

THE RELATIONSHIP OF CHRONIC TENSION HEADACHE TO
INDIVIDUAL AND FAMILY STRESSORS

by

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(ABSTRACT)

Tension, or muscle contraction, headache is by definition associated with life stress. However, there has been relatively little empirical research on the role of naturally occurring stressors in causing tension headache. The current investigation sought to examine some psychological variables hypothesized to be related to chronic tension headache, particularly psychosocial factors. The temporal relationship of headache activity and stress was a major focus. A second purpose of the study was to investigate the family as a particularly salient environmental source of stress for the headache sufferer. Experimental subjects were 18 family pairs, with one member diagnosed as having chronic tension headache. Control subjects were 15 family pairs in which one member had recently sustained an orthopedic injury, resulting in pain. All subjects kept a 14-day diary, monitoring mood swings, the occurrence of stressful events, headache and other somatic complaints. Subjects participated in a semi-structured interview and completed questionnaires concerning depression, anxiety, physical complaints, life hassles, previous illness experiences, and family life. Analyses revealed moderate correlation between targets'

average headache activity and average diary ratings of their own hassles and their families' hassle. Additionally, correlations between targets' average headache activity and their own average mood ratings and physical symptom ratings approached significance. Concerning temporal relationships, analyses revealed mild-to-moderate isomorphic correlations between target headache activity and diary ratings of target hassles. Cross-lagged correlations indicated daily headache fluctuations were also mildly-to-moderately related to target hassles from the previous day and the following day. Temporal results are discussed in terms of potential cause and consequence. Implications are discussed in terms of support for a multi-component model of chronic tension headache.

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INTRODUCTION

Headache is one of the most common psychosomatic disorders with incidence estimates in the general population varying between 15% and 60% (Ad Hoc Committee on Classification of Headache, 1962; Harrison, 1975; Leviton, 1978; Waters, 1970) and higher incidence estimates for some specific populations. Harper and Steger (1978) estimated that 65% of the general population suffer from periodic headache, 31% have two or more headaches per month, and one percent have daily headaches. Ogden (1952) sampled 4,634 individuals and found similar incidence.

Headaches are even more prevalent in the general medical practice population (Philips, 1977). In this group as much as 75% to 90% of patients have problems with headache. Further, six percent to seven percent of all general physician visits are specifically caused by headache (Leviton, 1978). In 1979, Andrasik, Holroyd, and Abell published data suggesting that over 50% of American undergraduate students reported one to two headaches per week or higher, and 20% reported an average of three to four headaches per week or higher.

Although many of these studies fail to differentiate tension headache from migraine and other types of headache, it is presumed that tension headache comprises the majority of headache cases in these samples. Bakal (1975) has indicated that 80% to 85% of headache subjects seen in headache clinics are identified as tension headaches.

The Classification Controversy

There is some controversy concerning the appropriate diagnostic nomenclature of headache. The Ad Hoc Committee on the Classification of Headache (1962) divides headache disorders into several distinct categories. Migraine headaches are defined by several constellations of variables, including their unilateral nature, the occurrence of nausea and vomiting, sensory or motor prodrome, family history, and mood disturbance. Tension, or muscle contraction, headache is defined by the Committee as an "ache or sensation of tightness, pressure, or constriction widely varied in intensity, frequency, and duration, sometimes long lasting and commonly suboccipital. It is associated with sustained contraction of the skeletal muscles in the absence of permanent structural change, usually as part of the individual's reaction during life's stress."

Thus, the defining variables of tension headache are the (1) nature and (2) location of the pain, the (3) occurrence of sustained contraction of skeletal muscles, and (4) association with life stress. In the 25 years since this definition, question has arisen as to the consistency with which these variables are associated with each other.

In regards to sustained muscle contraction, tension headache patients have not been found to have higher resting muscle tension of the head or neck than do controls (Bakal and Kaganov, 1977; Martin and Mathews, 1978; Philips, 1977, 1978). Furthermore, with regards to association with life stress, several studies have evaluated whether tension headache subjects react to "stress" with increased scalp and/or

neck muscle tension. No consistent difference in response to laboratory stressors has been found, although there seem to be some "hyperreactors" (Philips, 1978; Anderson & Franks, 1981). Does neck/scalp muscle contraction increase inevitably and in synchrony with symptoms of tension headache? The literature is controversial, but at least two carefully done studies deny such a relationship (Bakal & Kaganov, 1977; Philips & Hunter, 1982).

Using electromyography, almost all studies of neck and scalp muscle tension during any severe headache episodes have documented, on the average, increased muscle tension over headache-free periods. Several of these studies, however, have documented as much or more tension in patients diagnosed as migraine cases as in those diagnosed as tension headache. Philips (1978), in review of this complex subject, also cites studies on the absence in tension headache patients of good correlation between the level of pain reported and objective evidence of muscle contraction. All of these findings raise the strong possibility that in most patients diagnosed as having muscle tension the pain is derived from multiple, as yet poorly understood, causes and that muscle constriction may be, in part, a phenomenon secondary to the pain. The data on increased scalp and neck muscle contraction in many patients cutting across diagnostic categories strongly suggest that the group clinically now called "tension headache" is markedly heterogeneous. It is possible, if not probable, that within this group there are patients in whom excessive muscle contraction does function as the principal pain generator.

Studies of cerebral blood flow have muddled the issue of headache definition even further. Although several studies have shown complex blood flow changes in classic migraine, many have not shown such changes in common migraine (Olesen, Tfelt-Hansen, Henriksen, Lauritzen, & Larsen, 1982). Additionally, vascular changes have been associated with tension headache. A few studies (Martin & Mathews, 1978; Onel, Friedman, & Grossman, 1961) have found tension headache to be associated with vasodilation. However, the results of most studies have been consistent with the hypothesis that vasoconstriction and ischemia may be contributing factors in tension headache (Feuerstein, Adams, & Beiman, 1976; Friedman, 1964; Friedman & Merritt, 1959; Ostfeld, Reis, & Wolff, 1957; Wolff, 1963). A variety of methodologies have been employed, including the comparison of pulse wave velocities and photoplethysmography responses of muscle-contraction headache and no-headache subjects, the assessment of the vasomotor responses of headache and no-headache subjects to stress, and the assessment of the effects of cephalic vascular modifications on head pain. Several authors have suggested that localized vasoconstriction may exacerbate pain associated with muscle contraction by diminishing the blood supply to muscles which may already be experiencing an oxygen deficit and symptoms of muscles fatigue. The hypothesized etiological role of vasomotor responses is not necessarily an alternative to the muscle-contraction hypothesis, but rather an additional etiological factor. Or both may be elements of the same etiological factor.

Because of the overlap in symptomatology of the population who would be variously classified by the Committee guidelines, some researchers (Bakal 1982; Martin & Mathews, 1978; Philips, 1978), have argued that it is more accurate to conceptualize chronic headache as falling along a continuum. On this continuum the differences are quantitative, not qualitative, with excessive muscle contraction present in all headaches and vascular complications increasing with severity of headache. Despite the fact that the "intensity" or "single headaches disorder" model has received considerable acceptance, many researchers reject it. Certain treatments have been differentially effective for different diagnostic groups. Also, different variables are predictive of successful outcome among the different diagnostic classifications (Blanchard, Andrasik, Neff, Arena, Ahles, Jurish, Pallmeyer, Saunders, Teders, Barron, & Rodichok, 1982; Blanchard, Andrasik, Arena, Neff, Jurish, Teders, Barron, & Rodichok, 1983).

The failure to identify systematic, clear-cut psychophysiological differences between experimental groups with ostensibly different chronic headache problems and between headache sufferers and control subjects emphasizes the futility of seeking a unidimensional, physiological-response-based etiology to chronic headache pain problems. Headache appears to be a complex phenomenon. Thus, more intricate models, such as a biopsychosocial model, are needed to guide assessment and treatment.

Headache and Affect

Several authors (Dalessio, 1968; Diamond, 1964; Diamond & Baltes, 1971; Kudrow, 1976) have reported that tension headache is frequently associated with depression. Support for this hypothesis comes from studies assessing the correlation between these two variables and from studies which have monitored headache activity before, during, and after antidepressant therapy.

Concerning the correlation between depression and occurrence of headache, Diamond (1964) noted that 84% of depressed patients also report frequent headache. Kashiwagi, McClure, and Wetzel (1972) studied 473 patients at a medical school and noted that 28% had headache as their chief complaint. While there was a strong association between the occurrence of depression and tension headache, the authors noted that tension headache was the most frequent headache type in those subjects with no psychiatric diagnosis.

In contrast to these findings, other studies have failed to find significant correlation between depression and headache. One study (Andrasik, Blanchard, Arena, Teders, Teevan, & Rodichok, 1982) administered a battery of psychological tests to four groups of headache sufferers (migraine, tension, combined tension-migraine, and cluster) and to matched non-headache controls. The tension headache group and the combined tension-migraine group displayed more anxiety than did the cluster group or the control group. However, no differences in depression were found among any groups.

In a cross-lagged analysis, Arena, Blanchard, & Andrasik (1984) examined the possible etiological relationship between affect and headache activity, using chronic sufferers of either migraine, tension headache, or combined migraine-tension headache. They found same-day, isomorphic, changes in headache and affect (anger, anxiety, and depression). However, affective changes did not generally lead to headache. In that study, only seven of 31 tension headache subjects showed any significant isomorphic association between depression and headache activity. No other temporal relationship between headache activity and change in affect was found. Increases in depression or anxiety did not generally lead to increased headache activity in tension headache sufferers nor in any other headache group.

