else I will be referred to by the assigned subject number that appears in the above right hand corner.

This research has been approved by the Human Subjects Research Commitee. Questions about the project should be directed to:

Mark Edwards, 961-5291
Dr. Debra F. Neff, 961-5819

or the chair of the Human Subjects Research Commitee:

Dr. Steve Zaccaro
Dr. Charles Waring, 961-5284

I hereby agree to voluntarily participate in the research project described above.

Signature _____

I. D. # _____-_____-_____

Appendix B

Questionnaires administered each session.

Session 1

Demographics Questionnaire

Psychosomatic Symptom Checklist

Childhood Medical Checklist

Health Screening Questionnaire

Childhood Health Questionnaire

Current Health Questionnaire

Beck Depression Inventory

Life Experiences Scale

Session 2

Illness Behavior Questionnaire

Health Screening Questionnaire

Childhood Health Questionnaire

Current Health Questionnaire

Childhood Medical Checklist

State-Trait Anxiety Inventory

Family Environment Scale

Appendix C

Verbal Instructions

This is a study looking at various factors that might relate to health and illness. It involves filling out a series of questionnaires. You will receive 3 credits for your participation provided that you complete all the following requirements. You must attend both testing sessions at the stated times and complete all the questionnaires completely. The first testing session should last about one full hour. Eight (8) questionnaires will be administered. Some of these questionnaires should take only a few minutes to fill out, others will take several minutes longer. Each test will be administered to the group one at a time. When the group is finished with one questionnaire, then another will be administered. If you finish before the others, just relax and wait until the next questionnaire is passed out. We cannot allow exceptions to this procedure. Plan on being here the full hour, but no longer than an hour and a half. If you have other commitments, it would be better to not participate. As each test is handed out, follow any written or verbal instructions and feel free to ask any questions. You will need a #2 pencil to fill out the

opscans for certain questionnaires.

The second testing session should also last about 1 hour. It involves completing 7 questionnaires. When you show up for the second session, sit in the same seat as you did for the first session. Credit sheets will be signed after the second testing session. You are free to leave after you have completed the last questionnaire.

Appendix D

Health Screening Questionnaire

Answer the following questions about illnesses in your **CHILDHOOD** (before age 16):

1. Did you have **recurrent headaches** in your **childhood**? (check one) _____**Yes** _____**No**
   if you answered **yes**, answer the following:
   a) at anytime in your childhood did you have at least 3 headaches a month for a period of 1 year?
      _____yes _____no

2. Did you have **frequent stomachaches** in your **childhood**? _____**Yes** _____**No**
   if you answered **yes**, answer the following:
   a) was the pain usually like a sudden severe attack?
      _____yes _____no
   b) did the stomach pains occur more than 3 times a month?
      _____yes _____no
   c) did the pains usually result in a change in activity? (e.g.school or play time?)
      _____yes _____no

3. Did you have **recurrent diarrhea** in your **childhood**? _____**Yes** _____**No**

4. Did you have **recurrent constipation** in your **childhood**? _____**Yes** _____**No**

5. Did you have **recurrent vomiting** in your **childhood**? _____**Yes** _____**No**

6. Did you have **asthma** in your **childhood**? _____**Yes** _____**No**
   if you answered **yes**, answer the following:
   a) did a physician diagnose you as having asthma?
      _____yes _____no

7. Did you have **diabetes** in your **childhood**? _____**Yes** _____**No**
   if you answered **yes**, answer the following:
   a) did a physician diagnose you as having diabetes?
      _____yes _____no

8. Did you have **allergies** in your **childhood** ?
_____**Yes** _____**No**

9. Did you have an **ulcer** in your **childhood** ?
_____**Yes** _____**No**
if you answered **yes**, answer the following:
a) did a physician diagnose you as having an ulcer?
_____yes _____no

10. Did you have frequent **ear infections** in your childhood?
_____**Yes** _____**No**

11. Did you have frequent **skin problems** in your **childhood?**
_____**Yes** _____**No**

12. Did you have any **chronic illnesses** in your **childhood** ?
_____**Yes** _____**No**
if you answered **yes**, answer the following:
a) please list the illnesses:_____
b) were you hospitalized?
_____yes: how many days? _____
_____no
c) did you miss a lot of school?
_____yes how many days? _____
_____no

13. Did you have any **serious accident** in your **childhood** ?
_____**Yes** _____**No**
if you answered **yes**, answer the following:
a) did you have a serious head trauma?
_____yes _____no
b) were you hospitalized?
_____yes: how many days? _____
_____no
c) did you miss a lot of school?
_____yes how many days? _____
_____no

14. Are there any **other chronic disorders or illnesses** you had in **childhood** ?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) please list the illnesses: _____

b) were you hospitalized?

