PSYCHOSOCIAL VARIABLES IN THE PREDICTION OF SOMATIC COMPLAINTS

WITH APPLICATIONS TO STRESS-RELATED DISORDERS

by

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(Abstract)

In Study 1, 280 undergraduate students (177 female, 103 male) were administered a battery of questionnaires assessing functional somatic symptoms, psychosocial variables, and behavioral responses to health-related situations. Significant predictors of functional somatic symptoms differed for females and males. The amount of stress experienced, perceived suscpetibility to illness, perceived barriers to health care and level of pain tolerance were significant predictors for males. Significant predictors for females included perceived susceptibility to illness, amount of stress experienced, and not responding to health-related situations by seeking medical attention. A discriminant analysis correctly classified 81.25% of these groups. In Study 2, sixty-two subjects were selected based on reported

level of specified functional somatic symptoms. Individuals
monitored physical symptoms and behavioral responses to those
symptoms daily for a two-week time period. The initial self-
report of functional somatic symptoms was validated and the
predicted behavioral responses were partially supported.
Individuals identified as high and low on functional somatic
symptoms differed in their response to functional symptoms
but not to illness symptoms. Individuals within the high
group attended more towards functional symptoms than towards
illness symptoms while individuals in the low group did not
differ in their response. Health beliefs, stress and certain
behavioral responses appear to have a role in the development
and maintenance of stress-related disorders.

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Psychosocial Variables in the Prediction of Somatic Complaints

with Applications to Stress-related Disorders

Approximately 60% to 80% of individuals in a normal
population report experiencing at least one functional
somatic symptom in a given week (Kellner & Sheffield, 1973;
Rerdinberg & Lowenthal, 1968). While many individual
experience some symptoms, other individuals develop stress-
related disorders. Stress-related disorders such as
irritable bowel syndrome (IBS) and tension headache are
problematic for an estimated 8% to 20% of the population
(Thompson & Heaton, 1980; Leviton, 1978). Both of these
disorders may be viewed on a continuum, in that the
disturbance is one of increased intensity and frequency of
symptoms. On one end of the continuum are individuals who
experience no symptoms and at the other end are individuals
who suffer from chronic stress-related disorders. Thus,
understanding the development and maintenance of functional
somatic symptoms may aid in the understanding of these
disorders.

From a biopsychosocial model (Engel, 1977), Schwartz
(1982) proposed that biological, psychological, and social
factors are important in the study of health and illness.
Previously, individuals' risk for illness had been defined
solely in terms of their exposure to stress. The
biopsychosocial model proposes that the interaction of

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biological, psychological, and social factors should always be considered in the diagnosis, treatment, and prevention of illness. Using the biopsychosocial approach, this study examined the role of learning in illness behavior in the development and maintenance of stress-related symptoms.

Psychological and physiological factors should be considered in the relationship between stress and the transformation of emotion into somatic symptoms. Kellner (1985) discussed known mechanisms producing somatic symptoms in the absence of physical disease or damage to tissues. Individuals prone to illness behavior are more likely to attend to, perceive, and label physical symptoms and therefore experience more somatic symptoms and illnesses. The perception of and behavioral response to physical symptoms may lead to somatic symptoms through modeling, reinforcement, or avoidance learning.

Psychological factors and learning theory principles related to sick-role or illness behavior (Mechanic, 1978; Parsons, 1951) have been proposed as explanations for the development and maintenance of stress-related disorders. The sick-role concept guides the individual's behavior and others' responses toward the individual. The consequences resulting from the individual's sick-role behavior are of particular importance to the development of illnesses. The individual may learn to make responses in terms of behaviors

positively reinforced. Secondary gains or potential benefits from an illness may serve as reinforcement for the patient (Melamed & Siegel, 1980). Mechanic defined illness behavior as the way symptoms are perceived, evaluated, and acted upon by a person who recognizes some pain, discomfort, or other signs of organic malfunction. The inclination to adopt this behavior pattern is considered a learned pattern of behavior influenced by situational contingencies. Sick-role or illness behavior has specific learned components that may contribute to the maintenance of an individual's negative condition.

Individual response patterns during stress have been examined in determining how individuals experience and respond to illness and physical symptoms (Frost, Morgenthau, Reissman, & Whalen, 1986). A two-part study was conducted to test whether individuals with a somatic response pattern would experience a higher frequency of physical symptoms, experience greater sleep disturbance, and utilize health services more frequently. In the first part, somatic and cognitive responding to the experience of stress and anxiety (as measured by the Holmes' [1984] scale), physical symptoms, and sleep disturbance were measured at the end of the subjects' senior year in college. Health service utilization was ascertained by examining the health service records for the subjects' four years in college. In the second part,

somatic and cognitive responding, an expanded set of physical symptoms and depression were measured at the beginning of another group of subjects' freshman year. Health service use was ascertained by health service records at the end of the freshman year. The results supported the hypothesis that somatic responding to stress is associated with a greater frequency of physical symptoms, sleep disturbance and health service use. These findings could not be attributed to general anxiety or depression, although controlling for depression reduced the difference between high and low somatic responders in health service use.

Studies of IBS and tension headache have suggested that these stress-related disorders may not be fully explained by the proposed physiological mechanisms of action (Latimer, Sarna, Campbell, Latimer, Waterfall, & Daniel, 1981; Holroyd, Penzein, Hursey, Tobi, Rogers, Holm, Marcille, Hall, & Chila, 1984; Borgeat, Hade, Elie, & LaRouche; 1984). The proposed mechanisms for IBS and tension headache are colonic motility and sustained muscle contraction, respectively.

Both psychological and physiological factors have been implicated in the presence and exacerbation of symptoms. Further research needs to give greater consideration to the psychological factors implicated in IBS in addition to physiological factors.

Consideration of psychological and physiological factors

is also necessary in studying the etiology and treatment of tension headache. Tension headache patients have increasingly been treated by psychological methods (Blanchard et al., 1984). EMG biofeedback, relaxation training, and psychotherapy have been demonstrated as effective treatment procedures. In addition, consideration should be given to cognitive changes in improvement of headaches. The physiopathology of tension headaches remains undetermined. As with IBS, tension headaches is a complex biopsychosocial phenomenon.

Psychological factors of learned illness behavior and differential sensitivity to physical symptoms are proposed to account, in part, for functional somatic symptoms. Given that a physical component exists in functional somatic symptoms, the behavioral response to the symptoms may depend on the differential perception and interpretation of the symptoms. Thus, physical symptoms (whether it be a cold, headache, or physical injury, etc.,) may result in increased attention, sensitivity, and learned behavior in response to physical symptoms in the future. Thus, increased sensitivity to symptoms may increase the likelihood of experiencing symptoms.

The present study examined behavioral responses and cognitive beliefs and interpretations in the experience of functional somatic symptoms. Cognitive interpretations and

beliefs include perceived susceptibility to and severity of a given illness, beliefs in the benefits (efficacy) of action taken, perceived barriers to performing the recommended behavior, and beliefs about capabilities of performing specific behaviors. The second part of the study was designed to monitor physical symptoms experienced and behavioral responses associated with these symptoms in groups reported to be high and low in functional somatic symptoms.

The following three hypotheses were evaluated in Study 1. Individuals who experience increased functional somatic symptoms would be predicted by their behavioral response to physical symptoms, health beliefs, stress, self efficacy, actual and ideal health protective behaviors, attitudes toward health protective behaviors, pain tolerance, and social support.

More specifically, individuals high on functional somatic symptoms were expected to respond sooner to physical symptoms and to respond with self-care, turning to significant others, and seeking medical attention behavioral responses in health-related situations. Individuals scoring lower on functional somatic symptoms were expected to respond to health-related situations by doing nothing. Higher levels of health beliefs (susceptibility, severity and barriers and lower on benefits) and stress and lower levels of self-efficacy, health protective behaviors, pain tolerance, and social support were

expected to predict individuals scoring higher on functional somatic symptoms.

In Study 2, symptoms and behavioral responses reported by selected subjects in Study 1 were validated by comparison with daily self-report of symptoms and behavioral responses over a two-week period of time. In addition, the following two hypotheses were evaluated. Individuals scoring higher on selected functional somatic symptoms (headache, backache, stomach pain, and diarrhea/constipation) were expected to report experiencing a greater amount of functional somtic symptoms and illness symptoms. Individuals scoring lower on selected functional somatic symptoms were expected to report experiencing no symptoms. Individuals scoring higher on selected functional somatic symptoms were also expected to respond to the experience of functional somatic symptoms and illness symptoms with behavioral responses of self-care, turning to significant others, and seeking medical attention more often than individuals lower on selected functional somatic symptoms. Individuals lower on selected functional somatic symptoms were expected to respond to functional and illness symptoms by doing nothing.

Study 1

Method

Subjects.   Two-hundred and eighty undergraduate students (177
female, 103 male) consented to participate in this study.
Subjects ranged in age from 17 to 39 years with a mean age of
18.73 (SD = 1.70).   See Table 1 for demographic information.

Insert Table 1 about here

Measures and Procedures.

     The following measures were given in one-hour mass
testing sessions: the SUNYA revision of Psychosomatic Symptom
Checklist (Cox, Freudnlich, & Meyer, 1975) and the Life
Experiences Survey (Sarason, Johnson, & Siegel, 1978).

     A measure of health beliefs was constructed, based on
the Health Belief Model (Janz & Becker, 1984), which predicts
health action from 1) perceived susceptibility to given
illness, 2) severity of a given illness, 3) beliefs in the
benefits of recommended health action to reduce threat of
illness (efficacy) and, 4) perceived barriers to (costs of)
performing the recommended behavior.

     Self-efficacy was assessed by a scale developed from
Bandura's (1977) theory.   This measure consisted of
behavioral statements related to symptoms and illness.
Individuals rated their level of confidence in performing

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given responses to illness situations.

A three-part Health Protective Behaviors questionnaire was developed based on Harris and Guten's (1979) 30 health-protective activities. Individuals rated the behaviors in terms of personal attitude toward health protective behaviors, actual behaviors performed, and how they rate their ideal behavior.

Pain tolerance was assessed by self-report of predicted behavioral response to physical symptoms. Individuals rated the level of discomfort at which they would respond in a specified way to physical symptoms experienced. Social support also was assessed by a Likert-type scale.

Test-retest reliability correlations for the developed scales (Health Beliefs, HRBRQ, Self-efficacy, Health Protective Behaviors, Pain Tolerance, and Social Support) previously described ranged from .55 to .97 with an average reliability coefficient of .84. Testing sessions were one week apart. The Health Beliefs Questionnaire and the Health-Related Behavioral Response Questionnaire are categorized by major components.

All reliability coefficients were above .70, with the exception of the susceptibility component of the Health Belief Model (r = .55) and the social support questionnaire (r = .58). Internal consistency measures of reliability resulted in alpha coefficients of .78 for susceptibilty and

.81 for social support.

The Health-Related Behavioral Response Questionnaire
(HRBRQ; Sikkema, 1988) measured the type of predicted
behavioral response to physical symptoms in health-related
scenarios. The categorical dimensions of behavioral
responses were 1) self-care behaviors; 2) turning to
significant others; 3) seeking medical attention; 4) doing
nothing. The reliability analysis produced coefficient
alphas of .80, .86, .74, and .90 for each of these
categories, respectively. Intercorrelation coefficients
ranged from -0.04 to 0.46, with an average coefficient of
.26. The matrix of intercorrelations supported the validity
of these four categories as distinct types of behavioral
responses. The test-retest reliability correlation of the
HRBRQ was .97.

Results

A significant difference was found for the number of
males and females in high, medium, and low groups of
functional somatic symptoms as reported on the PSC (X^2 (2) =
15.86, p < .01). There were more females in the high and
medium groups and more males in the low group. Therefore,
separate analyses were carried out for males and females.

Multiple Regression

A stepwise multiple regression analysis was carried out,
using the psychosocial variables assessed in the
questionnaires to predict overall functional somatic
symptoms. The variables listed in Table 2 accounted for 18%
and 41% of the variance for females and males, respectively.
All changes in F were significant between each consecutive
step at the .01 level of significance.