Several studies have noted the amelioration of headache symptoms concomitant with the administration of antidepressant medication. Kudrow (1976) suggested that the tricyclic antidepressant medication, amitriptyline, may be useful in treating depressed subjects with tension headache. Dalessio (1968) noted that self-reported pain from headache frequently diminishes following the administration of antidepressant medication.

Diamond and Baltes (1971), evaluated the efficacy of administering amitriptyline to depressed patients and monitoring the effect on headache activity. In a double-blind study, 90 headache patients with either concomitant depression or anxiety were randomly assigned to treatment groups receiving varying doses of amitriptyline or placebo. Although exact dosages were not reported, lower doses of amitriptyline

were reportedly associated with greater reduction in headache activity than were higher doses or placebo. Differences emerged after one week of drug therapy, but no differences were noted between treatment groups after two weeks or four weeks of drug therapy. The reason for these results is unclear. Perhaps relaxation or sedation was related to the smaller doses, while unpleasant anticholinergic side-effects were associated with larger doses.

Taken together, these findings suggest that the relationship between situational depression and tension headache is tenuous at best. Also, they suggest that headache may covary with factors other than, or in addition to, affective state.

Headache and Stress

Both migraine and muscle-contraction headaches have been thought to be related to stress (Bakal, 1975, Friedman, 1964; Kiritz & Moos, 1974; Mitchell & White, 1976). As noted earlier, the Ad Hoc Committee on Classification of Headache (1962) included the relationship between life stress and tension headache in its statement of diagnostic criteria.

There is a vast amount of research suggesting that environmental stressors have significant physiological effects (Goldberg & Breznitz, 1986). Many studies previously cited have documented the occurrence of increased EMG levels and vasomotor responses to stressors under experimental conditions (cf., Phillips, 1978). These findings suggest that stress can initiate or exacerbate a headache because of its physiological effects.

There has been relatively little empirical research on the role of naturally occurring stressors in causing headache. One study tested the interactions of migraine sufferers' daily experiences and headache cycles (Levor, Cohen, Naliboff, McArthur, & Heuser, 1986). Subjects monitored their migraine symptoms, level of physical activity, various emotional states, and upsetting or stressful events. Results showed elevations of stressful events and declines in physical activities during the 4 days prior to migraine onset. There was a trend toward significant emotional arousal during the same 4-day cycle. No tension headache sufferers were included in this sample.

Despite the frequency with which patients make this association, there are few objective data on the relationship between stress and tension headache. And there is no proof that the objective severity of such a headache has been caused or changed by stress. However, there is a small, but growing, body of evidence that the use of stress-coping techniques diminishes tension headache activity. For example, Holroyd, Andrasik, & Westbrook (1977) focused on altering the maladaptive cognitive responses assumed to mediate tension headache. Lists of stressful situations were constructed, and subjects were taught to focus on (1) the cues that trigger tension and anxiety, (2) how they responded to these (often with anxiety), (3) thoughts prior to and following tension, and (4) the ways in which these cognitions contributed to their headaches. Subjects were taught how to interrupt the sequence preceding their emotional response and to engage in cognitive control techniques incompatible with further tension and stress. This "stress-coping"

training, accomplished in eight biweekly sessions with a 15-week follow-up, was employed with ten subjects, who were compared to subjects receiving either biofeedback or no treatment. At the termination of treatment and at follow-up, only the stress-coping group demonstrated substantial improvement on frequency, duration, and intensity of headaches. Holroyd & Andrasik (1982) reported a two-year follow-up on the same headache subjects. The stress-coping group were still significantly improved and continued to use the coping strategies. Moreover, 63% of those who received the stress-coping training reported decrements in symptoms other than headaches (e. g. dysphoric affect, psychophysiological symptoms) in contrast to the other groups, none of whom reported any improvements in symptoms other than headaches. Such treatment results imply a relationship between psychological stress and tension headache. Additional research is needed on other parameters, such as the duration of stress necessary to elicit a headache, the types of stressors which may be associated with tension headache, and individual differences in response to stress.

Headache and Learning Experience

In addition to examining the stress-headache relationship, application of learning principles in the study of chronic headache may add to the understanding of its etiology and maintenance. Interest in the development and investigation of treatment procedures derived from learning theory has flourished in the past two decades (Rimm & Masters, 1979; Turner, Calhoun, & Adams, 1981). Meanwhile, the etiology of behavioral disorders, and psychosomatic disorders in particular, have

received somewhat less attention from the learning theory viewpoint (Turkat,1982).

A fraction of the chronic pain literature is devoted to headache. As suggested by Fordyce (Fordyce, 1978; Fordyce, Fowler, & DeLateur, 1966; Fordyce, Fowler, Lehmann, & DeLateur, 1968; Fordyce, Fowler, Lehmann, DeLateur, Sand, & Trieschmann, 1973), headache reports can have strong effects on the subject's social environment and can be under the control of environmental contingencies. Reports of headache pain may be associated with avoidance of an unpleasant activity, such as doing housework or attending school, empathic and sympathetic communication from significant others, or other forms of externally delivered reinforcers. According to the learning model, the illness role is rarely consciously adopted. Rather it is shaped by three types of influences: (1) vicarious learning, or modeling, particularly in childhood; (2) direct social reinforcement of illness behavior by family, friends, and physician; and (3) avoidance learning (Bellissimo & Tunks, 1984; Lachman, 1972). Thus, evaluating the patient's past experiences with suffering and pain might be useful in understanding current chronic psychosomatic symptoms. For example, it might be useful to know whether the patient grew up with a sick sibling or parent who received special treatment or avoided certain responsibilities because of illness. Or perhaps the patient received special caring and attention only when ill.

Turkat (1982) applied learning principles to study the etiology of illness behavior. In that study diabetics with an avoidant model (a

parent who avoided work and responsibilities when ill) were more likely to avoid work and responsibilities when ill themselves than were diabetics with a non-avoidant model (parents did not avoid work or responsibilities when ill). Additionally, the diabetics with an avoidant model experienced more physician office visits, more hospital admissions, more days ill, and reported poorer quality of life ratings, although their degree of disease pathology was no different than the diabetics with non-avoidant models.

Turkat and Noskin (1983) replicated the study using healthy subjects, who were not chronically ill and did not have a parental history of chronic illness. Similarly, he found that healthy individuals with an avoidant model reported more work and responsibility avoidance when ill than did healthy individuals with a non-avoidant model. Additionally, he found that healthy individuals with avoidant models reported more positive reinforcement for current illness than did those without such a model. However, this difference on positive reinforcement did not emerge in the diabetic sample. Turkat and Noskin (1983) concluded that generally healthy individuals are more likely to receive positive reinforcement if they avoid responsibilities than diabetics who avoid, because acute illness is a more novel event. That conclusion was not tested. However, by extrapolating that conclusion, it would be expected that individuals who experience occasional tension headache would receive more positive reinforcement for their headache complaints than would chronic headache sufferers.

Phillips and Jahanshahi (1986) studied the behavioral consequences of chronic headache. They evaluated the responses of 267 chronic headache sufferers and identified six independent avoidance factors of pain behavior. In descending order of percent of variance, these six factors were: avoidance of social activity, avoidance of housework, daily mobility avoidance, activity avoidance, daily exercise avoidance, and stimulation avoidance. Other factors identified included non-verbal complaint, verbal complaint, self-help strategies, and medication use. Further analysis revealed that the more chronic headache sufferers reported more avoidance of housework and activities and more non-verbal complaints of pain than did the subjects with more recent headache onset, regardless of pain severity ratings. Additionally, there was a significant difference between high and low avoiders on their depression level and their headache severity. High avoiders scored higher on depression and headache severity. This study suggests that while some chronic headache sufferers may withdraw from involvements, others may confront stimuli and situations, despite the pain. It also suggests that avoidant behavior may be an important factor in sustaining distress and incapacity associated with chronic headache. Further, longer duration of the headache problem may lead to greater depression and more avoidance behaviors.

Another potentially important consequence of pain behavior may be the presence of externally delivered reinforcers, such as sympathetic or empathic communication from significant others. It is believed that a patient is more likely to focus on, amplify, or cling to a symptom if it

produces secondary gain. Such reinforcement might consist of attention and support, being excused from responsibilities, or the ability to manipulate other people who accept the patient as being sick. Turk, Meichenbaum, & Genest (1983) developed a "significant-other diary" to be used, in conjunction with the patient's own pain diary, during assessment of chronic pain. The significant other diary was used to note how other's reactions affect the patient's behavior, and vice versa. Each diary entry included (1) the date, (2) time, (3) location, (4) how he/she recognized the patient's pain, (5) what he/she thought, (6) how he/she felt, (7) how he/she tried to help, and (8) a rating of how much he/she thought the action helped. Having the significant other monitor reactions to the patient's pain allowed examination of the pattern of interpersonal reactions, their reciprocity, and their cycles, which presumably influenced the pain experience. At the end of a one- or two-week assessment period these authors discussed the diaries with the patient and significant other. They believed that such discussions provided a basis for considering any hidden agendas that the patient or significant other might have concerning the maintenance vs change of the patient's pain behavior. Unfortunately, these authors reported no data resulting from the use of this diary.