_____yes: how many days? _____

_____no

c) did you miss a lot of school?

_____yes

how many days? _____

_____no

Answer the following questions about illnesses you **CURRENTLY** have:

15. Do you **currently** have **recurrent stomach pain**?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) is it usually accompanied by diarrhea?

_____yes _____no

b) is it usually accompanied by constipation?

_____yes _____no

c) have you experienced these symptoms at least once per month for the last six months?

_____yes _____no

16. Did you **currently** have frequent **ear infections**?

_____**Yes** _____**No**

17. Did you **currently** have frequent **skin problems**?

_____**Yes** _____**No**

18. Do you **currently** have **recurrent headaches**?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) have they been diagnosed by a physician as migraine?

_____yes _____no

b) is the headache onset usually on only one-side of your head?

_____yes _____no

c) would you describe your headaches as typically throbbing or pulsating?

_____yes _____no

d) are your headaches usually accompanied by nausea and/or vomiting?
_____yes _____no
e) have you had at least 2 headaches in the last month?
_____yes _____no
f) have you had a physician diagnose them as muscle contraction headaches?
_____yes _____no
g) is the headache onset usually on both sides of your head, beginning in the back of the neck?
_____yes _____no
h) would you describe it as usually feeling like a tightness or external pressure on the head and/or like a "cap" or "band" around the head?
_____yes _____no
i) would you describe it as a continuing dull ache?
_____yes _____no
j) do you have at least 3 headaches per week?
_____yes _____no

19. Do you **currently** have **asthma**? _____**Yes** _____**No**

if you answered **yes**, answer the following:
a) did a physician diagnose you as having asthma?
_____yes _____no

20. Do you **currently** have **diabetes**? _____**Yes** _____**No**

if you answered **yes**, answer the following:
a) did a physician diagnose you as having diabetes?
_____yes _____no

21. Do you **currently** have **allergies**? _____**Yes** _____**No**

22. Do you **currently** have an **ulcer**? _____**Yes** _____**No**

if you answered **yes**, answer the following:
a) did a physician diagnose you as having an ulcer?
_____yes _____no
b) what type do you have: _____

23. Do you **currently** have a **chronic illness**?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) please list the illness:_____

b) have you been hospitalized for this illness?

_____yes: how many days? _____

_____no

24. Do you **currently** have **hypertension** ?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) did a physician diagnose you as having hypertension?

_____yes _____no

25. Have you **recently** been in a **serious accident**?

_____**Yes** _____**No**

if you answered **yes**, answer the following:

a) did you have a serious head trauma?

_____yes _____no

b) were you hospitalized for this accident?

_____yes: how many days? _____

_____no

Appendix E

Childhood Medical Checklist

Instructions: Indicate the age or ages at which you had any of the following illnesses in your **childhood** **(before age 16)**.

Age or Ages	
	Infective and Parasitic
_____	Dysentery
_____	Tuberculosis
_____	Whooping cough
_____	Meningococcal infection
_____	Septicemia
_____	Chickenpox
_____	Measles
_____	Rubella
_____	Viral encephalitis
_____	Coxsackie virus disease
_____	Syphilis
_____	Rocky mountain spotted fever
_____	Other_____
	Tumors
_____	Leukemia
_____	Brain or nervous system
_____	Other malignant tumors
_____	Benign tumors
_____	Other_____
	Allergic, Endocrine and Metabolic
_____	Disease of thymus gland
_____	Vitamin and other nutritional deficiency
_____	Diabetes
_____	Disorder of the pancreas
_____	Other_____
	Blood
_____	Hemophilia
_____	Anemia
_____	Coagulation defects
_____	Other_____
	Nervous System and Sense Organs
_____	Seizures
_____	Epilepsy
_____	Multiple sclerosis