Insert Table 2 about here

Significant predictors of functional somatic symptoms
differed for females and males. The best predictor for males
was the amount of stress experienced which accounted for 20%
of the variance. Health beliefs, social support and the
medical behavioral response were also predictors of
functional somatic symptoms. Social support and the
behavioral response of seeking medical attention were

negatively related to overall functional somatic symptoms. Health beliefs was the most significant predictor of functional somatic symptoms for females, with stress and medical behavioral response also significant predictors.

Since health beliefs was a significant predictor variable, a second stepwise multiple regression analysis was carried out using the four components (severity of illness, susceptibility to illness, benefits of health care, and barriers to seeking health care) of health beliefs as separate predictor variables. Perceived susceptibility to illness and disease and perceived barriers to seeking medical attention were found to be the significant components of health beliefs. The variables listed in Table 3 accounted for 25% and 35% of the variance for females and males, respectively. All changes in F were significant between each consecutive step at the .05 level of significance.

Insert Table 3 about here

The amount of stress experienced remained as the most significant predictor of functional somatic symptoms for males and perceived susceptibility to illness and disease was the most predictive health belief for females. In addition to perceived susceptibility, perceived barriers to seeking medical attention were significant predictors for males. The

level of pain tolerance was also predictive of functional somatic symptoms experienced for males.

Discriminant Analyses

A discriminant analysis was performed to differentiate groups high and low on level of functional somatic symptoms. Groups were defined as the upper 33% and lower 33% as assessed by the Cox Psychosomatic Checklist. The following significant predictor variables were entered into the analysis: 1) gender; 2) perceived susceptibility to illness and disease; 3) perceived severity of illness and disease; 4) perceived barriers to medical attention; 5) total stress; 6) behavioral response of seeking medical attention; 7) pain tolerance; and 8) social support. This significant discrimination function (Wilks' lambda = .62, $X^2(8) = 80.83$, $\underline{p}$ < .001) correctly classified 81.25% of the cases (79.3% of low somatic symptoms, 83.0% of high somatic symptoms). Separate analyses of males and females with gender removed as a predictor variables resulted in 79.81% and 82.86% correct classification for females and males, respectively. Thus, psychosocial variables indicated differentiated groups high and low on functional somatic symptoms with the exclusion of gender.

Analysis of Variance

Oneway analyses of variance were computed to compare the types of behavioral responses as predicted by the HRBRQ among

females and males in groups high and low on functional

somatic symptoms. A significant difference was found in the

turning to significant other behavioral response category

($F(3) = 5.32$, $p < .002$). Tukey's post hoc test found

differences between females and males in the low group and

also between males in the low group and females in the high

group. Females in both groups indicated a greater likelihood

of turning to a significant other in health-related

situations. A significant difference was also found in the

summation of all behavioral response categories (self-care,

turning to a significant other, seeking medical attention),

($F(3) = 4.34$, $p < .006$). Tukey's post hoc test found

differences in males in the low group and females in the high

group. Females in the high group indicated a greater

likelihood of all types of behavioral responses in health-

related situations than males in the low group.

Study 2

Method

Subjects.   Sixty-two undergraduate students (44 female, 18 male) consented to participate in this continuation study of Study 1.   Subjects ranged in age from 17 to 22 years with a mean age of 18.59 (SD = .99).   See Table 4 for demographic information.

Insert Table 4 about here

Selection Criteria.   Selection criteria were based on self-report of four functional somatic symptoms reported in the Psychosomatic Symptom Checklist (PSC; Cox, Freudnlich, & Meyer, 1975).   These symptoms included headache, backache, stomach pain, and diarrhea/constipation.   These symptoms were summed and the upper and lower 12% were selected to participate in this study.   (See Table 5).

Insert Table 5 about here

Procedures. Subjects consented to monitor their experience of physical symptoms and behavioral responses to these symptoms daily for a two-week time period on self-monitoring forms provided to them.   (See Appendix A2).   Subjects recorded any physical symptoms (e.g. headache, stomachache, diarrhea,

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menstrual discomfort) or any illness (e.g. cold, sore throat, flu, mononucleosis) experienced and the severity of the symptom or illness. Subjects also recorded what they did in response to the symptom or illness (e.g. go to bed, ignore symptoms, take medication, exercise, change diet, talk to friend or relative, go to infirmary, etc.)

Results

Validity of the Psychosomatic Symptom Checklist

The validity of the Psychosomatic Symptom Checklist was examined by comparing it to the self-monitoring report on a day-to-day basis. The average number of symptoms reported during the two-week self-monitoring period are outlined in Table 6.

Insert Table 6 about here

Pearson Correlations

The report of symptoms experienced on the daily self-monitoring form were correlated with the self-report of symptoms assessed by the Psychosomatic Symptom Checklist (Cox, Freudnlich, & Meyer, 1975) in Study 1. (See Table 7). These will be referred to as functional symptoms based on there inclusion in the PSC. See Table 7. The remaining symptoms will be referred to as illness symptoms.

Insert Table 7 about here

Significant correlations were found between experience of selected criteria symptoms and those symptoms as reported on the PSC. These correlations remained significant for females whereas the experience of headache was the only

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significant correlation for males. A significant correlation was found between functional symptoms experienced and psychosomatic symptoms reported on the PSC (r = .58, p < .001). A significant negative correlation was found between experience of no symptoms and psychosomatic symptoms reported (r = -.53, p < .001).

Analysis of Variance

Oneway analyses of variance were completed to compare the experience of symptoms among the groups high and low on the various types of symptoms. The results are presented in Table 6. A significant difference between groups was found on the experience of functional symptoms and the experience of no symptoms. A significant difference was found on the experience of headache, stomachache, and muscle pain. Individuals in the high functional somatic symptom group reported a greater number of the symptoms selected for classification into this group. The low frequency of occurrence of fatigue/dizziness, diarrhea/constipation, and anxiety/depression may account for the nonsignificant results.

Validity of the Health-Related Behavioral Response Questionnaire

The validity of the Health-Related Behavioral Response Questionnaire (HRBRQ; Sikkema, 1988) was examined by the self-monitoring report on a day-to-day basis. The average

number and type of behavioral responses to symptoms reported
during the two-week self-monitoring period are outlined in
Table 8.

Insert Table 8 about here

The behavioral responses (self-care, turning to a
significant other, medical attention, and doing nothing)
reported on the daily self-monitoring form were correlated
with the type of predicted behavioral response as assessed by
the HRBRQ. Correlations were computed for functional and
illness symptoms for both males and females. The only
significant correlations were found between the medical
behavioral response for functional symptoms experienced with
the predicted response of seeking medical attention on the
HRBRQ (r = .366, p < .01) and a negative correlation between
the self-care behavioral response to functional symptoms
experienced and the predicted self-care response in the
situations on the HRBRQ (r = -.577, p < .01) for males only.
No other significant correlations were found.

Analysis of Variance

Oneway analyses of variance were completed to compare
the types of behavioral responses to symptoms among the
groups high and low on selected functional somatic symptoms.
A significant difference was found between groups in the

self-care behavioral response to symptoms ($F(1) = 15.55$, $p < .001$). Individuals high on selected functional symptoms reported a greater amount of self-care behavioral responses. Females in the high symptom group differed significantly from females in the low symptom group and from males in the low symptom group ($F(3) = 5.03$, $p < .004$). Females in the high symptom group reported a greater amount of self-care behavioral responses to all symptoms. The low frequency in reporting of turning to a significant other and seeking medical attention behavioral responses may account for their lack of significance.

A significant difference was found between groups in the self-care behavioral responses to functional symptoms ($F(1) = 20.30$, $p < .001$). Individuals with high symptoms reported more of these type of responses to functional symptoms. The behavioral responses to functional symptoms appear to account for the significant results in the experience of all symptoms.

Within Group Comparisons

T-tests were computed to compare the types of behavioral responses to functional and illness symptoms within each of the groups high and low on functional somatic symptoms. A significant difference was found within the high functional somatic symptom group in self-care behavioral responses ($t(30) = 3.90$, $p < .001$) and in seeking medical attention

behavioral responses ($\underline{t}(30) = -2.29$, $\underline{p} < .03$) to functional symptoms and illness symptoms. Individuals high on functional somatic symptoms reported more self-care behaviors and fewer medical responses to functional symptoms. No differences were found within the low functional somatic symptom group in the types of behavioral responses to functional symptoms and illness symptoms.

Discriminant Analysis

A discriminant analysis was performed using the same variables as the analyses completed in Study 1. Variables entered included the following: 1) perceived susceptibility to illness and disease; 2) perceived severity of illness and disease; 3) perceived barriers to medical attention; 4) total stress; 5) behavioral response of seeking medical attention; 6) pain tolerance; and 7) social support. This significant discrimination function (Wilks' lambda = .52, $X^2(7) = 35.57$, $\underline{p} < .001$) correctly classified 86.67% of the grouped cases (82.8% of low somatic symptoms, 90.3% of high somatic symptoms). Separate analyses of males and females 83.72% and 88.24% correct classification for females and males, respectively.

Discussion

The development and maintenance of stress-related
disorders involves the interaction of biological,
psychological, and social factors in the experience of
functional somatic symptoms. The role of psychological
factors in addition to physiological factors in the
relationship between stress and the experience of somatic
symptoms (Kellner, 1985) was supported in this study. A
comparison of groups differing on levels of functional
somatic symptoms on psychosocial variables, experience of
symptoms, and behavioral responses to those symptoms provided
support for the biopsychosocial approach to stress-related
disorders.

The hypotheses that individuals who experience increased
functional somatic symptoms would be predicted by higher
levels of health beliefs related to susceptibility and
severity of illness and the benefits and barriers of seeking
health care, greater amounts of stress, and lower levels of
social support were supported. These individuals were also
predicted by a lesser likelihood of indicating a behavioral
response of seeking medical attention in health-related
situations. Increased levels of pain tolerance as a
predictor of the experience of functional somatic symptoms in
males was also an unexpected finding. Individuals higher on
selected functional symptoms (headache, backache, stomach

pain, and diarrhea/constipation) did report experiencing a greater amount of functional symptoms but not illness symptoms and differed in self-care and medical behavioral responses to functional symptoms from individuals lower on selected functional symptoms.

The concept of learned illness behavior (Mechanic, 1978) was partially supported by the symptoms and behavioral responses monitored in Study 2. Individuals identified as high on selected functional somatic symptoms did perceive, label, and thus experience more symptoms than the low group and were more likley to respond to functional symptoms with self-care behaviors. The notion of somatic responding to stress with an increased experience of physical symptoms and health service use proposed by Frost, Morgenthau, Reissman, and Whalen (1986) was partially supported. Individuals high on functional symptoms in this study reported more experience of symptoms but were less likely to seek medical attention in response to their symptoms.

Effects of Gender

A gender difference was found between groups scoring high, medium, and low on functional somatic symptoms. Psychosocial variables predictive of functional somatic symptoms differed between males and females, with the prediction for males accounting for larger portion of the variance.

The best predictor of experience of functional somatic symptoms in males was the amount of stress experienced. This supports the notion of gender-role conflict and health care problems in males. O'Neil (1982) defined these health care problems as difficulties in maintaining positive health in terms of diet, exercise, relaxation, sickness, and stress management. Men reportedly have been socialized to ignore the physical symptoms that lead to illness and chronic health problems. Some men have limited body awarness which prevents them from understanding and being sensitive to their somatic functions, changes, or physiological processes; ignoring messages of internal stress or symptoms of sickness. Also, males often keep their stresses to themselves rather than expressing emotions. Emotions that are not expressed verbally or behaviorally may be released through physical pain and illness (Mayer, 1978).

Stress being the most significant predictor of functional somatic symptoms experienced for males, health beliefs of perceived susceptibilty to illness and disease and perceived barriers to seeking medical attention were also predictive. A dynamic interaction of experience of symptoms in the past month with perceived susceptibility and perceived barriers to health care was indicated in the experience of stress-related symptoms. Higher levels of pain tolerance being predictive of functional somatic symptoms suggested

that males do not report symptoms until pain is at a highly intolerable level. The gender role difference was further supported by self-monitoring report of fewer symptoms and the lack of behavioral responses to those symptoms. However, it is uncertain as to whether males do not actually experience symptoms or whether physical changes and symptoms are just not attended to and thus not reported.