Much of the headache research to date has suffered from lack of clarity. Some authors have failed to adequately explain their statistics or method. Some have failed to define their "chronic headache" population. Others have combined subjects with a variety of headache problems (migraine, tension, mixed tension-migraine) into one

general headache comparison group. Additionally, authors often consider only global self-report measures, rather than actual behaviors.

Finally, no one has reported actual assessment data on family members of chronic tension headache sufferers.

Overview of Proposal

The aim of this study is to increase the understanding of the etiology and maintenance of chronic tension headache. Most medical scientists tend to believe that most "headaches do not result from organic pathology, but rather are the result of stressful stimulation in combination with psychological and physiological characteristics" (Bakal, 1975). This study will examine some psychological variables hypothesized to be related to chronic tension headache, and will particularly focus on psycho-social factors.

Assessment will include evaluation of headache activity, concomitant behavioral and affective response, current and childhood health history, operant learning experiences, depression, anxiety, and family environment.

Family evaluation is deemed important for several reasons. First, family members' reports may serve to validate the headache subject's behavioral reports. Secondly, the family is potentially the most cogent and potent social stimuli/social reinforcer in the headache subject's environment. Therefore, the family may be a crucial factor in the development and maintenance of the headache problem itself.

In the development of chronic headache, the family may function in a number of roles. For example, the family may function as an

instrument of learning, providing a model for and reinforcement for illness behavior. Additionally, the family may serve as a stressor for the headache-prone individual. Thus, the family may be an important determinant in whether an episodic event, such as a tension headache, becomes a chronic problem. Therefore, similar to Turk et al. (1983), this study will assess the family members as well as the individual headache sufferer.

As explained earlier, physiological vulnerability is believed to play a role in the etiology of headache. Yet questions remain as to what stressors activate the vulnerability. This study will assess potential stressors of the identified headache sufferer and those of their family members. It is believed that evaluation of the stressors of the entire family will give a fuller picture of the overall emotional environment, itself a potential stressor.

Headache sufferers have been shown to score higher than normals on psychological tests (Blanchard et al., 1984). However, it is unknown whether their family members also score higher on these tests. Higher scores by family members would suggest higher stress within the family. Thus, greater disturbances in affect of family members and of the headache subject himself, as indicated by higher scores on measures of depression and anxiety, may be related to greater headache activity of the identified headache sufferer. Also, daily monitoring of moodswings and stressful events of the headache subject and family members may reveal a correlation with headache activity.

Families experiencing greater stress are at risk for a variety of somatic problems. Somatic complaints in other family members may represent a reaction by those individuals to stress. In turn, such complaints may increase the level of stress experienced by the headache member, thus increasing his/her likelihood of experiencing a headache. Therefore, reports of other somatic symptoms in the family may increase with the severity of the headache problem.

As previously noted, increases in stress can lead to increased physiological response, and ultimately to headache or other somatic symptom. It is this response which can be shaped and reinforced.

As noted by Phillips and Jananshahi (1986), some individuals tend to persist in their normal scheduled daily activities even in the face of unpleasant somatic symptoms. Some persist quietly; others persist less quietly. Still others focus on their symptoms and respond with behaviors that allow them to continue to focus on the symptoms. These individuals are more likely to adopt avoidance strategies, such as lying down, leaving work early, etc.

It is hypothesized that avoidant strategies will reflect a coping strategy modeled in the family of origin. However, regardless of that history, the greater the avoidance behaviors, the more likely they are to gain the attention of others in the environment. Further, those responses are more likely to be reinforced.

Because focusing on symptoms is related to the awareness/attention of others, it is possible to make some general predictions. For example, headache activity may be greater in families where members are

more aware of the sufferer's headaches. Degree of family awareness is likely to be related to frequency and severity of headaches, degree of avoidance behaviors, and degree of expression and anxiety exhibited by the headache member. Additionally, greater family awareness of headache is likely to be related to patterns of greater expressiveness and cohesiveness within the family.

Further, in families where members are less aware of another member's symptoms, learning of illness behavior response is less likely to be taking place. Therefore, the children of these families are less likely to report somatic symptoms or illness behaviors than are children of families who are more aware of each others' symptoms. Conversely, subjects with more severe headache problems will probably have families with greater somatic complaints.

Hypotheses

A. Headaches and Stress

As discussed earlier, tension headaches are related to life stress. The family has been conceptualized as a potential source of stress for a headache-prone member. Distress experienced by one family member may impact the life and stress level of other members. Therefore, distress in the whole family may impact headache activity in that family member identified as having a problem with tension headache. This conceptualization has led to the following hypotheses.

1. Identified headache subjects (hereafter known as headache "target" subjects) and their family will be more distressed than normals. They will score higher than the standardized norms on the BDI,

the STAI, and the Hassles Scale. Additionally, they will score higher on these scales than the control subjects, who are are experiencing pain from an orthopedic injury but who are not suffering from a chronic psychosomatic disorder.

2. Further, higher scores on the BDI, STAI, and Hassles Scale, higher ratings of life dissatisfaction, and greater number of somatic symptoms experienced by the target and his family members will be related to greater headache problem (e.g., higher overall headache index) in the target individual.

3. Based on the finding of Arena et al (1984) that an individual's headache activity and negative affect increase on the same day, or isomorphically, target members' daily headache index is expected to have an isomorphic relationship with his/her own mood. The relationship of the target's daily headache index to his/her daily ratings of environmental stressors and somatic symptoms will be evaluated. Somatic symptoms and mood are expected to vary isomorphically with headache index. Based on Levor et al's (1986) findings concerning the psychosocial precursors of migraine headache, increases in environmental stressors (hassles) are expected to precede increases in headache index and remain elevated with rises in headache index.

4. Although Arena et al (1984) found that an individual's emotional state on the two days prior to a headache did not correlate with occurrence of the headache, it is well to note that the individual does not function in isolation. It is possible that stresses among

those in the individual's environment may impact his headache activity.

Therefore, it is predicted that the emotional status of the family, the rating of somatic complaints in the family, and the rating of stressful events (hassles) experienced by the family on one day will be related to the target's headache index on the following day. That is, the target's headache on "day n" will be related to the family stressors on "day n-1".

5. Further, it is possible that an individual's headache may affect others' lives on the day following the headache. Therefore, the target's headache index on day n is expected to impact (be correlated with) the family's mood, somatic symptoms, and stressful events (hassles) on the following day, or "day n+1".

B. Headaches and Learning

As potential social reinforcers and models, the family has the opportunity to affect the development and maintenance of chronic headache. Illness behavior associated with headache is more likely to be reinforced when others are aware of the headache. These concepts from the social learning model were the basis for the following hypotheses:

6. Headache subjects with avoidant parental models will themselves be more avoidant when ill than will those with non-avoidant parents.

7. Those target subjects who tend to avoid responsibilities (negative reinforcement) when ill will have a higher overall (14-day average) headache index than those who do not avoid responsibilities.

Those target subjects who currently report receiving positive reinforcement, in the form of special attention or assistance, when ill will have a higher overall headache index than those who do not report receiving positive reinforcement.

8. Greater family awareness of the actual occurrence of headache in the target member will be correlated with family patterns of higher cohesion and expressiveness, greater number of illness behavior responses emitted by the target member, and more somatic symptoms experienced by family members.

9. Overestimation by the target of his family member's awareness of his headaches will be related to the target being more distressed. That is, if the target subject believes the family member is aware of his/her headache, while in actuality the family member is not aware of the headache, the target may not receive the amount of support he/she expects in times of pain. Such expectations are expected to lead to distress. Greater overestimation will be accompanied by higher scores on the BDI and STAI, greater marital dissatisfaction and general life dissatisfaction, and lower family patterns of cohesion and expressiveness.

METHOD

Subjects

Experimental subjects were 18 family pairs with one member diagnosed as having chronic tension headache. Control subjects were 15 family pairs in which one member had recently sustained an orthopedic injury (i.e., severe sprain, broken limb) which resulted in pain. Family pairs consisted of either cohabiting couples (spouses or significant others), cohabiting adult siblings, or cohabiting parent and child. In only one case was the child member a minor (age 14). Subject demographics are summarized in Table 1.

Headache subjects were recruited through public service announcements and physician referral. The identified headache subjects (headache "targets") had experienced tension headaches for at least one year and were not undergoing psychological treatment for headache. Diagnosis of tension headache was made in a semi-structured interview which followed the "Specific Diagnostic Inclusion Criteria for SUNYA Headache Project" (Blanchard & Andrasik, 1985) which is adapted from the diagnostic criteria of the Ad Hoc Committee on Classification of Headache (1962).

Headache targets met the following inclusion criteria. First, targets reported averaging at least three headaches per week. Second, they reported at least two of the following: (a) headache usually described as bilateral and beginning in the occipital, suboccipital, or back of the neck region; (b) headache described as usually feeling like

Table 1

Demographic Characteristics of Headache Targets and Control Targets

<u>Characteristics</u>	<u>Headache Targets</u>	<u>Control Targets</u>
Age		
Mean	34.5	38.7
S.D.	13.8	18.7
Range	20-64	21-83
Sex*		
Female	17	10
Male	1	5
Marital status		
Married	11	7
Single	7	8
Income (in dollars)		
Mean	33M	30.5M
Range	16M-60M	6M-85M
Education (in years)		
Mean	15.3	13.4
Range	9-19	9-20

*Chi-square comparison revealed difference between groups ($p < 0.01$).

a tightness or external pressure on head and/or a "cap" or "band " around the head; (c) headache usually described as a continuing "dull ache." Additionally, independent physician diagnosis of tension headache was obtained.