_____ Meningitis
_____ Other_____

Respiratory System
_____ Acute Respiratory infections
_____ Pneumonia
_____ Bronchitis
_____ Emphysema
_____ Cystic Fibrosis
_____ Other_____

Digestive System
_____ Hernia
_____ Gastroenteritis
_____ Ulcerative Colitis
_____ Crohn's Disease
_____ Other_____

Congenital Anomalies
_____ Congenital heart defect
_____ Respiratory system
_____ Digestive system
_____ Urinary system
_____ Circulatory system
_____ Other_____

Other Injuries and Illnesses
_____ Motor vehicle accident (with injury)
_____ Poisoning
_____ Severe burn
_____ Head trauma (e.g., concussion)
_____ Accidental falls (with injury: e.g., broken bones)
_____ Skin disease
_____ Other surgery that required hospitalization

_____ Other _____
_____ Other _____
_____ Other _____
_____ Other _____

Appendix F

Childhood Health Questionnaire

Instructions: Answer the following questions by filling in the appropriate circle on your opscan. Answer the questions as you experienced them **as a child**. If you did not experience the situation described, then answer the question as a hypothetical situation, that is, as you probably would have experienced it, had it happened.

While you were growing up, rate the amount of material care (e.g., special foods, toys, gifts, etc.) **your parents (or guardians) gave you:**

1. ..**in general**: (circle on opscan)

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

2. ..when you **had a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

3. ..when you **had a serious illness** (e.g., scarlet fever, pneumonia, meningitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

4. ..when you **had an accident** (e.g., car accident, concussion, broken bones, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

5. ..when you **complained of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

6. ..when you **had an academic success** (e.g., good grades, etc.) :

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material care

7. ..when you **did well in some extracurricular activity** (e.g., sports, music, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care ... very much material car

While you were growing up, rate the amount of <u>attention</u> (e.g., talking, listening, being with you) **your parents (or guardians) gave you:**

8. ..**in general**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

9. ..when you **had a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

10. ..when you **had a serious illness** (e.g., scarlet fever, pneumonia, meningitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

11. ..when you **had an accident** (e.g., car accident, concussion, broken bones, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

12. ..when you **complained of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

13. ..when you **had an academic success** (e.g., good grades, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

14. ..when you **did well in some extracurricular activity** (e.g., sports, music, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

While you were growing up, rate the amount of affection (e.g., verbal comfort, expressions of love, physical affection, etc.) **your parents (or guardians) gave you:**

15. ..**in general**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

16. ..when you **had a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

17. ..when you **had a serious illness** (e.g., scarlet fever, pneumonia, meningitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

18. .. when you **had an accident** (e.g., car accident, concussion, broken bones, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

19. .. when you **complained of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

20. ..when you **had an academic success** (e.g., good grades, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

21. ..when you **did well in some extracurricular activity** (e.g., sports, music, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

While you were growing up, rate how likely it was for you to have been able to stay home from school when you:

22. ..**said** you felt sick (but did not show obvious signs such as fever, vomiting, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

23. ..showed signs of sickness (e.g., fever, vomiting, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

While you were growing up, rate how likely it was for you to have been able to stay home from other non-school activities (e.g, church, visiting a relative, chores, etc.) when you:

24. ..**said** you felt sick (but did not show obvious signs such as fever, vomiting, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

25. ..showed signs of sickness (e.g., fever, vomiting, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

Rate how enjoyable it was for you, **as a child**, to:

26. ..be at school:

1-----2-----3-----4-----5-----6-----7-----8-----9
not very
enjoyable enjoyable

27. ..be around your home:

1-----2-----3-----4-----5-----6-----7-----8-----9
not very
enjoyable enjoyable

28.Aside from the fact that you were sick and in some pain and discomfort, rate how enjoyable it was for you, **as a child**, to have stayed home from school when you were sick: (circle one number):

1-----2-----3-----4-----5-----6-----7-----8-----9

not enjoyable — very enjoyable

Of the following people, rate how characteristic it was for them to have wanted people to be involved with them when they were sick (e.g., let people know they were sick, want people around them, want people to take care of them, etc.):

29. ..of yourself **as a child**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little — very much

30. ..of your mother:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little — very much

31. ..of your father:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little — very much