Females reported a greater amount of functional somatic symptoms and thus may respond to psychological factors and physical symptoms in a manner different than males. Perceived susceptibilty to illness and disease was the most significant predictor of functional somatic symptoms experienced in the past month for females. The belief that one is susceptible to physical symptoms or illnesses may contribute to the development and maintenance of stress-related disorders. Females who have recently experienced symptoms may expect to experience more symptoms in the future or feel more susceptible given the recent experience of symptoms; support for dynamic interaction in the development of stress-related disorders. This may develop into a vicious cycle resulting in an inappropriately passive response to the experience of physical changes and symptoms. The amount of stress experienced and the lack of seeking medical attention in response to health-related situations was also predictive of functional somatic symptoms in females.

Females were more likely to report a greater amount of functional somatic symptoms, and also more likely to predict some type of behavioral response in a health related situation; particularly turning to a significant other. In the self-monitoring of symptoms and behavioral responses, individuals high on functional somatic symptoms reported more self-care behaviors and fewer medical responses to functional symptoms. Females were more likley to report a greater amount of self-care behavioral responses to symptoms.

These results support the stereotypic gender-role differences in the experience of symptoms and response to those symptoms and suggest the notion of learned helplessness (Peterson & Seligman, 1984) in the explanation of the gender differences. Females may believe they are more susceptible to illness and respond differently to stress experienced. Following from learned helplessness, individuals may feel that their experience of symptoms is uncontrollable and respond with maladaptive passivity. Given the self-care behavioral responses to symptoms and the lack of responding to symptoms by seeking medical attention, learned helplessness may be a result of previous medical experience and the inability to treat functional somatic symptoms. These individuals may be familiar with their symptoms and somatic experiences and attribute their etilogy factors not remedied by medical attention, thus the learned self-care

responses.

Another explanation is that females report a greater
amount of symptoms and are more attentive to physical changes
and somatic experiences. Females are more likely to express
emotions that males and thus turn to significant others in
response to health-related situation. This supports the
cyclic nature of stress-related disorders and the concept of
learned illness behavior. Females attend to, perceive, label
and experience more symptoms and are more likely to receive
reinforcement and secondary gain from significant others.

This study supports the interactional nature of
cognitions, behaviors, emotions, and physiological
experiences in the maintenance of stress-related disorders.
Cognitions and behaviors contribute to the self-fulfilling
aspect of functional somatic symptoms as they develop into
stress-related disorders of a chronic nature. An
understanding of the development and treatment of stress-
related disorders is best approached from a biopsychosocial
perspective.

One limitation of this study was the subjects were
college students mass tested in groups. To insure the data
was truthful and reliable, subjects' progress in completing
the questionnaires was monitored and assurances were given
that confidentiality would be maintained. College students
were selected for study because they experience a variety of

functional symptoms, many of which might develop into stress-
related disorders.

Subjects were divided into high and low groups based on
self-report. However, in Study 2 the initial self-report was
validated by subjects' daily report of symptoms experienced
over a two-week period. Subjects were not told why they were
selected (e.g. into high and low somatic symptoms) in an
attempt to guard against this biasing their report of
symptoms.

Another limitation is that the type of behavioral
response found to be significant in Study 2 may be a result
of the experience of more symptoms. Individuals selected for
the high group of symptoms did report more symptoms and
therefore, the number and type of behavioral responses may be
an artifact of the number of symptoms experienced.

The HRBRQ was only partially supported by the self-
monitoring report. The difficulty may be with the
inconsistency of the type of forms; the questionnaire being a
forced choice rating for each type of behavioral response and
the self-monitoring for being open-ended. At this stage of
development, it was necessary to keep the monitoring form
open-ended for purposes of information gathering. Revisions
may include options on the HRBRQ and a checklist format for
the self-monitoring form.

Further research is needed to support the notion that a

behavioral response to a physical symptom, illness symptoms in particular, furthers the development of stress-related disorders. Validation of the questionnaire was not completely supported by the self-monitoring of symptoms and behavioral responses on a day-to-day basis.

This study did support the inclusion of psychological factors in addition to physiological components in understanding stress-related disorders. Psychosocial variables predictive of functional somatic symptoms differed between males and females. Following a gender-role pattern, the amount of stress experienced and health beliefs were most predictive for males and females, respectively. Given the importance of beliefs and behavioral responses, implications for treatment of stress-related disorders would include altering behavior patterns and cognitive restructuring.

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Table 1

Demographic Information

	Gender		Age		Race				
	Female	Male	Mean Age	Std Dev	White	Chicano	Asian	Black	Unknown
Group 1 (Low Number of Symptoms)	42	48	18.88	2.47	69	10	7	4	0
Group 2 (Medium Number of Symptoms)	66	27	18.61	1.02	86	3	2	1	1
Group 3 (High Number of Symptoms)	69	28	18.71	1.31	88	3	1	4	1
Total	177	103	18.73	1.70	243	16	10	9	2

Table 2

Stepwise Multiple Regression Findings for Level of Somatic

Distress

Females

			R^2
Step 1	Health Beliefs:	.09
Step 2	Total Stress:	.13
Step 3	Medical Response:	.18

Males

			R^2
Step 1	Total Stress:	.20
Step 2	Health Beliefs:	.30
Step 3	Medical Response:	.36
Step 4	Social Support:	.41

Table 3

Stepwise Multiple Regression Findings for Level of Somatic

Distress with Individual Health Beliefs

Females

			R^2
Step 1	Susceptibility:		.20
Step 2	Total Stress:		.23
Step 3	Medical Response:		.25

Males

		R^2
Step 1	Total Stress:	.20
Step 2	Susceptibility:	.28
Step 3	Barriers to Medical Attention:	.32
Step 4	Pain Tolerance:	.35

Table 4

Demographic Information

	Gender		Age		Race		
	Female	Male	$\bar{X}$	SD	White	Asian	Black
High symptoms	25	6	18.65	1.02	29	1	1
Low symptoms	19	12	18.55	1.00	24	7	0

Table 5

Selection Criteria

	High symptoms			Low symptoms		
	Mean	Range	SD	Mean	Range	SD
Total PSC Score	87.32	50-125	17.43	29.58	17-68	11.49
Selected Symptoms	31.97	27-51	5.66	5.84	4-7	1.70

Table 6

Experience of Symptoms

	High Symptoms		Low Symptoms		Oneway ANOVA	
	Mean	SD	Mean	SD	F	p
Functional Symptoms	9.29	3.69	4.45	7.62	24.25	.0000
Headache	3.45	2.36	1.26	1.46	19.32	.0000
Stomachache	1.87	2.06	.94	1.06	5.04	.0284
Muscle pain	1.48	1.79	.52	1.06	6.73	.0119
Fatigue/Dizziness	1.32	1.85	1.48	2.92	.07	ns
Diarrhea/Constipation	.87	2.38	.10	.30	3.24	.0770
Anxiety/Depression	.29	1.01	.16	.74	.33	ns
Illness Symptoms	6.90	7.07	4.71	8.16	1.28	ns
Cold/Sore throat	5.45	6.04	4.10	7.62	.60	ns
Ears/Teeth/Eyes	.52	1.88	.19	.60	.83	ns
Infections	.48	1.55	.07	.36	2.16	ns
Allergies	.45	1.29	.36	1.64	.07	ns
Menstrual Symptoms	.74	1.21	.45	1.21	.89	ns
No Symptoms	3.26	2.53	7.81	4.07	27.93	.0000

Table 7

Correlations of Monitored Symptoms with PSC

	All Subjects	Females	Males
	r	r	r
Diarrhea/Constipation	.60**	.63**	ns
Headache	.57**	.54**	.56**
Stomachache	.52**	.60**	ns
Backache	.40**	.42*	ns
Fatigue/Dizziness	ns	ns	ns
Depression	ns	ns	ns

Table 8

Analysis of Variance for Behavioral Responses

	High Symptoms		Low Symptoms		Oneway ANOVA	
	Mean	S.D.	Mean	S.D.	F	p
Functional Symptoms						
Self-care	5.90	3.88	2.32	2.12	20.30	.0000
Significant other	.26	.68	.10	.40	1.30	ns
Medical attention	.52	1.23	.16	.45	2.25	ns
Do nothing	3.35	2.70	2.03	2.90	3.45	.0683
Illness symptoms						
Self-care	2.58	3.81	1.29	2.65	2.40	ns
Significant other	.16	.38	.06	.36	1.08	ns
Medical attention	2.45	4.41	2.19	6.90	.03	ns
Do nothing	2.16	2.48	1.84	3.06	.21	ns

Appendix A

Appendix A1
Consent Forms

44

<u>Assigned Subject #</u>

Consent Form A

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 social dimensions. I understand that some of the questions may be of a personal nature, and I do not have to answer any questions that make me uncomfortable. I understand that I may discontinue my participation in this study at any time. These tests should take less than 2 hours total to complete. I will be given 2 credits for my participation, which I will receive at the completion of the testing session.

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 corner.

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

Kathy Sikkema, 961-5388
Dr. Debra Neff, 961-5819

or to the chair of the Human Subjects Research Committee:

Dr. Steve Zaccaro, 961-7916

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

Signature _____

I.D. #   _____

Sex: Male   Female

Age: _____

<u>Assigned Subject #</u> _____

Consent To Be Contacted

We are conducting a second study this quarter that gives <u>2 credits</u>. If you are interested in participating in this study, you need to give consent. This form, which contains your name and subject number, will be kept separate from your questionnaires to assure confidentiality.

_____ No, I am not willing to be involved in the second study. (Please do not write your name below.)

_____ Yes, I am willing to be involved in the second study. (Please write your name below.)

Name _____

I.D. # _____

Phone # _____

_____

Best Hours to Call _____

_____

_____

Your consent to be involved in further study does not guarantee your involvement in the second study.

There are no apparent risks associated with this study.

Every attempt will be made to maintain confidentiality.

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

> Kathy Sikkema, 961-5388
> Dr. Debra Neff, 961-5819

or to the chair of the Human Subjects Research Committee:

> Dr. Steve Zaccaro, 961-7916

Assigned Subject #_____

Consent Form B

I understand that I am participating in a study designed to investigate factors in the development of certain illnesses. I will be asked to monitor my experience of physical symptoms, illnesses, behavioral responses, and emotional states. I understand some of the items may be of a personal nature and I do not have to respond to any items that make me feel uncomfortable. I understand that I may discontinue my participation in this study at any time. I will be given 3 credits for my participation, which I will receive after self-monitoring for a two week period.

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 corner.

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

    Kathy Sikkema, 961-5388
    Dr. Debra Neff, 961-5819

or to the chair of the Human Subjects Research Committee:

    Dr. Steve Zaccaro, 961-7916

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

Signature _____ _____

I.D. # _____

Sex: Male   Female

Age: _____

Assigned Subject #____

Consent Form

I understand that I am participating in a study designed to investigate health-related behaviors and attitudes. I will be required to take a number of psychological tests during two different testing sessions. I understand some of the questions may be of a personal nature and I do not have to answer any question that makes me uncomfortable. Testing sessions will be approximately one week apart. Each session will last approximately one hour. The entire time spent on this study will be less than two hours. I will receive 2 extra credits for participating in this study.

There are no apparent risks associated with this study.

I understand that I can withdraw from participation in this study at any time.

I understand that it is the intent of the principal investigator to maintain the confidentiality of records identifying subjects in this study. Names of individual subjects will be on the consent forms along with subjects numbers. All data will be identified through the subject number. Therefore, no names will be on the psychological tests.

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

        Kathy J. Sikkema   961-5388
        Dr. Debra F. Neff   961-5819

Or the chair of the Human Research Committee:

        Dr. Steve Zaccaro   961-7916

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

Signature: _____   I.D.# _____

Phone: _____   Address: _____

Appendix A2
Self-Monitoring Form

Week # _____   Assigned Subject # _____

In this section, I am interested in your daily experience of physical symptoms.

A. Did you experience any physical symptoms (e.g. headache, stomachache, diarrhea, menstrual discomfort) or any illness (e.g. cold, sore throat, flu, mono)?

B. Rate the severity of the symptom or illness on the following scale:

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7
    slight   moderate   severe   debilitating

C. Write in what you did about the physical symptom or illness (e.g. go to bed, ignore symptoms, take medication, exercise, change diet, talk to friend or relative, go to infirmary, etc.)?