The identified orthopedic control subjects (targets) were referred by orthopedic surgeons. Control targets (1) were identified by their orthopedist as having recently sustained a severe sprain or a broken bone, (2) experienced pain related to said injury, (3) did not meet the criteria for chronic tension headache described above, (4) denied experiencing any other chronic pain condition (e.g., arthritis) or any psychosomatic condition which might be stress-related (e.g., IBS, asthma), and (5) did not suffer from a serious psychiatric illness.

Initial screening of potential orthopedic control subjects was conducted by the physician who diagnosed and treated the injury. The physician then referred potential control subjects for possible participation in the study.

Potential subjects were screened in a brief telephone interview to determine their appropriateness for and interest in the study. This initial screening was conducted by the principal investigator, a graduate student in clinical psychology who was knowledgeable concerning the diagnostic criteria of headache and the aims of this study. Respondents who lived alone were excluded.

Procedure

Appropriate respondents and their family members were invited to make an appointment for additional evaluation. At this initial

appointment, identified headache subjects and orthopedic subjects provided written consent (See Appendix A and Appendix B, respectively) (a) to respond to questionnaires and interviews which required approximately two hours, (b) to keep a symptom diary (described in next section) for two weeks, and (c) to allow his/her family to participate in the assessment. Additionally, headache subjects consented to the contact of his/her personal physician who would be asked to indicate diagnostic procedures conducted, their results, and the final headache diagnosis (See Appendix C for Release Form and Appendix D for Physician Evaluation Form).

All family members consented in writing (See Appendix E and Appendix F) to participate in the assessment, which required them to complete the semi-structured interview, answer the questionnaires described in the next section, and keep the two-week daily diary. All subjects also consented to refrain from discussing their individual diary information with the other family member. The questionnaires were administered in random order to minimize fatigue effects. No order effect was anticipated.

Assessments of the headache families were conducted at the Psychological Services Center by graduate students in clinical psychology and by well-trained, closely supervised undergraduate psychology students. Assessments of the orthopedic control families were similarly conducted at the Psychological Services Center or in their own home. No subject's responses to the mental status portion of the semi-structured interview suggested psychosis or extreme

psychological distress (e.g., depression) which might compromise the individual's ability to participate fully in the study.

Measures

The following measures required approximately two hours to complete. They explore family relationships and provide a general evaluation of each participant's current mood state, psychosomatic experience, illness-reinforcement history, and current stressful life events.

1. The Beck Depression Inventory, (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) is a widely used scale which assesses the cognitive, affective, vegetative, motivational, and psychomotor components of depression (See Appendix G). The BDI has good to excellent reliability and validity (Beck, 1967). An overall depression score was calculated.
2. The State-Trait Anxiety Inventory (STAI) (See Appendix H) is a widely used two-part scale assessing both state and trait anxiety. It is a brief scale with good reliability and validity (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Overall scores for both state anxiety and trait anxiety were calculated.
3. The Psychosomatic Symptom Checklist (PSC; Cox, Freundlich, & Meyer, 1975) measures the extent and severity of a variety of psychosomatic complaints, including headache (See Appendix I). A frequency score and a severity score were obtained for each of the 17 somatic symptoms. The PSC has proved to be a highly reliable instrument ($r > 0.80$). It has been demonstrated to be a very sensitive measure

of psychosomatic distress, discriminating between "normal" subjects and those with identified psychosomatic complaints (Attanasio, Andrasik, Blanchard, & Arena, 1984).

4. The Illness-Behavior Experiences questionnaire (See Appendix J) is a 6-item instrument based on an interview developed by Turkat (1982). It identifies the participant's parental model of illness behavior as either avoidant or non-avoidant. It also assesses the presence or absence of positive and negative social reinforcers for illness behavior experienced currently and in childhood. Based on the answer to item #1, subjects were identified as having either an avoidant parental model or a non-avoidant parental model. The number of affirmative and negative responses to each question was computed for each group. No reliability or validity data are available for this questionnaire.

5. The Hassles Scale (Appendix K) consists of a list of 117 irritating, frustrating, and distressing demands which to some degree characterize everyday transactions with the environment. Participants rate the severity of the hassles experienced in the past month. Frequency and cumulative intensity scores were calculated. One-month test-retest data indicate adequate reliability ($r > 0.48-0.79$). High retest reliability might not be expected for such a state-dependent measure. This scale has been shown to be a better predictor of concurrent and subsequent psychological symptoms than major life event scores (Kanner, Coyne, Schaefer, & Lazarus, 1981).

6. The Family Environment Scale (FES; Moos & Moos, 1981) is a 90-item, true-false, self-report measure of the family social climate. It assesses three dimensions - - relationship, personal growth, and system maintenance - - and identifies different family structures (See Appendix L). Total scores were obtained on 10 separate scales: cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral-religious emphasis, organization, and control.

7. The Index of Marital Satisfaction (IMS; Hudson, 1982) is a 25-item instrument designed to measure perceived problems in the marital relationship (See Appendix M). Each item is rated on a five-point scale indicating degree of contentment. It has excellent internal consistency ($\alpha = 0.96$) and two-hour test-retest stability ($\alpha = 0.96$). It has very good discriminant and construct validity. Excellent concurrent validity with the Locke-Wallace Marital Adjustment Test has been demonstrated. A total satisfaction score was obtained, with higher scores giving evidence of greater marital dissatisfaction.

8. The Semi-structured Interview (Appendix N) for headache subjects and family members assesses headache history, headache characteristics, and behavioral responses of the headache sufferer or the family member. The interview is designed to identify and quantify the behavioral responses emitted by the individuals when they feel ill in general and, more specifically, when they experience headache. Specific responses assessed include doctor visits, medication intake, going to bed, leaving work/school, not going to work/school, becoming

less active, and foregoing activities. Other behavioral responses may be identified by the subjects.

The interview also assesses the degree to which the chronic headache problem has affected the individual and the family member. Subjects rated the degree to which the chronic headache problem has affected their career, education, personal life, family relations, homelife satisfaction, and marital satisfaction.

Additionally, the interview assesses the family member's awareness of and reaction to the occurrence of headache in the identified headache subject, as perceived by the headache subject and by other family members.

A brief mental status evaluation is embedded in the interview. This evaluation is intended to help screen out those potential subjects whose mental status would preclude their full participation in the study.

9. The Semi-structured Interview for the Orthopedic Subject (Appendix O) is similar to the interview for the headache subject described above. It focuses on the orthopedic pain experience, while exploring the same consequences and ramifications explored for the headache sufferers.

10. Likewise, the Semi-structured Interview for Family of Orthopedic Subjects (Appendix P) is similar to the interview for the family of headache sufferers, exploring the ramifications and consequences of injury-related pain.

11. The Daily Headache Diary (Appendix Q) guides the monitoring of headache activity four times daily for two weeks. The diary includes the monitoring of mood swings, the occurrence of stressful events, and the experience of other somatic symptoms.

The sum of the headache ratings was calculated for each day, with the maximum score = 20. A daily headache index and an overall average headache index were calculated for each subject. Likewise, subjects monitor occurrence and severity of stressful events. From these ratings, an average hassle index was calculated for each day. Additionally, subjects rate seven moods, or feelings (4 negative moods and 3 positive moods), on a six-point scale. Daily sums and 14-day averages of the negative and positive ratings were obtained. Subjects also rate the severity of six physical symptoms on the same six-point scale. A daily sum, a 14-day total, and a 14-day average of the symptom ratings were calculated.

Behavioral responses to headache, such as lying down, discussing the headache with others, taking medication, or interrupting activities or plans, are also monitored. Total number of behavioral responses to headache was calculated for the 14-day diary-keeping period.

Additionally, the awareness by family members of the presence of headache in the identified headache subject is assessed. On the days which the headache subject experiences a headache, he/she indicates whether the other family member is suspected of being aware of the headache. This report was compared to the reports of awareness by the

other family member. The degree to which the headache subject overestimated or underestimated the family awareness was calculated.

12. The Orthopedic Pain Diary (see Appendix R) assesses the same variables as does the Headache Diary just described, except the Orthopedic Pain Diary monitors injury-related pain instead of headache pain.

RESULTS

To explore whether headache sufferers and their family members are more distressed than normals [Hypothesis 1], these two groups were compared to standardized norms on three psychological measures. The scores of headache targets were compared via t-test to standardized norms for working adults and college students [State=36.584, Trait=36.972] for the STAI (Speilburger et al, 1983). Also, the targets' Hassle frequency scores were compared to the adult frequency norm of 18.9. The correlation between frequency and cumulative severity, or total score, is 0.95 (Kanner et al, 1981). The BDI scores of the headache targets were compared to the "borderline" cutting score of 10. As predicted in Hypothesis 1, the headache targets scored higher than established norms on the anxiety measures and the Hassle Scale (for all comparisons t 's > 2.27 and $p < 0.0187$). The headache targets scored within the borderline range on the depression measure. Group means for these measures are displayed on Table 2. Because of the distribution differences in males and females in the control target group, scores for both male and female subgroups are reported.

The scores of the control targets were compared to the same standardized norms. Group means, including male and female subgroups, are displayed in Table 2. This group scored no differently than the normative samples, with the exception of the Hassle score, control targets endorsing fewer than "normal" hassles.