While you were growing up, rate how likely it was for you to have been able to stay home from school with the following illnesses:

32. colds:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

33. flu:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

34. headaches:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

35. stomachaches:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

36. other (write here:_____):
1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

37. **While you were growing up**, rate which illness you were more likely to have been able to stay home from school with?
1-----2-----3-----4-----5-----6-----7-----8-----9
headaches stomachache

38. **While you were growing up**, about how many times a year did you get sick? (circle on opscan):
(1) _____ 0 -2 times
(2) _____ 3 -5 times
(3) _____ 6 -8 times
(4) _____ 9 -11 times
(5) _____ 12 -14 times
(6) _____ 15 or more times (if greater than 15, write in amount here:_____)

39. **While you were growing up**, about how many days of school did you miss per a year because of an illness? (circle on opscan):
(1) _____ 0 -2 times
(2) _____ 3 -5 times
(3) _____ 6 -8 times
(4) _____ 9 -11 times
(5) _____ 12 -14 times
(6) _____ 15 or more times (if greater than 15, write in amount here:_____)

Appendix C

Current Health Questionnaire

Instructions: Answer the following questions as you experienced them **within the last year**. If, within the last year, you have not experienced the situation described, then answer the question as a hypothetical situation, that is, as you probably would have experience it, had it happened.

Rate the amount of material care (e.g., special foods, clothes, gifts, etc.) **you receive from the people around you** (roommates., friends, parents, etc.):

1. ..**in general**: (circle one)

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

2. ..when you **have a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

3. ..when you **have a serious illness** (e.g., pneumonia, hepatitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

4. ..when you **have an accident** (e.g., car accident, concussion, broken bone, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

5. ..when you **complain of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

6. ..when you **have an academic or work success** (e.g., good grades, pay raise or compliment etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

7. ..when you **do well in some extracurricular activity** (e.g., non-work or school related):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little material care — very much material care

Rate the amount of <u>attention</u> (e.g., talking, listening, being with you) **you receive from the people around you** (roommates., friends, parents, etc.):

8. ..**in general**: (circle one)

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

9. ..when you **have a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

10. ..when you **have a serious illness** (e.g., pneumonia, hepatitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

11. ..when you **have an accident** (e.g., car accident, concussion, broken bone, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

12. ..when you **complain of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

13. ..when you **have an academic or work success** (e.g., good grades, pay raise or compliment etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

14. ..when you **do well in some extracurricular activity** (e.g., non-work or school related):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little attention — very much attention

Rate the amount of affection (e.g., verbal comfort, expressions of love, physical affection, etc.) **you receive from the people around you** (roommates., friends, parents, etc.):

15. ..**in general**: (circle one)

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

16. ..when you **have a cold or the flu**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

17. ..when you **have a serious illness** (e.g., pneumonia, hepatitis, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

18. ..when you **have an accident** (e.g., car accident, concussion, broken bone, etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

19. ..when you **complain of a stomachache or headache**:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

20. ..when you **have an academic or work success** (e.g., good grades, pay raise or compliment etc.):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

21. ..when you **do well in some extracurricular activity** (e.g., non-work or school related):

1-----2-----3-----4-----5-----6-----7-----8-----9

very little affection — very much affection

Rate how enjoyable it is for you to:

25. ..be at work:

1-----2-----3-----4-----5-----6-----7-----8-----9

not enjoyable — very enjoyable

26. ..be around your residence:

1-----2-----3-----4-----5-----6-----7-----8-----9

not enjoyable — very enjoyable

27. Aside from the fact that you were sick and in some pain and discomfort, rate how enjoyable it is for you to stay home from work when you are sick: (circle one number):

1-----2-----3-----4-----5-----6-----7-----8-----9

not enjoyable — very enjoyable

Of the following people, rate how characteristic it is for them to want people to be involved with them when they are sick (e.g., let people know they are sick, want people around them, want people to take care of them, etc.):

28. ..of yourself:

1-----2-----3-----4-----5-----6-----7-----8-----9

very little — very much

29. ..of some person you currently respect and spend time with::

1-----2-----3-----4-----5-----6-----7-----8-----9

very little — very much

Within the last year, rate how likely it is for you to stay home from work with the following illnesses:

30. colds:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

31. flu:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

32. headaches:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

33. stomachaches:

1-----2-----3-----4-----5-----6-----7-----8-----9

very unlikely — very likely

35. other (write here:_____):
1-----2-----3-----4-----5-----6-----7-----8-----9
very unlikely very likely

36. Rate which illness you are more likely to stay home from work with?
1-----2-----3-----4-----5-----6-----7-----8-----9
headaches stomachache

37. About how many times did you get sick within the last year? (check one):
(1) _____ 0 -2 times
(2) _____ 3 -5 times
(3) _____ 6 -8 times
(4) _____ 9 -11 times
(5) _____ 12 -14 times
(6) _____ 15 or more times (if greater than 15, write in amount here:_____)

38. About how many days of school did you miss because of an illness within the last year? (check one):
(1) _____ 0 -2 times
(2) _____ 3 -5 times
(3) _____ 6 -8 times
(4) _____ 9 -11 times
(5) _____ 12 -14 times
(6) _____ 15 or more times (if greater than 15, write in amount here:_____)

Appendix H

Family Prevalence

Of the people **WHO AT SOME TIME LIVED IN THE HOUSEHOLD YOU GREW UP IN**, put a check by all the illnesses they had:

Recurrent headaches: migraine or tension
Gastrointestinal problems (GI): (stomach pain, irregular bowel habits, recurrent diarrhea or constipation, Irritable Bowel Syndrome, spastic colon, etc.)
Ulcer: any type
Asthma
Diabetes
Hypertension: high blood pressure
Other recurrent problems: (please list)

	Head-aches	GI prob.	Ulcer	Asth-ma	Dia-betes	Hyper-tension	Other Problems
Father	____	____	____	____	____	____	_____
Mother	____	____	____	____	____	____	_____
sibling	____	____	____	____	____	____	_____
sibling	____	____	____	____	____	____	_____
sibling	____	____	____	____	____	____	_____
sibling	____	____	____	____	____	____	_____

(check only if they lived in your household at some time)

Grand-father	____	____	____	____	____	____	_____
Grand-mother	____	____	____	____	____	____	_____
Other	____	____	____	____	____	____	_____

(List:_____)

Other	____	____	____	____	____	____	_____

(List:_____)

(please list relation of other)

Appendix I

Childhood Stress

Childhood Stress

40.How stressful was your household environment **while you were growing up**? (circle on opscan)

1-----2-----3-----4-----5-----6-----7-----8-----9

not very stressful very stressful

41. Did your parents divorce or separate while you were at home? (circle on opscan): **no (1) yes (2)**

42. Was there a death in your household while you were living at home? **no (1) yes (2)**

43. Did you move a lot when you were growing up? (How many times?_____) **no (1) yes (2)**

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Page 1 of 3

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Page 3 of 3

THE ROLE OF LEARNING IN THE DEVELOPMENT AND MAINTENANCE OF HIGH-PERCEPTION PSYCHOPHYSIOLOGICAL DISORDERS

by

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(ABSTRACT)

The present study examined the relationship between psychophysiological disorders with easily perceived symptoms and learning experiences. One-hundred-fifty-one college undergraduates were given self-report questionnaires assessing presence or absense of childhood and current high-perception disorders, childhood and current learning experiences, family prevalence of disorders, illness behavior, childhood and current stress, childhood family factors, depression, and anxiety.

Multivariate F tests showed that subjects who reported a current high-perception disorder reported more reinforcement for mild illnesses in childhood than did subjects who reported no current disorder ($F(2,65) = 4.79$, $p = .011$), with a significant univariate F test with positive reinforcement as the dependent variable ($F(1,66) = 4.27$; p =

.042). Support was not provided for the hypothesis that people who reported having a childhood high-perception disorder were reinforced for mild illness more in childhood than those reporting no childhood disorder. Family prevalence analysis showed that people who reported a current disorder were more likely to have a parent with a high-perception disorder than were people who reported no current disorder (chi-square = 5.80, df = 1, p = .016). Analysis of environmental and person variables showed that people who reported a current disorder scored higher on depression (t = 2.5, p = .013) and state and trait anxiety than people who reported no disorder (t = 2.57, p = .013 and t = 3.0, p = .004, respectively). Implications of these findings and future directions are discussed.