Date	Symptom or Illness	Rating	Response
_/ /87			
_/ /87			
_/ /87			
_/ /87			
_/ /87			
_/ /87			
_/ /87			

Appendix A3
Demographic Information

Instructions: Read each question carefully. Using
the scale provided with each question, fill in the
appropriate circle completely.

1. Write in your AGE here: _____

3. SEX:
    (1=female, 2=male)--
4. RACE:
    (1=Black, 2= White, 3=Chicano, 4=Asian, 5=Other)---------------------
5. Your EDUCATION LEVEL: (1= less than high school; 2= high school; 3= college freshma
    4= college sophomore; 5= college junior; 6= college senior; 7= graduate)------
6. FATHER'S EDUCATION: (1= less than high school; 2= high school; 3= some college;
    4= completed college; 5= graduate)------------------------------
7. MOTHER'S EDUCATION: (1= less than high school; 2= high school; 3= some college;
    4= completed college; 5= graduate)------------------------------
8. Yearly FAMILY INCOME: (1=less than $10,000/year; 2= 10-$20,000; 3= 20
    $30,000; 4= 30-$40,000; 5= 40-$50,000; 6= more than $50,000/year)--
9. NUMBER OF CHILDREN IN YOUR FAMILY (including yourself):
    (if > 10 fill in circle 10 and write the number here: ____) ---------------
10. WHERE DO YOU FALL IN THE FAMILY ORDER?
    (1=first (or only child); if > tenth, fill in 10 and write the number here: _____

11. ARE YOU ADOPTED? (1= no, 2=yes)-----------------------------

12. FATHER'S OCCUPATION: (write in here: _____

13. MOTHER'S OCCUPATION: (write in here: _____

Appendix A4
Psychosomatic Symptom Checklist

This questionnaire is to be filled out in two ways. Please note the instructions.

SYMPTOM CHECKLIST

DIRECTIONS: On your opscan sheet, indicate the <u>frequency</u> and <u>intensity</u> of the followig symptoms, if you have experienced them in the <u>past month</u>, according to the scales below.

<u>Frequency Scores</u>
1. not a problem
2. occurs about once a month
3. occurs about once a week
4. occurs several times a week
5. occurs daily

<u>Intensity Scores</u>
1. not a problem
2. slightly bothersome when is occurs
3. moderately bothersome when it occurs
4. severely bothersome when it occurs
5. extremely bothersome when it occurs

	<u>Frequency</u>	<u>Intensity</u>
Headaches	1._____	2._____
Backaches	3._____	4._____
Gastric ulcer	5._____	6._____
Stomach pain	7._____	8._____
Asthma	9._____	10._____
Spastic colitus	11._____	12._____
Insomnia	13._____	14._____
High blood pressure	15._____	16._____
Fatigue	17._____	18._____
Depression	19._____	20._____
Nausea	21._____	22._____
General stiffness	23._____	24._____
Heart palpitation	25._____	26._____
Eye pain associated with reading	26._____	27._____
Diarrhea/constipation	28._____	29._____
Dizziness	31._____	32._____
Weakness	33._____	34._____

This questionnaire is to be filled out in two ways. Please note the instructions.

SYMPTOM CHECKLIST

DIRECTIONS: On your opscan sheet, indicate the <u>frequency</u> and <u>intensity</u> of the following symptoms, if you have <u>ever experienced them in your life</u>, according to the scales below.

<u>Frequency Scores</u>
1. not a problem
2. occurs about once a month
3. occurs about once a week
4. occurs several times a week
5. occurs daily

<u>Intensity Scores</u>
1. not a problem
2. slightly bothersome when is occurs
3. moderately bothersome when it occurs
4. severely bothersome when it occurs
5. extremely bothersome when it occurs

	<u>Frequency</u>	<u>Intensity</u>
Headaches	1._____	2._____
Backaches	3._____	4._____
Gastric ulcer	5._____	6._____
Stomach pain	7._____	8._____
Asthma	9._____	10._____
Spastic colitus	11._____	12._____
Insomnia	13._____	14._____
High blood pressure	15._____	16._____
Fatigue	17._____	18._____
Depression	19._____	20._____
Nausea	21._____	22._____
General stiffness	23._____	24._____
Heart palpitation	25._____	26._____
Eye pain associated with reading	26._____	27._____
Diarrhea/constipation	28._____	29._____
Dizziness	31._____	32._____
Weakness	33._____	34._____

Appendix A5
Health-Related Behavioral Response Questionnaire

Rate how likely you would be to respond to the described situation in the following way by marking the scale with a slash (/).

1. For the past three days you have had a runny nose and are feeling run down.

Plan to take care of self better.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Ask a friend for help or advice.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Go to the infirmary or a doctor.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

2. You have had a cold for four days. The cold has continually gotten worse since the first day you were feeling poorly.

Change diet in some way to include healthier foods, particularly more fluids.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Contact family member or someone close to you.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

See a doctor after 48 hours if little or no improvement.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Rate how likely you would be to respond to the described situation in the following way by marking the scale with a slash (/).

3. You have developed a headache over the course of the day. Your head and neck muscles feel tight and pressured.

      Discuss your distress with a friend.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      Go to the infirmary or a doctor.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      Initiate or continue regular exercise.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      Do nothing.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

4. You have developed a stomach ache and are feeling nauseous. You are feeling tired and know that the flu has been going around.

      Check with friends for similar symptoms.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      See a doctor within 24 hours if little or no improvement.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      Take stomach medicine.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

      Do nothing.

       1-----2-----3-----4-----5-----6-----7
not likely   very likely

Rate how likely you would be to respond to the described situation in the following way by marking the scale with a slash (/).

5.   You felt terrible when you woke up this morning. You feel sick to your stomach and also have a slight headache.

    Take aspirin, Tylenol, and/or stomach medicine.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Contact family member or someone close to you.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Go to the infirmary or a doctor.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Do nothing.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

6.   You have an upset stomach. You have been feeling uptight and are experiencing tightness and pain in your stomach muscles.

    See a doctor within 24 hours if little or no improvement.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Plan to take better care of myself.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Ask friend for help or advice.

    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

    Do nothing.
    1-----2-----3-----4-----5-----6-----7
    not likely   very likely

Rate how likely you would be to respond to the described situation in the following way by marking the scale with a slash (/).

7. During a physical examination, the doctor informed you that your blood pressure is high for your age group.

Contact family member or someone close to you.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Get a second opinion and/or further testing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Change diet to include healthier foods.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

8. You had a complete physical examination and were informed that you have a high level of cholesterol.

Initiate or continue regular exercise.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Ask friend for help or advice.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Consult with physician for changes in diet.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Rate how likely you would be to respond to the described
situation in the following way by marking the scale with
a slash.

9. While waiting in the doctor's office you notice a
chart which indicates you are ten pounds overweight.

     Join an athletic club to work out regularly.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Contact family member or someone close to you.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Ask doctor for proper diet plan.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Do nothing.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

10. During an annual physical exam, the doctor informed
you that you have a pre-cancerous condition and must
undergo further testing.

     See a specialist for test and treatment.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Change diet and initiate or continue regular
     exercise.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Contact family member or someone close to you.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

     Do nothing.

     1-----2-----3-----4-----5-----6-----7
not likely   very likely

Rate how likely you would be to respond to the described situation in the following wayby marking the scale with a slash (/).

11. The dentist found two cavities and signs of gum disease during your dental checkup.

Check with others for similar symptoms and see what they would do.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Get a second opinion and/or further examination.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Change diet (cut down on sweets, starchy foods).

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

12. You were in a minor traffic accident and suffered minor injuries.

Take aspirin or Tylenol to relieve pain.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Talk to your friends about the accident.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

See a doctor to have minor injuries examined

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Do nothing.

1-----2-----3-----4-----5-----6-----7
not likely   very likely

Appendix A6
Health Belief Model Questionnaire

BELIEFS ABOUT HEALTH

Rate the likelihood that you will experience each of the
following symptoms in the next 12 months. Next to each
symptom circle the number that most closely indicates the
likelihood of occurrence. The higher the number the more
likely you will experience the identified symptoms.

		Very Unlikely				Very Likely
1.	Runny nose	1	2	3	4	5
2.	Sore throat	1	2	3	4	5
3.	Cold	1	2	3	4	5
4.	Fatigue	1	2	3	4	5
5.	Upset stomach	1	2	3	4	5
6.	Stomach ache	1	2	3	4	5
7.	Flu	1	2	3	4	5
8.	Headache	1	2	3	4	5
9.	Insomnia	1	2	3	4	5
10.	Asthma	1	2	3	4	5
11.	Diarrhea/Constipation	1	2	3	4	5
12.	Muscle pain	1	2	3	4	5

Rate the likelihood that you could get one of the following
diseases in the next five years. Next to each symptom circle
the number that most closely indicates the likelihood of
occurrence of the disease. The higher the number the more
likely it is you could get the disease.

		Very Unlikely				Very Likely
1.	Heart disease	1	2	3	4	5
2.	Stroke	1	2	3	4	5
3.	High blood pressure	1	2	3	4	5
4.	Cancer	1	2	3	4	5

BELIEFS ABOUT HEALTH

Judge the need for medical attention for each of the following symptoms. Next to each symptom circle the number that most closely indicates the need for medical attention. The higher the number the more you feel medical attention is necessary.

		Unnecessary				Necessary
1.	Runny nose	1	2	3	4	5
2.	Sore throat	1	2	3	4	5
3.	Cold	1	2	3	4	5
4.	Fatigue	1	2	3	4	5
5.	Upset stomach	1	2	3	4	5
6.	Stomach ache	1	2	3	4	5
7.	Flu	1	2	3	4	5
8.	Headache	1	2	3	4	5
9.	Insomnia	1	2	3	4	5
10.	Asthma	1	2	3	4	5
11.	Diarrhea/Constipation	1	2	3	4	5
12.	Muscle pain	1	2	3	4	5

Rate how much of an effect each of the following diseases would have on a person's life. Next to each disease circle the number that most closely indicates this effect. The higher the number the greater the effect of the disease on the person's life.

		Mild Effect				Severe Effect
1.	Heart disease	1	2	3	4	5
2.	Stroke	1	2	3	4	5
3.	High blood pressure	1	2	3	4	5
4.	Cancer	1	2	3	4	5

BELIEFS ABOUT HEALTH

State what you think would happen if no medical action was taken for each of the following symptoms. The number corresponds to the result as follows: 1 = go away, 2= stay the same, 3 = become worse.

		Go Away 1	Stay the Same 2	Become Worse 3
1.	Runny nose	1	2	3
2.	Sore throat	1	2	3
3.	Cold	1	2	3
4.	Fatigue	1	2	3
5.	Upset stomach	1	2	3
6.	Stomach ache	1	2	3
7.	Flu	1	2	3
8.	Headache	1	2	3
9.	Insomnia	1	2	3
10.	Asthma	1	2	3
11.	Diarrhea/Constipation	1	2	3
12.	Muscle pain	1	2	3

BELIEFS ABOUT HEALTH

Rate the amount of benefit that might be obtained from
bringing each symptom to the attention of a physician or
health care professional. Next to each symptom circle the
number that most closely indicates the benefit that would be
received. The higher the number the more you feel medical
attention is beneficial.

		Little Benefit				Great Benefit
1.	Runny nose	1	2	3	4	5
2.	Sore throat	1	2	3	4	5
3.	Cold	1	2	3	4	5
4.	Fatigue	1	2	3	4	5
5.	Upset stomach	1	2	3	4	5
6.	Stomach ache	1	2	3	4	5
7.	Flu	1	2	3	4	5
8.	Headache	1	2	3	4	5
9.	Insomnia	1	2	3	4	5
10.	Asthma	1	2	3	4	5
11.	Diarrhea/Constipation	1	2	3	4	5
12.	Muscle pain	1	2	3	4	5

BELIEFS ABOUT HEALTH

Rate the amount of benefit to your health that might be derived from each of the following behaviors. Next to each behavior circle the number that most closely indicates the benefit that would be obtained. The higher the number the more you feel the behavior is beneficial to your health.