As shown in Table 2, the two target groups did not differ on their measure of pain experienced, as measured by the headache/orthopedic pain

Table 2

Comparison Between Scores of Headache Targets and Control Targets

	Headache Target		Control Target		t	df	p(1-tail)
	<u>M</u>	<u>S.D.</u>	<u>M</u>	<u>S.D.</u>			
Headache/ Pain Index	1.571	0.893	1.606	0.894	-0.11	31	0.4560
BDI	10.333	6.748	4.867	2.997	2.90	31	0.0035
Male	11.000	.	4.000	2.915	.	.	.
Female	10.294	6.953	5.300	3.093	2.14	25	0.0210
State Anxiety	42.889	10.538	32.600	7.917	3.12	31	0.0020
Male	43.000	.	38.000	7.969	.	.	.
Female	42.882	10.862	29.900	6.707	3.40	25	0.0010
Trait Anxiety	42.772	9.857	33.333	6.925	3.10	31	0.002
Male	50.000	.	35.600	5.595	.	.	.
Female	42.294	9.989	32.200	7.509	2.76	25	0.005
Hassle Score	54.333	36.763	19.600	12.844	3.48	31	0.001
Male	52.000	.	27.800	17.796	.	.	.
Female	54.471	37.890	15.500	7.735	3.19	25	0.002
Hassle #	32.333	25.097	12.467	8.210	2.93	31	0.003
Male	35.000	.	16.800	12.194	.	.	.
Female	32.176	25.861	10.300	4.808	2.63	25	0.007
Marital (dis)satis- faction	44.455	12.201	35.167	3.430	1.80	15	0.046
Male	.	.	37.500	0.707	.	.	.
Female	44.455	12.201	34.000	3.741	2.28	14	0.027
Quality of Life	3.765	0.903	4.143	0.770	-1.24	29	0.113
Male	4.000	.	3.800	0.837	.	.	.
Female	3.750	0.931	4.333	0.707	-1.16	18	0.145

indices. Yet, as predicted, compared to the orthopedic control targets, the headache targets were more depressed, more anxious, endorsed more items on the Hassle Scale, and rated those hassles as more bothersome. Headache sufferers indicated more marital dissatisfaction than did orthopedic targets. But these two groups rated their quality of life similarly. Since the headache target group was more heavily weighted with females than was the control target group, comparisons of the females in these two groups were conducted to explore a possible sex bias. No such bias was found. Female headache sufferers were more distressed than female control targets, as shown in Table 2. Taken together these results suggest that chronicity of pain, not the pain level, is related to psychological distress.

The scores of the headache family members were compared to the same standardized norms. However, in contrast to the prediction, the headache family members did not score higher than standardized norms on the BDI, the STAI, or the Hassle Scale. In fact, they tended to score lower than normative samples. Group mean scores are displayed on Table 3.

The scores of the control family members were likewise compared to standardized norms of the three psychological measures. This group scored no differently than the normative samples. Group means are displayed on Table 3.

Family members of the headache targets scored no differently than the family members of the control targets on the same psychological measures. (See Table 3) And both groups were not dissimilar to the

Table 3

Comparison Between Scores of Headache Family and Control Family

	Headache Family		Control Family		t	df	p(1-tail)
	M	S.D.	M	S.D.			
Headache Index	0.109	0.136	0.326	0.491	-1.80	31	0.041
BDI	5.333	3.865	6.200	6.050	-0.50	31	0.311
Male	4.667	4.163	2.833	1.941	1.01	16	0.155
Female	6.667	3.077	8.444	6.894	-0.59	13	0.285
State Anxiety	29.833	6.555	35.467	14.147	-1.51	31	0.070
Male	29.083	5.333	27.833	4.355	0.49	16	0.310
Female	31.333	8.914	40.555	16.295	-1.26	13	0.117
Trait Anxiety	32.556	9.294	37.667	9.897	-1.53	31	0.069
Male	29.167	6.645	32.167	3.312	-1.03	16	0.151
Female	39.333	10.671	41.333	11.258	-0.34	13	0.344
Hassle Score	23.389	17.047	34.667	25.432	-1.52	31	0.069
Male	20.417	16.676	21.333	8.335	-0.13	16	0.450
Female	29.333	17.682	43.556	29.433	-1.06	13	0.155
Hassle #	15.833	11.036	20.467	11.070	-1.20	31	0.120
Male	14.500	11.540	16.833	5.845	-0.46	16	0.323
Female	18.500	10.407	22.889	13.289	-0.68	13	0.257
Marital (dis)satisfaction	36.583	11.611	38.500	6.626	-0.37	16	0.357
Male	36.583	11.611	37.750	8.381	-0.18	14	0.427
Female	.	.	40.000	1.414	.	.	.

normal population, suggesting that the emotional climate within the headache family is not notably disturbed. As with the two target groups, these family groups were further broken down by sex and evaluated for sex bias. No sex bias was found, as shown in Table 3.

Compared to their own family members, headache sufferers were more depressed, more anxious, endorsed more items on the Hassle Scale and rated them as more bothersome, or intense ($t > 2.5$, $p < 0.0075$ on every measure). This result is interesting because the target and family share a variety of environmental and interpersonal stimuli, yet only the target endorsed abnormally high levels of psychological distress and experienced a headache problem.

In summary, these results do not challenge the conceptualization of the family as a potential source of stress for a headache-prone member, or vice versa. However, the headache family members were no more distressed than "normal", according to the global measures used to assess distress. The results do suggest that there is something about the extended experience of chronic pain that is more distressing than the experience of acute pain.

Hypothesis 2 predicted that greater headache problems would be correlated with greater personal distress. Therefore, Pearson Product Moment correlations were conducted to explore the relationship between the headache targets' pain index and (1) their own scores on the psychological measures, (2) their families' scores on the psychological measures, (3) their marital satisfaction ratings, and (4) their experience with other somatic symptoms as determined by PSC scores. As

shown in Table 4, the 14-day average headache index of the headache targets was only weakly related or negligibly related to their own global ratings of depression (BDI), anxiety (STAI), hassles, marital satisfaction (IMS), or life satisfaction (from semi-structured interview). Stronger relationship existed between average headache index and global rating of somatic complaints (PSC). In other words, the greater headache problems were not correlated with higher scores on the global measures of psychological distress, but were strongly correlated with psychosomatic distress.

Targets' headache activity was virtually unrelated to their families' ratings on the same measures. These correlations are shown on Table 5.

It could be argued that when exploring the relationship of the targets' pain indices and personal distress, it is more appropriate to compare the 14-day average headache index to measures of emotional and somatic status monitored during the same 14-day period, rather than to global measures. Correlations using only daily diary ratings of headache and distress were calculated. Table 6 displays the Pearson Product Moment correlations between the targets' 14-day average headache index and targets' and families' average ratings of daily moods, hassles, and somatic symptoms during the same 14-day period. While only personal hassles and family hassles were significantly correlated with headache activity, the correlations with physical symptoms and negative mood approached significance.

Table 4

Correlations Between Target's Average Headache Index
and Global Target Measures

	Average Headache Index		
	<u>r</u>	<u># obs</u>	<u>p</u>
BDI	0.2787	18	0.131
State Anxiety	0.2775	18	0.132
Trait Anxiety	-0.0101	18	0.484
Hassle Score	0.2412	18	0.167
Marital (dis)satisfaction	0.2486	11	0.230
PSC	0.7092	17	0.001
Quality of Life	-0.2178	18	0.201

Table 5

**Correlations Between Target's Average Headache Index
and Global Family Measures**

	Average Headache Index		
	<u>r</u>	<u># obs</u>	<u>p</u>
BDI	0.1351	18	0.296
State Anxiety	0.2292	18	0.180
Trait Anxiety	0.0114	18	0.482
Hassle Score	0.0100	18	0.484
Marital (dis)satisfaction	0.0245	12	0.470
PSC	0.1540	18	0.271

Table 6

Correlations Between Target's Average Headache Index
and Average Diary Ratings

	Average Headache Index		
	<u>r</u>	<u># obs</u>	<u>p</u>
Positive Mood	-0.2535	18	0.155
Negative Mood	0.3434	18	0.081
Physical Symptoms	0.3953	18	0.052
Hassle	0.7316	18	0.000
Family Positive Mood	0.0409	18	0.436
Family Negative Mood	0.2034	18	0.209
Family Physical Symptoms	0.0657	18	0.398
Family Hassle	0.4190	18	0.042

Attention was then turned to daily variations in diary data. Pearson Product Moment correlations were computed between each target's daily headache indices and the following variables: (1) daily positive mood ratings, (2) daily negative mood ratings, (3) daily somatic symptom ratings, (4) and daily ratings of stressful events, or hassles. Each target's daily headache index was paired with the four variable ratings on the same day (day n). Then all 18 subjects' daily correlations were averaged to determine a mean correlation for each of the 14 days. [See Hypothesis 3.] Results are displayed on Table 7. On average, the targets' daily headache index was not significantly correlated with their own negative mood, positive mood, physical status, or hassle ratings on the same day. However, the correlation with hassles approached significance.

Cross-lagged correlations were also conducted. Each day's (day n) headache index was paired with the four variables as reported on the day immediately preceding (day n-1) and the day immediately following (day n+1). [See Hypotheses 4 and 5, respectively.] As before, all 18 subjects' daily correlations were averaged to determine a mean correlation for each of the 13 days. Results are displayed on Tables 8 and 9, respectively. On average, the targets' daily headache index was not significantly correlated with their own negative mood, positive mood, somatic symptoms, or hassle ratings on either day n-1 or day n+1. However, the correlations with hassles approached significance.