		Little Benefit				Great Benefit
1.	Proper diet	1	2	3	4	5
2.	Exercise	1	2	3	4	5
3.	Get enough sleep	1	2	3	4	5
4.	Maintain proper weight	1	2	3	4	5
5.	Regular checkups	1	2	3	4	5
6.	Use dental floss	1	2	3	4	5
7.	Do not drink alcohol	1	2	3	4	5
8.	Take vitamins	1	2	3	4	5
9.	Wear seat belt	1	2	3	4	5
10.	Early treatment of illess	1	2	3	4	5

Rate whether any of the following would be a barrier to your seeking medical attention for any of the physical symptoms listed on page 1. Circle the number that most closely indicates the strength of the perceived barrier. The higher the number the greater the barrier to seeking medical attention.

		No Barrier				Extreme Barrier
1.	Lack of time	1	2	3	4	5
2.	Fear of serious illness	1	2	3	4	5
3.	Laziness	1	2	3	4	5
4.	Cost of medical services	1	2	3	4	5
5.	Availability of services	1	2	3	4	5
6.	Prior experience with medical professionals	1	2	3	4	5

Appendix A7
Self Efficacy Scale

BELIEFS ABOUT HEALTH

Rate how confident you feel in performing the following responses to each illness situation. Next to each response circle the number that most closely indicates the confidence that you would feel. The higher the number the more confident you would feel in responding to the illness in that way.

If you have a <u>cold and sore throat</u>, how confident are you that:

	Not Very Confident			Extremely Confident	

1. You will be able to relax and get some rest.   1   2   3   4   5

2. Rest and relaxation will improve your symptoms.   1   2   3   4   5

3. You will be able to ask a friend to take care of you.   1   2   3   4   5

4. Asking a friend for help will improve your symptoms.   1   2   3   4   5

5. You will go to the infirmary.   1   2   3   4   5

6. Going to the infirmary will improve your symptoms.   1   2   3   4   5

7. You will do nothing about the symptoms.   1   2   3   4   5

8. Doing nothing will improve your symptoms.   1   2   3   4   5

If you have a <u>tension headache</u>, how confident are you that:

9. You will take aspirin, Tylenol, or other medicine.   1   2   3   4   5

10. Taking aspirin, Tylenol, or other medicine will improve your symptoms.   1   2   3   4   5

11. You will call a family member to talk or ask advice.   1   2   3   4   5

	Not Very Confident				Extremely Confident

12. Calling a family member   1   2   3   4   5
     will improve your symptoms.

13. You will go to a medical   1   2   3   4   5
     center.

14. Going to a medical center   1   2   3   4   5
     will improve your symptoms.

15. You will do nothing about   1   2   3   4   5
     the symptoms.

16. Doing nothing will improve   1   2   3   4   5
     your symptoms.

If you have mononucleosis, how confident are you that:

17. You will rest and take   1   2   3   4   5
     care of yourself better.

18. Rest and self care will   1   2   3   4   5
     improve your symptoms.

19. You will contact a family   1   2   3   4   5
     member for advice and
     support.

20. Contact with a family   1   2   3   4   5
     member for advice and
     support will improve your
     symptoms.

21. You will consult a medical   1   2   3   4   5
     professional or specialist.

22. Consultation with a   1   2   3   4   5
     medical professional will
     result in improvement of
     symptoms.

23. You will do nothing about   1   2   3   4   5
     the symptoms.

24. Doing nothing will improve   1   2   3   4   5
     your symptoms.

Appendix A8
Health Protective Behaviors Scales

HEALTH BEHAVIORS

Directions: Indicate how important or unimportant you feel each of the following behaviors is to maintain good health. The higher the number the more important you feel the behavior is to good health.

		Very Unimportant			Very Important	
1.	Eat sensibly.	1	2	3	4	5
2.	Get enough exercise.	1	2	3	4	5
3.	Get enough sleep.	1	2	3	4	5
4.	Get enough relaxation.	1	2	3	4	5
5.	Watch one's weight.	1	2	3	4	5
6.	Don't smoke.	1	2	3	4	5
7.	See a doctor for regular checkup.	1	2	3	4	5
8.	Do things in moderation.	1	2	3	4	5
9.	See a dentist for regular checkup.	1	2	3	4	5
10.	Avoid overworking.	1	2	3	4	5
11.	Limit foods like sugar, fats, etc.	1	2	3	4	5
12.	Don't let things "get me down".	1	2	3	4	5
13.	Spend free time outdoors.	1	2	3	4	5
14.	Keep emergency numbers near the phone.	1	2	3	4	5
15.	Have a first aid kit in home.	1	2	3	4	5
16.	Destroy old or unused medicines.	1	2	3	4	5
17.	Avoid getting chilled.	1	2	3	4	5
18.	Use dental floss.	1	2	3	4	5
19.	Don't drink alcoholic beverages.	1	2	3	4	5
20.	Take vitamins.	1	2	3	4	5
21.	Check condition of electrical applicances, the car, etc.	1	2	3	4	5
22.	Wear a seat belt.	1	2	3	4	5
23.	Avoid parts of city with high crime.	1	2	3	4	5
24.	Pray/live by principles of religion.	1	2	3	4	5
25.	Avoid parts of city with high pollution.	1	2	3	4	5
26.	Fix broken things in home right away.	1	2	3	4	5
27.	Avoid over-the-counter medicines.	1	2	3	4	5
28.	Discuss health with friends.	1	2	3	4	5
29.	Avoid doctors when feeling okay.	1	2	3	4	5
30.	Ignore health advice from friends.	1	2	3	4	5

HEALTH BEHAVIORS

<u>Directions</u>:   Indicate how often you actually perform each of
the following behaviors. The higher the number the more
frequently you actually perform the behavior.

		Never	Some time	Quite often	Usually	Always
1.	Eat sensibly.	1	2	3	4	5
2.	Get enough exercise.	1	2	3	4	5
3.	Get enough sleep.	1	2	3	4	5
4.	Get enough relaxation.	1	2	3	4	5
5.	Watch one's weight.	1	2	3	4	5
6.	Don't smoke.	1	2	3	4	5
7.	See a doctor for regular checkup.	1	2	3	4	5
8.	Do things in moderation.	1	2	3	4	5
9.	See a dentist for regular checkup.	1	2	3	4	5
10.	Avoid overworking.	1	2	3	4	5
11.	Limit foods like sugar, fats, etc.	1	2	3	4	5
12.	Don't let things "get me down".	1	2	3	4	5
13.	Spend free time outdoors.	1	2	3	4	5
14.	Keep emergency numbers near the phone.	1	2	3	4	5
15.	Have a first aid kit in home.	1	2	3	4	5
16.	Destroy old or unused medicines.	1	2	3	4	5
17.	Avoid getting chilled.	1	2	3	4	5
18.	Use dental floss.	1	2	3	4	5
19.	Don't drink alcoholic beverages.	1	2	3	4	5
20.	Take vitamins.	1	2	3	4	5
21.	Check condition of electrical appliances, the car, etc.	1	2	3	4	5
22.	Wear a seat belt.	1	2	3	4	5
23.	Avoid parts of city with high crime.	1	2	3	4	5
24.	Pray/live by principles of religion.	1	2	3	4	5
25.	Avoid parts of city with high pollution.	1	2	3	4	5
26.	Fix broken things in home right away.	1	2	3	4	5
27.	Avoid over-the-counter medicines.	1	2	3	4	5
28.	Discuss health with friends.	1	2	3	4	5
29.	Avoid doctors when feeling okay.	1	2	3	4	5
30.	Ignore health advice from friends.	1	2	3	4	5

HEALTH BEHAVIORS

<u>Directions</u>: Indicate how often you ideally would like to
perform each of the following behaviors. The higher the
number the more frequently you ideally would like to perform
the behavior.

		Never	Some time	Quite often	Usually	Always
1.	Eat sensibly.	1	2	3	4	5
2.	Get enough exercise.	1	2	3	4	5
3.	Get enough sleep.	1	2	3	4	5
4.	Get enough relaxation.	1	2	3	4	5
5.	Watch one's weight.	1	2	3	4	5
6.	Don't smoke.	1	2	3	4	5
7.	See a doctor for regular checkup.	1	2	3	4	5
8.	Do things in moderation.	1	2	3	4	5
9.	See a dentist for regular checkup.	1	2	3	4	5
10.	Avoid overworking.	1	2	3	4	5
11.	Limit foods like sugar, fats, etc.	1	2	3	4	5
12.	Don't let things "get me down".	1	2	3	4	5
13.	Spend free time outdoors.	1	2	3	4	5
14.	Keep emergency numbers near the phone.	1	2	3	4	5
15.	Have a first aid kit in home.	1	2	3	4	5
16.	Destroy old or unused medicines.	1	2	3	4	5
17.	Avoid getting chilled.	1	2	3	4	5
18.	Use dental floss.	1	2	3	4	5
19.	Don't drink alcoholic beverages.	1	2	3	4	5
20.	Take vitamins.	1	2	3	4	5
21.	Check condition of electrical appliances, the car, etc.	1	2	3	4	5
22.	Wear a seat belt.	1	2	3	4	5
23.	Avoid parts of city with high crime.	1	2	3	4	5
24.	Pray/live by principles of religion.	1	2	3	4	5
25.	Avoid parts of city with high pollution.	1	2	3	4	5
26.	Fix broken things in home right away.	1	2	3	4	5
27.	Avoid over-the-counter medicines.	1	2	3	4	5
28.	Discuss health with friends.	1	2	3	4	5
29.	Avoid doctors when feeling okay.	1	2	3	4	5
30.	Ignore health advice from friends.	1	2	3	4	5

Appendix A9
Pain Tolerance Questionnaire

BELIEFS ABOUT HEALTH

<u>Directions</u>: Consider these responses to physical symptoms in relation to the following scale. This scales denotes a general level of discomfort.

1	2	3	4	5
slight	mild	moderate	severe	extreme
barely	somewhat	bothersome	very	disabling
noticeable	bothersome		bothersome	

When you experience physical symptoms (stomach ache, headache, cold, flu, twisted ankle), at what level of discomfort would you:

	slight				extreme
1. Take aspirin or other medicine.	1	2	3	4	5
2. Go to the infirmary.	1	2	3	4	5
3. Call a family member.	1	2	3	4	5
4. Get rest and take better care of yourself.	1	2	3	4	5
5. Contact a physician or other health care professional.	1	2	3	4	5
6. Tell a friend.	1	2	3	4	5
7. Do nothing for the symptoms.	1	2	3	4	5
8. Exercise and/or change diet.	1	2	3	4	5

Appendix A10
Life Experiences Survey

LIFE EXPERIENCES SURVEY

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

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

Section 1

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
1. Marriage	___	___	-3	-2	-1	0	+1	+2	+3
2. Detention in jail or comparable institution	___	___	-3	-2	-1	0	+1	+2	+3
3. Death of spouse	___	___	-3	-2	-1	0	+1	+2	+3
4. Major change in sleeping habits (much more or much less sleep)	___	___	-3	-2	-1	0	+1	+2	+3
5. Death of close family member:									
a. mother	___	___	-3	-2	-1	0	+1	+2	+3
b. father	___	___	-3	-2	-1	0	+1	+2	+3
c. brother	___	___	-3	-2	-1	0	+1	+2	+3
d. sister	___	___	-3	-2	-1	0	+1	+2	+3
e. grandmother	___	___	-3	-2	-1	0	+1	+2	+3
f. grandfather	___	___	-3	-2	-1	0	+1	+2	+3
g. other (specify)	___	___	-3	-2	-1	0	+1	+2	+3
6. Major change in eating habits (much more or much less food intake)	___	___	-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
7. Foreclosure on mortgage or loan	——	———	-3	-2	-1	0	+1	+2	+3
8. Death of close friend	——	———	-3	-2	-1	0	+1	+2	+3
9. Outstanding personal achievement	——	———	-3	-2	-1	0	+1	+2	+3
10. Minor law violations (traffic tickets, disturbing the peace)	——	———	-3	-2	-1	0	+1	+2	+3
11. Male: wife/girl-friend's pregnancy	——	———	-3	-2	-1	0	+1	+2	+3
12. Female: pregnancy	——	———	-3	-2	-1	0	+1	+2	+3
13. Changed work situation (different work responsibility, major change in work conditions, working hours)	——	———	-3	-2	-1	0	+1	+2	+3
14. New job	——	———	-3	-2	-1	0	+1	+2	+3
15. Serious illness or injury of close family member:									
a. father	——	———	-3	-2	-1	0	+1	+2	+3
b. mother	——	———	-3	-2	-1	0	+1	+2	+3
c. sister	——	———	-3	-2	-1	0	+1	+2	+3
d. brother	——	———	-3	-2	-1	0	+1	+2	+3
e. grandfather	——	———	-3	-2	-1	0	+1	+2	+3
f. grandmother	——	———	-3	-2	-1	0	+1	+2	+3
g. spouse	——	———	-3	-2	-1	0	+1	+2	+3
h. other (specify)	——	———	-3	-2	-1	0	+1	+2	+3
16. Sexual difficulties	——	———	-3	-2	-1	0	+1	+2	+3
17. Trouble with employer (in danger of losing job, being suspended, demoted, etc.)	——	———	-3	-2	-1	0	+1	+2	+3
18. Trouble with in-laws	——	———	-3	-2	-1	0	+1	+2	+3
19. Major change in financial status (a lot better off or a lot worse off)	——	———	-3	-2	-1	0	+1	+2	+3
20. Major change in closeness of family members (increased or decrease closeness)	——	———	-3	-2	-1	0	+1	+2	+3