Similar analyses were conducted to test the hypothesis that the targets' headache activity is related to their families' stresses. The

Table 7

**Correlations Between Targets' Headache Index
on Day n and Variables on Day n**

	Headache Index			
	<u>r</u>	<u># obs</u>	<u>p</u>	<u>p-range</u>
Negative Mood	0.2350	14	0.4125	0.0261-0.9547
Positive Mood	-0.2377	14	0.4007	0.0035-0.9828
Physical Symptoms	0.2598	14	0.3524	0.0291-0.7881
Hassle	0.4654	14	0.1195	0.0045-0.7138
Family Negative Mood	0.1035	14	0.3951	0.0115-0.9601
Family Positive Mood	0.0100	14	0.6646	0.1406-0.9852
Family Physical Symptoms	0.0358	14	0.4639	0.0259-0.9422
Family Hassle	0.2952	14	0.3812	0.0621-0.1856

family variables to be tested were (1) the family members' daily rating of positive mood, (2) the family members' daily rating of negative mood, (3) family members' daily somatic symptoms ratings, and (4) familymembers' daily ratings of stressful events, or hassles. Pearson Product Moment correlations between each of the target's daily headache indices and each of the four family variables obtained on the same day (day n) were computed. As described above, average correlations were then calculated for each of the 14 days. Results are shown on Table 7. On average, the targets' daily headache index was not significantly correlated with the families' mood ratings, somatic symptoms, or hassle ratings on the same day.

Then cross-lagged correlations were computed in which each target's daily headache indices were paired with each of the four family variables on days n-1 and days n+1. Again, average correlations were computed for each of 13 days. [See Hypotheses 4 and 5, respectively.] As shown on Table 8 and Table 9, respectively, the targets' daily headache index was not significantly correlated with the family ratings of moods, physical symptoms, or hassles from either the previous day or the following day.

In summary, daily variations in these independent variables were not significantly related to daily fluctuations in headache activity, although target hassles showed a trend toward significance. (See Appendices S, T, U, and V for intrapersonal correlations.) Further, of the eight independent variables explored, only the average target hassles and average family hassles were significantly related to overall

Table 8

Correlations Between Target's Headache Index
on Day n and Variables on Day n-1

	Headache Index			
	<u>r</u>	<u># obs</u>	<u>p</u>	<u>p-range</u>
Negative Mood	0.2058	13	0.4453	0.0103-0.7776
Positive Mood	-0.1970	13	0.4641	0.0198-0.9581
Physical Symptoms	0.2270	13	0.4836	0.0073-0.9871
Hassle	0.4589	13	0.1195	0.0001-0.5459
Family Negative Mood	0.1447	13	0.4501	0.0084-0.9475
Family Positive Mood	-0.0312	13	0.6104	0.1043-0.9820
Family Physical Symptoms	0.0634	13	0.4059	0.0156-0.8715
Family Hassle	0.2660	13	0.3328	0.0066-0.9511

Table 9

Correlations Between Target's Headache Index
on Day n and Variables on Day n+1

	Headache Index			
	<u>r</u>	<u># obs</u>	<u>p</u>	<u>p-range</u>
Negative Mood	0.1406	13	0.5929	0.0535-0.9534
Positive Mood	-0.0843	13	0.5608	0.2007-0.9028
Physical Symptoms	0.1697	13	0.4626	0.0957-0.8908
Hassle	0.4209	13	0.1435	0.0038-0.4499
Family Negative Mood	0.0839	13	0.4792	0.0742-0.9919
Family Positive Mood	0.0171	13	0.6056	0.1763-0.9713
Family Physical Symptoms	0.0101	13	0.4769	0.0928-0.9039
Family Hassle	0.2881	13	0.3312	0.0430-0.9794

headache activity. Interestingly, these hassle variables were the only variables individually defined by the subjects themselves. In other words, the subjects themselves identified their own most salient hassles and rated them daily, resulting in their hassle index. Also, hassles were the only variables associated with observable, external conditions or events. The other variables were ratings of internal conditions (mood and somatic sensation).

Taken together these results yield only limited support for the theory that stress can initiate or exacerbate headache, suggesting only that environmental variables may be significant stressors for those individuals prone to headache. Thus the predictive ability of target and family variables identified in this study is suspect.

To explore the question of predictive ability, the variables were submitted to the all possible regressions procedure. This procedure was preferred over sequential methods because (1) the sequential methods give only one answer without displaying the results on a large number of subset models, and (2) they can't handle multicollinearity (Myers, 1986). There is no certainty that the truly best model will survive sequential procedures or will even be produced computationally. Full information is only attained from the use of all possible regressions.

After all possible regressions had been generated, the conceptual prediction criterion, C_p , was used to reduce the number of candidate models to a relatively small set. The C_p statistic is an estimate of model error, or a performance measure of the predictive ability of the model. C_p penalizes the model for being too big (overspecified) or too

small (underspecified), thus reducing variance and bias, respectively (Myers,1986).

Next, the candidate models were further investigated via standard regression procedures, which revealed the R-square for the whole model, the contribution of the individual regressors to the model, the measure of variance inflation, and the damage inflicted by collinearity. As expected, the strongest prediction of headache activity came from the model of same-day (day n) regressors. [See Table 10.] This model included two main effects, target hassles and symptoms, and two interactions, target positive mood-symptoms and family positive mood-hassles.

However, the models representing individual and family variables from the previous day (day n-1) were weak, but significant, predictors of headache activity on day n. Salient models are displayed on Table 11. Model A consisting of two main effects, target hassle and symptoms, was the most explanatory. Model B and Model C represent the combinations of family variables on day n-1 which best predicted target headache on day n. Model B consists of two main effects, family negative mood and family symptoms, plus two interactions of family hassles-positive mood and family positive mood-symptoms. Model C has only one main effect, family symptoms, but three interactions, family hassles-positive mood, family positive mood-negative mood, and family positive mood-symptoms.

Headache activity on day n was a weak predictor of the headache sufferer's intrapersonal condition and, to a lesser extent, the

Table 10

Regression Model for Headache Index on Day N

<u>Model A</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Hassle	.8.729	0.0001	1.035
Symptom	4.692	0.0001	3.640
Family Positive mood-Hassle	4.091	0.0001	1.075
Positive mood-Symptom	-3.138	0.0019	3.584

R-square=0.3517 F=30.78 Prob>F=0.0001 Collinearity cond.<0.354

Table 11

Models for Predicting Headache Index on Day N with Regressors from N-1

<u>Model A</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Hassle	8.75	0.0001	1.030
Symptoms	2.61	0.0095	7.400

R-square=0.2097 F=8.79 Prob>F=0.0001 Collinearity cond.<0.664

<u>Model B</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Family Negative mood	2.501	0.0131	1.127
Family Symptoms	1.836	0.0678	5.618
Family Hassles-Positive mood	3.714	0.0003	1.026
Family Positive mood-Symptoms	-2.074	0.0393	5.397

R-square=0.1091 F=6.486 Prob>F=0.0001 Collinearity cond.<4.644

<u>Model C</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Family Symptoms	2.307	0.0188	5.303
Family Hassles-Positive mood	3.694	0.0003	1.027
Family Positive mood- Negative mood	2.587	0.0103	1.075
Family Positive mood-Symptoms	-2.532	0.0121	5.338

R-square=0.1109 F=6.608 Prob>F=0.0001 Collinearity cond.<4.53

condition of the family member on the following day (day n+1). Salient models are displayed on Table 12. Model A consists of two main effects and two interactions, target hassles, symptoms, hassles-positive mood, positive mood-symptoms. Model B consists of one main effect, targetsymptoms, and two interactions, target hassles-positive mood and target positive mood-symptoms. Similarly, Model C and Model D represent family variables on day n+1 affected by headache activity on day n. Model C includes family symptoms, hassles-positive mood, positive mood-symptoms, positive mood-negative mood. Model D is the same as Model C minus one regressor.

Although these models were significant predictors, none were strong predictors of headache activity (as measured by R-square). This suggests a "noisy system" in which other variable(s) are active. The most likely candidate might be individual differences (ID). To explore this possibility, the more explanatory models from days n, n-1, and n+1 were re-evaluated with the general linear models procedure, which tolerates categorical and continuous variables. This procedure allowed the variability from subjects to be isolated (blocked) from the original regressors and then added to the model as an additional regressor (ID). This allows us to look at the effect of the original regressors minus the influence of individual differences upon them. The results are shown in Tables 13, 14, and 15. This procedure assumes the headache model is operant in all subjects. Since there is evidence that the group clinically known as tension headache sufferers is markedly heterogeneous, this procedural assumption may be questionable.