	0 to .6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
21. Gaining a new family member (birth, adoption, family member moving in)	____	____	-3	-2	-1	0	+1	+2	+3
22. Change of residence	____	____	-3	-2	-1	0	+1	+2	+3
23. Marital separation from mate (due to conflict)	____	____	-3	-2	-1	0	+1	+2	+3
24. Major change in church activities (increased or decreased attendance)	____	____	-3	-2	-1	0	+1	+2	+3
25. Marital reconcilation with mate	____	____	-3	-2	-1	0	+1	+2	+3
26. Major change in number of arguments with spouse (a lot more or a lot less arguments)	____	____	-3	-2	-1	0	+1	+2	+3
27. Married male: change in wife's work outside the home (begin work, cease work, change jobs)	____	____	-3	-2	-1	0	+1	+2	+3
28. Married female: change in husband's work (loss of job, new job, retirement)	____	____	-3	-2	-1	0	+1	+2	+3
29. Major change in usual type and/or amount of recreation	____	____	-3	-2	-1	0	+1	+2	+3
30. Borrowing more than $10,000 (buy home, business, etc.)	____	____	-3	-2	-1	0	+1	+2	+3
31. Borrowing less than $10,000 (buy car, TV, get school loan)	____	____	-3	-2	-1	0	+1	+2	+3
32. Being fired from job	____	____	-3	-2	-1	0	+1	+2	+3
33. Male: wife/girlfriend having abortion	____	____	-3	-2	-1	0	+1	+2	+3
34. Female: having abortion	____	____	-3	-2	-1	0	+1	+2	+3
35. Major personal illness or injury	____	____	-3	-2	-1	0	+1	+2	+3
36. Major change in social activities e.g., movies, parties, visiting (increased or decreased participation)	____	____	-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive
37. Major change in living conditions of family (new home, remodeling, deterioration of home, neighborhood, etc.)	——	——	-3	-2	-1	0	+1	+2	+3
38. Divorce	——	——	-3	-2	-1	0	+1	+2	+3
39. Serious illness or injury of close friend	——	——	-3	-2	-1	0	+1	+2	+3
40. Retirement from work	——	——	-3	-2	-1	0	+1	+2	+3
41. Son or daughter leaving home (due to marriage, college)	——	——	-3	-2	-1	0	+1	+2	+3
42. Ending of formal schooling	——	——	-3	-2	-1	0	+1	+2	+3
43. Separation from spouse (due to work, travel)	——	——	-3	-2	-1	0	+1	+2	+3
44. Engagement	——	——	-3	-2	-1	0	+1	+2	+3
45. Breaking up with boyfriend/girlfriend	——	——	-3	-2	-1	0	+1	+2	+3
46. Leaving home for the first time	——	——	-3	-2	-1	0	+1	+2	+3
47. Reconciliation with boyfriend/girlfriend	——	——	-3	-2	-1	0	+1	+2	+3

Other recent expeiences which have had an impact on your life.

48. _____	——	——	-3	-2	-1	0	+1	+2	+3
49. _____	——	——	-3	-2	-1	0	+1	+2	+3
50. _____	——	——	-3	-2	-1	0	+1	+2	+3

	0 to 6 mo	7 mo to 1 yr	extremely negative	moderately negative	somewhat negative	no impact	slightly positive	moderately positive	extremely positive

Section 2: Student Only

51. Beginning a new school experience at a higher academic level (college, grad school, etc.)	___	___	-3	-2	-1	0	+1	+2	+3
52. Changing to a new school at same academic level (undergrad, grad)	___	___	-3	-2	-1	0	+1	+2	+3
53. Academic probation	___	___	-3	-2	-1	0	+1	+2	+3
54. Being dismissed from dormitory or other residence	___	___	-3	-2	-1	0	+1	+2	+3
55. Failing an important exam	___	___	-3	-2	-1	0	+1	+2	+3
56. Changing a major	___	___	-3	-2	-1	0	+1	+2	+3
57. Failing a course	___	___	-3	-2	-1	0	+1	+2	+3
58. Dropping a course	___	___	-3	-2	-1	0	+1	+2	+3
59. Joining a fraternity or sorority	___	___	-3	-2	-1	0	+1	+2	+3
60. Financial problems concerning school (in danger of not having sufficient money to continue)	___	___	-3	-2	-1	0	+1	+2	+3

Appendix A11
Social Support Questionnaire

The following questions ask about the general avail-
ability and satisfaction you have with <u>social</u> support
from various people. Using the following scales, fill
in the appropriate circle for each question.

1. In general, do you feel there is someone you can turn to
    in time of need?
    1=never; 2=rarely; 3=sometimes; 4=usually; 5=always

2. Do you have any problems you can't discuss with any friend or
    relative? 1=yes; 2=no

For questions 3-7, please use the following scale:

1=very dissatisfied; 2=somewhat dissatisfied; 3=somewhat satisfied;
4=very satisfied

3. In general, are you satisfied with your current level of social
    activity?

4. In general, how satisfied are you with the support that you get
    from <u>your</u> <u>friends</u>?

5. In general, how satisfied are you with the <u>number</u> of people whom
    you could call up if you wanted to do something (like chat on
    the phone, visit each other's home, go to a movie, etc.)?

6. If you are married or living as married, how satisfied are you
    with the support you get from your <u>spouse</u>?

7. In general, how satisfied are you with the support you get from
    your <u>family</u>, <u>other</u> <u>than</u> <u>your</u> <u>spouse</u>?

Appendix B
Literature Review

Literature Review

Stress-related disorders such as irritable bowel syndrome (IBS) and tension headache are problematic for an estimated 8% to 20% of the population (Thompson & Heaton, 1980; Leviton, 1978). Both of these disorders may be viewed as quantitative disorders in that the disturbance is one of increased intensity and frequency of symptoms. Thus, understanding the development and maintenance of functional somatic symptoms aid in the understanding of the disorder.

Kellner (1985) reviewed empirical studies that suggest functional somatic symptoms are caused by physiological activity and tend to be aggravated by emotion. Kellner has defined functional somatic symptoms as those for which no organic cause can be found on routine investigation, although specific physiological changes can be detected in some of these symptoms (e.g. increased EMG activity). He has explained the etiology and development of these symptoms following the biopsychosocial approach to illness. Constitutional factors, somatic symptoms in the family, parental attitudes, previous disease, and selective perception are considered predisposing factors.

Kellner has suggested that conditioning and learning to perceive small physical changes are factors that maintain the cycle. Autonomic nervous system responses can be classically and operantly conditioned. Conditioning can improve the

perception of stimuli so that an individual will perceive changes previously not in awareness. Selective perception and selective attention to a part of one's body may increase an individual's ability to detect sensations. Anxiety and physiological changes that lead to somatic symptoms can be conditioned to environmental cues and perceived bodily changes. Kellner has suggested that a cycle of anxiety, somatic sensations, and more anxiety could lead to overlearning and to a predictable pattern of responding to illness.

Reinforcement and secondary gain also may contribute to the development and maintenance of functional somatic symptoms (Kellner, 1985). Interest shown by family members may reinforce selective attention to somatic sensations. Physician's interest and concern may reinforce selective perception or habitual attention to somatic symptoms. Secondary gain may result from somatic symptoms or illness by the avoidance of responsibilities and obligations.

Thus, the influence of learning is an important factor in the maintenance of functional somatic symptoms and, perhaps, in the development of stress-related disorders. As proposed by learning theory, the perception of physical symptoms may lead to somatic symptoms through modeling, reinforcement, or avoidance learning. Furthermore, the sick-role concept and learning theory are proposed as maintaining

the symptoms that may devleop into a stress-related disorder.

The Sick-Role Concept

The onset of illness and illness behavior can be considered a social, psychological, and physical process. Parsons (1951) proposed a social-psychological conceptualization of the sick-role, characterized by four basic features. Illness is involuntary, so the sick persons often are not considered responsible for their condition . Being labeled as sick legitimizes role behavior that exempts individuals from performing their social responsibilities and obligations. Individuals must engage in behaviors that indicate a desire to return quickly to a state of health. Individuals are also obligated to seek out and cooperate with health care providers and treatment agents to improve their health-related behaviors.

The sick-role concept guides the patient's behavior and others' responses toward the individual. The consequences resulting from the patient's sick-role behavior are of particular importance to the development of illnesses. The individual may learn to make responses in terms of behaviors positively reinforced. Secondary gains or potential benefits from an illness may serve as reinforcement for the patient (Melamed & Siegel, 1980). These reinforcing consequences may promote and maintain the patient's sick-role behavior and interfere with treatment and improvement of their health

related condition.

Mechanic (1978) defined illness behavior as the way symptoms are perceived, evaluated, and acted upon by a person who recognizes some pain, discomfort, or other signs of organic malfunction. The inclination to adopt sick-role behavior is considered a learned pattern of behavior influenced by situational contingencies. He examined the extent to which the frequency of reported illness is related to the amount of stress experienced by an individual and their inclination to adopt the sick role. The frequency of medical visits made by 614 male freshman was considered a function of both the inclination to adopt the sick role and of stress experienced. Stress was defined as the subject's report of the frequency with which he was bothered by loneliness and nervousness. The tendency to adopt the sick role was assessed by subjects' response to the question: "During the past school year would you have reported to the University Health Service in the following hypothetical situations?". The hypothetical situations were a) feeling poorly for a few days, b) felt a temperature of about 100 degrees, and c) felt a temperature of 101 degrees. Responses for each item ranged from 0, certainly, to 3, very unlikely. A high tendency to adopt the sick role was defined by a score of 0-5, and a low tendency by a score of 6-9. Individuals with a high inclination to adopt the sick role

sought medical assistance more quickly and more frequently when confronted with given symptoms. The data indicate the probability that individuals will be frequent visitors to a medical facility is largely a function of their inclination to adopt the sick role and only partly a function of stress experience.

Learning Theory Model

An increased behavioral response to illness and greater sensitivity to physical symptoms may result from learning experiences. Illness behavior may be learned through the basic principles of modeling, positive reinforcement, and avoidance learning.

Wooley, Blackwell, and Winget (1978) adopted a learning theory treatment model of chronic illness behavior with 300 psychosomatic inpatients. The learning model suggests that the behavior of chronic illness patients legitimizes the illness role. This model proposes that the illness role is shaped by three influences: 1) vicarious learning through models, primarily in childhood; 2) direct social reinforcement of illness behavior by family, friends, and physicians; and 3) avoidance learning, by which the illness role brings about exemption from social responsibilities with no other loss to the individual.

Patients with chronic illness behavior have been observed to elicit care and attention from others (Wooley et

al., 1978). This appears to function to free the patient of responsibility and keep them from moving to a healthier, more independent lifestyle. Wooley et al. suggested that these behaviors are an intrinsic part of chronic illness behavior and have been learned because they consistently elicit caretaking interpersonal behavior.

Wooley et al. (1978) examined the somatic complaints and care eliciting interpersonal behaviors of patients characterized by the chronic illness behavior syndrome. This syndrome is exhibited by a disability disproportionate to disease, a lifestyle that revolves around the illness role, and a perpetual search for new and better medical care. The behaviors observed in these patients are demands for care and attention, displays of helplessness, excessive compliance, veiled hostility, threats and argumentativeness, dividing of professional staff, and silliness. Patients are found to reinforce others for care-giving behaviors. Treatment is designed to encourage the patient to assume responsibility for his own care and decrease caretaking responses by others, particularly physicians and family members. The treatment includes social skills training, family therapy, and behavior modification for reducing symptoms. Patients show improved tolerance of pain and lower amounts of drug use when caretaking responses are minimized and self-control is encouraged. Improvement ratings at discharge show that

involvement in treatment planning, self-monitoring, and family therapy are associated with short-term success. Rewards given by patients to one another demonstrate that the behavioral treatment program has shifted social contingencies with a decrease in rewards for care-giving behaviors and an increase in achievement orientation. One-year follow-up has shown that return to an intact family is the most predictive factor for maintenance of progress or continuing improvement.

Partial support for learning theory was suggested in a study by Edwards (1987): subjects with a current high-perception disorder report greater reinforcement for illness behavior in childhood. A high-perception disorder is a psychophysiological disorder with symptoms that are easily perceivable and therefore easily learned. Individuals with a current high-perception disorder also are more likely to report having a parent with a high-perception disorder, though not necessarily the disorder their parents experienced.

Psychological factors and learning theory principles related to sick-role or illness behavior are plausible explanations for the development and maintenance of stress-related disorders. Sick-role or illness behavior has specific learned components that may contribute to the maintenance of an individual's negative condition. Individuals who display sick-role or illness behavior are

suggested to have a distinctive learning history. Using a biopsychosocial approach, the role of learning in illness behavior has been proposed in the examination of the development and maintenance of stress-related symptoms.

Now consider psychosocial factors that protect an individual from the physical and psychological consequences of exposure to stress.

Chesney and Gentry (1982) have suggested the consideration of the combined, interactive effects of both susceptibility and resistance factors in determining an individual's risk for stress induced illness. Examples of susceptibility factors are personality, critical life events, coping styles, and socioecological stress. Resistance factors include personality, protective community forces, social support, and coping styles. Susceptibility and resistance represent, respectively, psychological and social factors, related but independent variables that mediate the nature and extent of stress-illness relationships. These factors help differentiate those individuals who get sick and those who do not.

Holohan and Moos (1985) looked at psychological factors proposed to buffer the potentially negative health effects of life stress. The role of self-confidence and an easy-going disposition as two different personality factors were explored as potential stress buffers. Subjects included men

and women who experienced a high degree of stress during the previous year. Individuals were separated into high- and low- distress groups based on life stress and psychological distress scores. The high-distress group was called the distressed group (high-stress, high- distress) and was characterized by individuals who became ill under stress. The low-distress group was called the stress-resistant group (high-stress, low- distress) and was characterized by individuals who adapted to life stress with little physical or psychological strain. Results indicate that the individuals in the stress resistant-group were more easy-going and less likely to use avoidance coping than individuals in the distressed group. In the stress resistant group, males were more self-confident and females had better family support than those in the distressed group. Approach coping failed to show the expected pattern of results. Healthy persons did not engage in more approach and less avoidance coping than unhealthy ones.

Various physical disorders are thought to be induced or facilitated by exposure to stress. These disorders include but are not limited to, hypertension, headache, chronic pain, and gastrointestinal disorders. Approximately 70% of the etiology of hypertension can be explained in terms of environmental factors (Weiner, 1979). For example, blood pressure and hypertension have been shown to be influenced by

the interaction of several factors including family history, stress, personality, obesity, physical activity, and diet. The stress variables Shapiro and Goldstein (1982) outlined also include natural disasters, culture and urbanization, occupational stress, prolonged illness, experimentally induced stress, response to stress in individuals with a family history of hypertension, and Type A behavior. Some of these factors may have a more potent influence than others on the development of hypertension, but it is probable that the interaction of several factors lead to the development of the disorder.

Thus, psychological and physiological factors should be considered in the relationship between stress and the transformation of emotion into somatic symptoms. Kellner (1985) discussed known mechanisms producing somatic symptoms in the absence of physical disease or damage to tissues. Individuals prone to illness behavior are more likely to attend to, perceive, and label physical symptoms and therefore experience more somatic symptoms and illnesses.

IBS and tension headache are stress-related disorders with a proposed physical mechanism of action: colonic motility and sustained muscle contraction, respectively. The symptoms of IBS and tension headaches may be considered on a continuum, with the increase in the frequency and intensity of the symptoms leading to the disorder.

Discussion of these two stress-related disorders will be reviewed, and evidence which calls these proposed mechanisms of action into question will follow. A learning theory model will be proposed to partially account for the development and maintenance of functional somatic symptoms, from which the disorder might develop.

Irritable Bowel Syndrome

Irritable bowel syndrome (IBS) is a prevalent functional gastrointestinal disorder estimated to affect 8% to 14% of healthy U.S. adults in one year (Thompson & Heaton, 1980). The clinical picture of IBS consists of an alteration in bowel habit (diarrhea or constipation) and abdominal pain and tenderness (Cohen & Snape, 1979). Most prominently, IBS sufferers are found to have disturbances in colonic motility (Drossman, Powell, and Sessions, 1977). Colonic motility refers to the contractions of the smooth muscles of the gut that propel food forward at an appropriate rate for digestion and absorption.

Latimer (1981) proposed a behavioral model to explain the complex clinical features of IBS. This behavioral model has three central features. Behavior relevant to IBS can be studied at three levels: verbal, motoric, and physiological. These behaviors vary on a continuum from extremes of 'normal' to 'abnormal,' with only quantitative changes in characteristic behavior exhibited by individuals with IBS.

Finally, Latimer also has suggested a genetic predisposition to neuroticism for individuals with IBS.

Learning experiences are suggested as a basis for IBS symptoms (Latimer, 1981). Children may learn misconceptions about 'normal' bowel habits from parents or significant others with IBS. Symptoms of IBS may be a socially acceptable sign of distress and a way to avoid unpleasant responsibilities, or to elicit concern and affection from family, friends and others. Latimer has proposed this behavioral model to use effective treatment at verbal, motoric, and physiological levels.

IBS patients have been found to have disturbances in colonic motility when compared to normal subjects and medical patients. Since IBS patients have been found to be more psychologically disturbed than normals and patients with other gastrointestinal complaints (Young, Alpers, Norland, & Woodruff, 1976), Latimer et al. (1981) proposed to use psychologically distressed individuals as a control group. Subject selection produced two groups who were equally psychologically disturbed and more disturbed than normals. The IBS patients did not differ significantly from psychoneurotic patients on measures of colonic motor activity or on colonic electrical control activity. These two groups were significantly different from normal control subjects on the colonic measures. Thus, IBS symptoms may not be due to

colonic disturbances. Because IBS and psychoneurotic groups had similar psychological characteristics, Latimer et al. have suggested the excess of colonic contractions reported by IBS patients may be related to psychological factors rather than physiological disturbances.

Whitehead, Winget, Fedoravicious, Wooley, and Blackwell (1982) studied the prevalence of chronic illness behavior in people with IBS and peptic ulcer. They have defined chronic illness behavior by frequent visits to physicians, multiple somatic complaints, and disability disproportionate to physical findings. Individuals with IBS are more likely to report multiple somatic complaints and express greater concern for physical symptoms than individuals with peptic ulcer or normal controls. The authors have suggested that people with IBS exhibit chronic illness behavior and that this behavior results from early learning experiences. Social learning and reward for illness were considered a contributor in the etiology of IBS. Therefore, the etiology of IBS is unclear. Both psychological and physical factors have been implicated in the presence and exacerbation of symptoms. Further research needs to give greater consideration to the psychological factors implicated in IBS in addition to physiological factors. Findings from the treatment literature support this notion. Treatments addressing both psychological and physiological responses are

most successful. Neff & Blanchard (1987) found that a multicomponent treatment that included educational information, progressive relaxation training, thermal biofeedback, and stress coping strategies effectively reduced gastrointestinal symptoms in at least half of the cases. From a biopsychosocial perspective, the role of learning in the development and maintenance of IBS symptoms must be examined.

Tension Headache

Tension headaches are associated with increased contraction of the head muscles, particularly the frontalis muscle. The head pain may be centered at the back of the head and neck but can appear in almost any portion of the head, neck, and shoulders. A tension headache may be distinguished from a migraine headache as a head pain with the absence of a prodrome, unilateral pain, and nausea, and vomiting, or both.

The primary mechanism of tension headache is excessive muscle contractions, although involvement of the vascular system is also indicated (Olton & Noonberg, 1980). A chronic elevation of the EMG from the frontalis muscle suggests excessive muscle activity as a mechanism of the tension headache. The data indicate that people with frequent and/or severe headaches have a resting level of muscle contraction greater than people without headaches, even when free of head

pain. Tension headache patients also are more likely to have elevated levels of muscle activity during or immediately after stress (Olton & Noonberg, 1980). However, these findings are not consistent across studies.

Studies have examined the mechanism of increased muscle tension in the explanation of tension headaches. Borgeat, Hade, Ellie, and Larouche (1984) assessed the relationship between hyperactivity of the head and neck muscles and subjective pain in tension headache by comparing the effects of voluntary muscle contraction on self-reports of pain in tension headache patients and normal volunteers. Tension headache patients report more pain than normal volunteers with similar amounts of muscle activity before, during, and after periods of voluntary frontal muscle contractions. The researchers have proposed the hypothesis of differential sensitivity or pain threshold to muscle tension to account for different experiences of pain, though EMG levels did not differ.

An investigation of a chronic headache population analyzed potential predictors from the biological, psychological, and social realm (Blanchard, Andrasik, Arena, Neff, Jurish, Teders, Saunders, Pallmeyer, Dudek, & Rodichok, 1984). For all headache types (tension, migraine, and combined tension and migraine), there is no significant difference between abilities of psychological and social

demographic variables to predict headache activity. Analysis

of the headache index reveals that more variance in headache

report of tension headache can be accounted for by biological

variables (psychophysiological responses) than for either

migraine or mixed headache. Data also provides strong

evidence of an association between the response of forehead

EMG to stress and overall headache activity in tension

headache sufferers. Thus it seems that tension headache

sufferers respond to stress with increased muscle tension.

The evidence suggests that the perception and

reinforcement of symptoms are the important determinants of

headache pain, rather than psychological disturbance or

social factors alone. The researchers suggested that tension

headache is a most complex phenomenon in that both

psychological and biological variables account for

significant increments in variance that indicates it is a

biopsychosocial disorder.

Andrasik and Holroyd (1980) tested specific and

nonspecific effects in biofeedback treatment of tension

headache. Thirty-nine headache sufferers were assigned to

one of three biofeedback procedures or to a no-treatment

control group. Biofeedback subjects received training

designed to produce either decreased, stable, or increased

frontal EMG levels. All subjects received similar

instructions and believed they were learning to reduce

frontal muscle tension levels. EMG levels during the feedback and self-control phases differed for the three biofeedback groups in the desired direction. The three biofeedback procedures produced similar reductions in headache symptoms posttreatment and follow-up assessments. The results suggest that the learned reduction of frontal EMG activity may play only a minor role in biofeedback treatment of tension headache.

Holroyd, Penzein, Hursey, Tobin, Rogers, Holm, Marcille, Hall, and Chila (1984) examined the impact of both the EMG feedback contingency (expected to determine changes in EMG activity) and performance feedback (expected to determine perceptions of success) on headache improvement. Subjects were led to believe they were learning to decrease frontal EMG activity, though actual feedback was contingent on decreased EMG activity for half of the subjects and increased EMG activity for the other half. Within these groups, subjects viewed video displays designed to convince them they were achieving high or moderate success in EMG reductions. Reported results in improved headache activity following biofeedback training were believed to be mediated by cognitive changes induced by performance feedback rather than reductions in EMG activity. Holroyd et al. have emphasized the role that perceived success experiences play in biofeedback training and the role evaluative performance

feedback plays in defining successful performance for the biofeedback trainee.

Tension headache patients have increasingly been treated by psychological methods. EMG biofeedback has been demonstrated as an effective treatment procedure. Relaxation training and psychotherapy also are used in the treatment of tension headache. In addition, consideration should be given to cognitive changes in improvement of headaches.