Table 12

Models for Predicting Regressors on Day N+1 From Headache Index on Day N

<u>Model A</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Hassles	1.697	0.0912	2.372
Symptoms	3.836	0.0002	4.825
Hassles-Positive mood	3.183	0.0017	3.238
Positive mood-Symptoms	-3.200	0.0016	5.034

R-square=0.2063 F=14.556 Prob>F=0.0001 Collinearity cond.<4.81

<u>Model B</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Symptoms	5.553	0.0001	3.478
Hassles-Positive mood	6.829	0.0001	1.375
Positive mood-Symptoms	-4.739	0.0001	3.692

R-square=0.1961 F=18.296 Prob>F=0.0001 Collinearity cond.<3.57

<u>Model C</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Family Symptoms	1.719	0.0871	5.242
Family Hassles-Positive mood	4.377	0.0001	1.040
Family Positive mood-Symptoms	-2.172	0.0310	5.244
Family Positive mood- Negative mood	1.617	0.1074	1.074

R-square=0.1047 F=6.196 Prob>F=0.0001 Collinearity cond.<4.49

<u>Model D</u>	<u>t</u>	<u>p</u>	<u>variance inflation</u>
Family Symptoms	0.1881	0.0613	5.190
Family Hassles-Positive mood	4.493	0.0001	1.034
Family Positive mood-Symptoms	-2.140	0.0334	5.243

R-square=0.0936 F=7.334 Prob>F=0.0001 Collinearity cond.<4.352

Table 13

Result of General Linear Procedure on Day N Model

Model A	df	F	P > F
ID	17	6.64	0.001
Hassle	1	4.64	0.032
Symptom	1	11.87	0.007
Family Positive mood-Hassle	1	5.19	0.024
Positive mood-Symptom	1	9.48	0.002

R-square=0.5784

Model F-value=13.72

P > F = 0.0001

Table 14

Result of General Linear Procedure on Day N-1 Models

<u>Model A</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	8.77	0.001
Hassle	1	10.50	0.014
Symptom	1	4.11	0.439

R-square=0.5252

Model F-value 11.45

P>F=0.0001

<u>Model B</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	12.24	0.001
Family Negative mood	1	2.96	0.087
Family Symptoms	1	0.28	0.600
Family Hassles-Positive mood	1	0.30	0.582
Family Positive mood-symptoms	1	0.01	0.943

R-square=0.5689

Model F-value= 12.25

P>F= 0.0001

Table 15

Result of General Linear Procedure on Day N+1 Models

<u>Model A</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	8.95	0.0001
Hassles	1	7.96	0.0052
Symptoms	1	2.27	0.1335
Hassles-Positive mood	1	10.50	0.0014
Positive mood-Symptoms	1	4.11	0.0439

R-square=0.5426 Model F-value= 11.69 P>F=0.0001

<u>Model B</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	8.47	0.0001
Symptoms	1	0.01	0.9046
Hassles-Positive mood	1	2.27	0.0905
Positive mood-Symptoms	1	0.61	0.4358

R-square=0.5250 Model F-value 11.50 P>F=0.0001

<u>Model C</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	10.17	0.0001
Family Symptoms	1	0.07	0.7864
Family Hassles-Positive mood	1	1.31	0.2535
Family Positive mood-Symptoms	1	0.00	0.9761
Family Positive mood-Negative mood	1	0.12	0.7341

R-square=0.5253 Model F-value=10.28 P>F=0.0001

<u>Model D</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
ID	17	10.47	0.0001
Family Symptoms	1	0.07	0.7903
Family Hassles-Positive mood	1	1.40	0.2384
Family Positive mood-Symptoms	1	0.00	0.9721

R-square=0.5251 Model F-value=10.83 P>F=0.0001

Indeed, inclusion of subject variability as a regressor in the models dramatically increased the predictive ability of the models, as indicated by the larger R-square. In all cases, ID became the strongest individual contributor to the model. Yet, in some cases, the other regressors continued to be significant, though weaker, contributors to the model. Both the regression procedure and the general linear procedure are reasonable methods of evaluating the predictive ability of the models and their components. However, comparing the results of both procedures suggests that effects of the regression variables (mood, somatic symptoms, and hassles) are highly dependent on the individual.

Another way exists to evaluate the relationship between the headache activity and the intrapersonal and familial variables, while neutralizing individual differences. That strategy involves the use of the averages of the variables in question. Each target's 14-day averages of these variables were entered into all possible regressions procedure. Table 16 shows the contribution of each of the single variable models to the explanation of mean headache activity.

Individually, target hassles was a moderately strong predictor of headache activity. The other regressors lacked notable prediction.

As before, the Cp statistic was used to select (from all the possible models) a few candidate models to evaluate further, using standard or general linear regression procedures. (When average scores are used, these two regression procedures yield identical results.) As shown in Table 17, models including the headache sufferers' average moods, somatic symptoms, and environmental stressors in a two-week

Table 16

Prediction of Mean Headache Index by Singular Regressors

<u>Mean Regression Variables</u>	<u>R-square</u>
<u>Target</u>	
Hassles	0.535
Symptoms	0.163
Negative mood	0.117
Positive mood	0.064
<u>Family</u>	
Hassles	0.175
Negative mood	0.041
Positive mood	0.002
Symptoms	0.000

Table 17

Candidate Models of Mean Target Variables Predicting Mean Headache Index

<u>Model A</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Symptoms	1	11.47	0.0054
Hassles-Positive mood	1	12.60	0.0040
Hassles-Symptoms	1	5.22	0.0413
Positive mood-Symptoms	1	17.33	0.0013
Negative mood-Symptoms	1	4.01	0.0679

R-square=0.8046 Model F-value=9.89 P>F=0.0006

<u>Model B</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Symptoms	1	21.83	0.0004
Hassles-Positive mood	1	23.00	0.0003
Positive mood-Symptoms	1	15.71	0.0014

R-square=0.7024 Model F-value=11.02 P>F=0.0006

<u>Model C</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Negative mood	1	4.33	0.0596
Symptoms	1	12.23	0.0044
Hassles-Positive mood	1	5.78	0.0333
Positive mood-Symptoms	1	7.25	0.0196
Hassles-Negative mood	1	3.96	0.0699

R-square=0.7813 Model F-value= 8.58 P>F=0.0012

period strongly predicted their average headache activity level during that time. However, as shown in Table 18, the family members' average moods, somatic symptoms, and hassles were considerably less predictive of the target's average headache activity.

The models using variable means were more predictive of average overall headache activity than were the models using daily variable measures predictive of headache activity day-to-day. Several factors could explain this result. First, the stressors examined in this study may have a cumulative effect which is a better predictor of overall headache activity. Perhaps the duration of stress, as well as level or type of stress, is critical to the elicitation or severity of headache. Second, some individuals (especially family members) endorsed very little variability when monitoring the variables. Small variability in the independent variable makes it difficult to demonstrate significant relationship to the dependent variable. Third, according to the central limit theorem, it is reasonable to assume that averages follow normal distributions. However, the day-to-day variations may not meet that assumption of normality, thus hampering the regression. Finally, inspection of individual data revealed that the general stress model explored in this study was operant within subjects to varying degrees day-to-day. For example, 65% of the subjects endorsed isomorphic changes in hassles and headache activity greater than 50% of the time. In other words, most subjects followed the predicted isomorphic pattern most of the time, but frequently failed to follow the pattern. Focus on

Table 18

Candidate Models of Mean Family Variables Predicting Mean Headache Index

<u>Model A</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Negative mood	1	2.02	0.1784
Positive mood	1	1.68	0.2176
Hassles-Positive mood	1	4.60	0.0514
Hassles-Negative mood	1	1.61	0.2272

R-square=0.3102

Model F-value= 1.46

P>F=0.2698

<u>Model B</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Negative mood	1	1.38	0.2600
Hassles-Positive mood	1	2.95	0.1077
Positive mood-Symptoms	1	0.71	0.4124

R-square=0.2432

Model F-value= 1.50

P>F=0.2578

<u>Model C</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Positive mood	1	0.71	0.4136
Hassles-Positive mood	1	3.57	0.0795
Positive mood-Negative mood	1	0.73	0.4063

R-square=0.2315

Model F-value= 1.41

P>F=0.2825

<u>Model D</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Positive mood	1	1.70	0.2144
Hassles-Positive mood	1	4.00	0.0670
Positive mood-Negative mood	1	1.53	0.2385
Hassles-Negative mood	1	1.00	0.3347

R-square=0.2866

Model F-value= 1.31

P>F=0.2866

<u>Model E</u>	<u>df</u>	<u>F</u>	<u>P > F</u>
Hassles-Positive mood	1	2.86	0.1117
Positive mood-Symptoms	1	0.15	0.7040

R-square=0.1687

Model F-value= 1.52

P>F=0.2500

day-to-day fluctuations may have masked, or washed out, a significant trend which became more evident over a two-week period.

The previous analyses have focused on biopsychosocial variables, especially family variables, as potential stressors contributing to the occurrence of headache. The following analyses focus on the family as potential social reinforcers and models for illness behavior, thus contributing to the headache problem.

According to headache targets' responses to the Illness Behavior Experience Questionnaire, parental modeling of avoidance of responsibility when ill did not predict the target's tendency to avoid responsibility when ill. Using Fisher's Exact Test (Blalock, 1972) to explore Hypothesis 6, the targets who identified their parents as avoiders were no more likely to identify themselves as avoidant than were targets who identified their parents as non-avoiders ($p=0.278$). Likewise, those targets who, as children, were allowed to miss school, chores, or work when ill were equally likely to identify themselves as avoiders or non-avoiders ($p=0.117$). Similarly, the targets who identified themselves as avoiders were no more likely than non-avoiders to endorse receipt of special attention when ill, either currently ($p=0.593$) or during childhood ($p=0.611$). Data from the Illness Behavior Experience Questionnaire and the Fisher Exact probability are displayed on Table 19. These results suggest that neither modeling, nor negative reinforcement, nor positive reinforcement affect the headache sufferer's inclination to avoid activities when ill. However, these results should

Table 19
Data for Fisher Exact Test

	NO	YES
NO	A	B
YES	C	D

<u>Column</u>	<u>Row</u>	<u>Cell A</u>	<u>Cell B</u>	<u>Cell C</u>	<u>Cell D</u>	<u>P (1-tail)</u>
Question						
1	2	6	5	2	5	0.278
1	3	5	7	3	3	0.563
2	3	9	3	2	4	0.117
2	5	9	5	3	1	0.593
2	6	10	7	1	0	0.611

be accepted guardedly, since only 18 subjects were distributed into four cells during the Fisher's Exact Test.