The physiopathology of tension headaches remains undetermined. As with IBS, tension headache is a complex phenomenon involving biological, psychological, and social factors that should be considered in the treatment of this disorder.

Appendix C

Measures and Reliability

The following assessment measures were administered to all participants. Copies of each measure are included in the Appendices. See Table 9 for reliability coefficients from the present study.

Demographic Information. A demographics questionnaire (See Appendix A3) was administered.

Psychosomatic Symptom Checklist. The SUNYA revision of Psychosomatic Symptom Checklist (PSC; See Appendix A4) is a self-report scale which lists 17 common psychosomatic complaints. Subjects rate each item on frequency and intensity of occurrence using a five-point scale. The cross products of these are 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 were varied, however the majority of correlations were greater than .50. The PSC has been shown to be sensitive to the presence of psychosomatic complaints (Cox, Freundlich, & Meyer, 1975; Holroyd & Andrasik; 1978). The PSC was used in the present study as a measure of psychosomatic disorders and the distress associated with the complaints to determine the level of functional somatic symptoms as prediced by the independent variables.

Two versions of the PSC were administered to assess

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symptoms experienced in 1) a lifetime and 2) the past month.
This allowed comparison of a recent report of somatic
complaints with a lifetime history of complaints.

The specified groups of stress-related disorders will
consist of the following. The functional gastrointestinal
distress symptoms are stomach pain, spastic colitus, and
diarrhea/constipation. Muscle tension symptoms are
headaches, backaches, and muscle pain or spasm.

Health-Related Behavioral Response Questionnaire. The
Health-Related Behavioral Response Questionnaire (HRBRQ; See
Appendix A5) measures the type of predicted behavioral
response to physical symptoms in health-related scenarios.
Twelve scenarios with varying degrees of severity are
presented. The scenarios are divided into situations of
early responding (items 3, 4, 5, and 6), later responding
(items 1 and 2), and lifetime situations (items 7, 8, 9, 10,
11, and 12) . The behavioral responses exemplify four
categorical dimensions. The categories are 1) self-care
behaviors; 2) turning to significant others; 3) seeking
medical attention; and 4) doing nothing. Subjects are asked
to rate the likelihood of responding in a given way to the .
situation described. This rating.is indicated on a 7-point
scale ranging from not likely to very likely.

The HRBRQ was developed in the following manner.
Undergraduate volunteers were initially given the scenarios

as open-ended questions in order to generate possible
response categories. Five categories (self care behaviors,
lifestyle changes, turn to significant others, seek medical
attention, and do nothing) were developed and responses
typical of these categories were used in pilot testing of the
questionnaire. A response category of "other" was also used
in this testing to allow for responses not fitting the above
categories.

Fifty-six undergraduates were then administered the
HRBRQ. Sixteen scenarios were presented (12 illness
situations and 4 positive health situations). The
reliability analysis produced coefficient alphas of .66, .81,
.87, .72, and .91 for the five categories, respectively.
Validation of the categories using a matrix intercorrelation
resulted in an overlap of self care behaviors and lifestyle
change categories.

The categories of self-care behaviors and lifestyle
changes were combined to improve reliability and validity
into one categorical dimension; self-care behaviors. The
positive health situations were dropped from the HRBRQ since
the behavioral responses were to situations different in
nature than illness scenarios. The twelve illness scenarios
were used in the final analysis. The reliability analysis
produced coefficient alphas of .80, .86, .74, and .90 for
categories of self-care behaviors, turn to significant

others, seek medical attention, and do nothing, respectively
(See Table 10). The matrix of intercorrelations supported
the validity of these four categories (See Table 11).

Item correlations were examined to identify problem
scenarios. The responses for the self-care behaviors
category were chosen from the original self-care behaviors
and lifestyle change categories by taking the one with the
higher item correlation for the combined scale. The response
items with item correlations less than .40 were altered to
illustrate a more appropriate behavioral response to the
physical symptoms depicted
in the scenario. See Appendix A5 for the final version of
the HRBRQ.

Health Belief Model Measures. The Health Belief Model
(HBM; See Appendix A6) predicts health action from perceived
susceptibility to and severity of a given illness, beliefs in
the benefits (efficacy) of recommended health action to
reduce threat of illness, and perceived barriers to (costs
of) performing the recommended behavior.

A review (Janz & Becker, 1984) of 46 HBM-related
investigations has provided a summary of studies that examine
health protective behaviors (HPB), sick-role behaviors (SRB),
and clinic utilization. Summary results provide substantial
empirical support for the HBM dimensions as important
contributors to the explanation and prediction of

individuals' health related behaviors. Findings from prospective studies have produced significance ratios as good or better than those obtained from retrospective studies.

"Perceived barriers" prove to be the most powerful HBM dimension across study designs and health behaviors. Barriers are potential negative aspects of a particular health action that may impede the recommended behavior. Examples of barries are expensive treatment, side effects, painful experiences, inconvenience, and time-consuming behaviors. "Perceived susceptibility", defined as the individual's feelings of personal vulnerability or subjective risk of contracting a condition, are found to be a stronger contributor to understanding HPB than SRB. One's beliefs regarding the effectiveness of various actions available to reduce the threat of illness or disease identified as "perceived benefits" is a stronger contributor to understanding SRB than HPB. "Perceived severity" or the feelings concerning the seriousness of contracting an illness evidenced the lowest overall significance ratio, but is strongly related to SRB and weakly associated with HPB.

The HBM dimensions of perceived susceptibility, severity, benefits, and barriers were measured as follows.

"Susceptibility" was measured by the respondent's perception of vulnerability to illness in the next twelve months and disease in the next five years. Susceptibility

will be based on their estimates of the likelihood that they will experience each of twelve commonly occuring symptoms (e.g., cold, stomach ache, headache, diarrhea/constipation) and four serious diseases (e.g. heart disease, cancer).

Three measures of "severity" were derived using the same symptoms and diseases checklist. The first measure asked the respondent to judge the need for medical attention for each symptom and another measure asks whether, if no medical action was taken, each symptom would "go away," "stay the same," or "become worse." The respondent was also asked to rate how much of an effect each disease would have on a peson's life.

"Benefits" was assessed with two measures. The first measure asked the respondent to rate the amount of benefit that might be obtained from bringing each of the commonly occurring symptoms to the attention of a physician or health care professional. The second efficacy measure asked the respondent to rate the amount of benefit to their health that might be derived from each behavior on a list of ten preventive health activities (e.g., exercise, regular checkups, take vitamins).

"Barriers" were assessed by six items rated as barriers to seeking medical attention for any of the commonly occurring symptoms (e.g., lack of time, cost, availability).

Self-Efficacy Scale. Self-efficacy relates to beliefs

about capabilities of performing specific behaviors in particular situations. According to Bandura (1977), efficacy expectations vary along dimensions of magnitude, strength, and generality. He has suggested a two-step approach to measuring self-efficacy: asking subjects whether they believe a particular behavior could be accomplished, and for each designated task, asking the subject to rate the strength of his or her belief.

A review (Strecher, DeVellis, Becker, and Rosenstock, 1986) of studies have suggested a strong relationship between self-efficacy and health behavior change and maintenance. Experimental manipulations of self-efficacy suggest that efficacy can be enhanced and that this enhancement is related to subsequent health behavior change.

The subjects were given a Self Efficacy Scale (SES; See Appendix A7) constructed for this study. This measure presents behavioral statements related to symptoms and illness. Subjects were asked to rate their level of confidence in performing given responses to illness situations. A two-step approach to measuring self-efficacy was utilized. Subjects were asked whether they believe a particular behavior could be accomplished (i.e. self efficacy). For each behavioral response, the subject was asked to rate the strength of his or her belief that the response will improve his or her symptoms (i.e. outcoe

expectancy). The behavioral responses were selected from the scenarios in the HRBRQ.

Health Protective Behaviors Scale. The 30 health-protective activities that Harris and Guten (1979) found among those most frequently reported were used to assess attitudes and behavior regarding health protective behaviors (HPBS; See Appendix A8). These 30 HPBs were used to construct a three-part Health Protective Behaviors questionnaire. Subjects will be asked to rate the 30 HPBs in terms of a) attitude, b) actual behavior, and c) ideal behavior.

The first part of the HPBS was designed to assess general attitudes regarding the 30 HPBs. Subjects were asked to indicate on a 7-point, Likert type scale the importance of each of the behaviors to maintain good health. The second part of the HPBS was designed to assess the frequency with which subjects actually perform each of the 30 HPBs. A 5-point, Likert type scale ranging from "never" to "always" was used to indicate actual performance of HPBs. The third part of the HPBS was designed to assess the subjects' desired frequency for performing the 30 HPBs. The same 5-point scale was used to indicate the ideal performance of HPBs.

Pain Tolerance Scale. Pain tolerance was assessed by self report of predicted behavioral response to physical symptoms. Subjects rated the level of discomfort at which

they would respond in a specified way to physical symptoms experienced. (See Appendix A9.) These ratings were on a 5-point Likert-type scale ranging from 1 to 5. A rating of 1 indicates a slight, barely noticeable level of discomfort. A rating of 5 indicates a extreme, disabling level of discomfort. Behavioral responses were reflective of the four response categories in the Health-Related Behavioral Response Questionnaire: 1) self-care behavior; 2) turn to significant other; 3) seek medical attention; and 4) do nothing.

Current Life Stress. The Life Experiences Survey (LES; Sarason, Johnson, & Sieget, 1978; See Appendix A10) was used as a measure of current life stress. An advantage of the LES over other measures of life changes (e.g., Schedule of Recent Events; Holmes & Rahe, 1967) is a distinction 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 in the past 0 to 6 months or 7 to 12 months. In addition, subjects rated separately the desirability and impact of the events they have experienced. Ratings were made on a 7- point Likert-type scale ranging from -3 to +3; extremely negative to extremely positive.

Positive, negative, and total change scores were

obtained by summing the impact of the appropriate events.
The negative change score has been shown to correlate with a
variety of health related problems. It has been suggested
that this negative change score should be used to determine
the degree of life stress (Sarason, Levine, & Sarason, 1982).

Test-retest of the LES shows that the negative and total
change scores are reasonably reliable (.56 to .88 and .63 to
.64., respectively). The positive change score has lower
reliability (.19 to .53). These reliabilities may be an
underestimate in that within an interval of several weeks,
subjects may actually experience a variety of events that
would be reflected in their scores.

Social Support. Social support was assessed by self
report of the general availability and satisfaction felt with
social support from various people. Subjects rated the
amount of satisfaction felt in relation to various social
support situations. (See Appendix A11). These ratings were
on a 4-point Likert-type scale ranging from 1 to 4. A rating
of 1 indicated great dissatisfaction and a rating of 4
indicated great satisfaction. Two general aspects of social
support were also assessed.

Table 9

Test-Retest Reliability

Assessment Measure	Reliability Coefficient
Health Belief Model	.91
Susceptibility	.55
Severity	.83
Benefits	.73
Barriers	.90
HRBRQ	.97
Self-care response	.96
Significant other response	.97
Medical attention response	.96
Do nothing response	.91
Self Efficacy	.77
HPB - Actual	.92
HPB - Ideal	.97
HPB - Attitude	.78
Pain Tolerance	.72
Social Support	.58

Table 10

<u>Reliability Analysis for the Health-Related Behavioral</u>

<u>Response Questionnaire</u>

Summated Scale Score Statistics for all Responders

Scale	S1	S2	S3	S4
N of Obs.	56	56	56	56
Mean	106.97	44.16	42.04	30.57
Std. Dev.	16.27	12.03	9.91	12.65
Mean Omits	0.20	0.04	0.20	0.23
Maximum	146	73	72	62
Minimum	58	17	23	12
Coef. Alpha	0.80	0.86	0.74	0.90

Table 11

<u>Validity Analysis for the Health-Related Behavioral Response</u>

<u>Questionnaire</u>

Matrix of Intercorrelations among Summated Scale Scores for
all Responders

	S1	S2	S3	S4
S1	1.00	0.23	0.46	-0.26
S2	0.23	1.00	0.37	-0.04
S3	0.46	0.37	1.00	-0.22
S4	-0.26	-0.04	-0.22	1.00

Appendix D

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