For each item on the Illness Behavior Experience Questionnaire, the headache index of those targets who answered in the affirmative was compared (via t-test) to that of targets who answered negatively. [See Hypothesis 7.] Those who affirmed that they now receive negative reinforcement when ill did not differ in headache activity from those who denied receipt of negative reinforcement. Similarly, those who affirmed that they now receive positive reinforcement when ill did not differ in headache activity from those who denied receipt of positive reinforcement. Likewise, those who affirmed childhood history of negative or positive reinforcement for being ill did not differ in headache activity from those who denied such reinforcement history. However, the subject size of comparison groups was disproportionate (e.g., 12 vs 6, 4 vs 14) and small, casting doubt on the results. In fact, only one target denied receiving special support when ill as a child, thus making it impossible to conduct a t-test with the remaining group of 17 targets who affirmed receipt of such reinforcement.

To further explore the possibility that learning of the target's illness behavior may be occurring within the family [Hypothesis 8], attention was focused on the degree to which the family was aware of the target's headache. Family members are more likely to reinforce the headache sufferer (e.g., give special assistance or attention) if they are aware of the headache occurrence. Also, in families where members are less aware of another member's symptoms, learning of illness

behavior response is less likely to take place. Therefore, these family members are less likely to report somatic symptoms or illness behaviors than are families who are more aware of each other's symptoms. An awareness quotient (# of hits per # of observations) was calculated for each family. As a group, the family members were aware of target headaches only 50.7% of the time. Four family members were aware 100% of the time. Five family members were aware 51-72% of the time. Six family members were aware 20-50% of the time, while three family members were aware only 10% of the time.

Pearson Product Moment correlations were calculated between the awareness quotient and (1) the member's PSC score and (2) the total number of somatic symptoms recorded by the family member on the diary. Neither the PSC score nor the number of somatic complaints endorsed on the diary were significantly correlated with the family member's awareness of headache within the target.

Although the number of illness responses emitted by the target in response to his/her headache was expected to contribute to the family's awareness of the headache condition, this did not prove to be so. Additionally, cohesiveness and expressiveness within the family were expected to be related to family awareness of the target's headache condition. Pearson correlations indicated that only cohesiveness was moderately related to awareness, while expressiveness was not related. Pearson Product Moment correlations between the awareness quotient and these variables are displayed on Table 20. None of these relationships

Table 20

Correlations Between Awareness and Other Measures

Measures	Awareness Quotient		
	<u>r</u>	<u>p</u>	<u>cases</u>
Cohesion	0.3708	0.071	17
Expressiveness	0.0801	0.494	17
# Illness Responses	0.0352	0.447	17
Target Total # Symptoms	0.3999	0.056	17
Family Total # Symptoms	-0.2915	0.128	17
PSC	-0.0875	0.369	17

was strong enough to meet inclusion criteria of $\alpha=0.05$ for stepwise regression.

When asked to guess whether their family member was aware of his/her headache, the target could make two kinds of errors - - overestimation or underestimation. Degree of overestimation = number of overestimates per number of guesses. Degree of underestimation = number of underestimates per number of guesses. As a group, the targets overestimated family awareness of headache only 7.7% of the time. Ten targets made no overestimation errors. Four targets made overestimation errors greater than 10% of the time, with only one target overestimating greater than 50% of the time. The targets underestimated family awareness of headache only 13.6% of the time. Nine targets made no underestimation errors. Six targets made underestimation errors greater than 10% of the time, with only one target underestimating greater than 50% of the time.

Pearson correlations were utilized to explore the relationship of such errors to the target's (1) mood, (2) number of physical symptoms experienced, (3) the number of illness behaviors emitted in response to headache, (4) marital satisfaction, and (5) life satisfaction. The results, displayed on Tables 21 and 22, suggest that estimation errors are mildly related to target distress, with overestimation being slightly more related than underestimation to some distress measures [Hypothesis 9]. Unfortunately, the small sample size reduces the chance of these correlations reaching significance.

Table 21

Correlations Between Overestimation and Other Measures

Measures	Overestimation		<u>cases</u>
	<u>r</u>	<u>p</u>	
# Illness Responses	0.225	0.193	17
BDI	0.251	0.166	17
State Anxiety	0.389	0.061	17
Trait Anxiety	0.179	0.245	17
Target Marital (dis)Satisfaction	0.325	0.165	11
Family Marital (dis)Satisfaction	0.402	0.110	11
Quality of Life	-0.263	0.154	17
# Symptoms	-0.175	0.251	17
PSC	0.124	0.324	17
Cohesion	0.130	0.309	17
Expressiveness	0.013	0.480	17
Conflict	0.513	0.017	17
Organization	0.254	0.162	17

Table 22

Correlations Between Underestimation and Other Measures

Measures	Underestimation		<u>cases</u>
	<u>r</u>	<u>p</u>	
# Illness Responses	0.237	0.180	17
BDI	-0.024	0.463	17
State Anxiety	-0.197	0.483	17
Trait Anxiety	-0.012	0.483	17
Target Marital (dis)Satisfaction	0.317	0.171	11
Family Marital (dis)Satisfaction	0.556	0.038	11
Quality of Life	0.135	0.302	17
# Symptoms	-0.137	0.299	17
PSC	-0.169	0.266	17
Cohesion	0.179	0.246	17
Expressiveness	0.118	0.325	17
Conflict	-0.166	0.262	17
Organization	-0.141	0.294	17

To explore the relationship of underestimation and overestimation to the target's perception of the family environment [Hypothesis 9], Pearson correlations were computed for salient FES subscales with both overestimation and underestimation. Results are displayed on Table 21 and Table 22, respectively. Greater overestimation was clearly related to the targets' perception of greater family conflict. Other relationships were weaker or negligible. Unfortunately, limited sample size and within group variance decreases the confidence with which these results can be accepted.

DISCUSSION

The chronic tension headache sufferers in this study rated their pain level to be equally severe to the pain level ratings of control subjects who had recently sustained an orthopedic injury. Yet, as expected, the headache targets were more depressed, more anxious, and more hassled than the control targets who experienced similar levels of pain. This heightened distress level of the headache targets is likely related to the chronic nature of their pain.

The experience of chronic pain, in this case chronic headache, seemed to be more demoralizing than the experience of an acute pain condition. This is supported by the literature devoted to the cognitive conceptualization of chronic pain, which indicates there are profound psychological ramifications when pain does not subside. The general explanation is that chronic pain sufferers come to feel increasingly vulnerable due to a diminished evaluation of their coping resources. The resulting anxiety, discouragement, disappointment, guilt, self-blame, sadness, hopelessness, helplessness, and anger are likely to activate depressogenic cognitions in a final common pathway of depression (Covington, 1982; Hendler, 1984; Lefebvre, 1981; Rosenstiel & Keefe, 1983).

Specific studies of the psychological functioning of headache sufferers have highlighted the distressing nature of chronic headache pain. Andrasik et al (1982) comprehensively assessed the psychological functioning of four headache populations. Subjects were diagnosed as having migraine, muscle contraction, combined, or cluster headaches.

Chronic muscle tension headache subjects were found to display the most pronounced and varied psychological distress of all groups. Further, the pattern of distress among the four groups was positively related to the frequency of headache but negatively related to severity of headache. Similarly, Sternbach, Dalessio, Kunzel, & Bowman (1980) found psychological distress to be directly related to "pain density." Blanchard, Radnitz, Evans, Schwarz, Neff, & Gerardi (1986) administered 17 psychological measures to irritable bowel sufferers, chronic tension headache sufferers, migraineurs, and normal controls. While irritable bowel subjects were the most distressed, tension headache subjects were a close second, followed by migraineurs and normal controls, respectively.

Headache sufferers in the present study were also more distressed than standardized norms, their own family members, and the control family members. In fact, contrary to prediction, these latter three groups were quite similar to each other in terms of global measures of distress. Family members of the headache subjects were expected to be more distressed than standardized norms, orthopedic controls or their family members based on the assumption that living with a family member who has a chronic pain condition would be quite stressful. Complaining and ventilation by the chronic pain sufferer is reported as being frequently met by sarcasm on the part of family members. Also when family schedules are upset as a consequence of one member's chronic pain, anger on the part of the other family members is likely (Eimer, 1989). Further, based on the prediction that the headache sufferers

were being impacted by heightened stress within the family environment, disturbances in affect, elevated hassle scores, and numerous somatic complaints were expected in the headache family. But these expectations were not borne out. The headache family members were not more distressed than the normal population, suggesting that living with a chronic headache sufferer is not particularly stressful or these family members had adapted well to an undesirable situation.

Although, the headache family members did not endorse high levels of stress, one cannot conclude the family is not a source of stress for the headache-prone member. First, the headache subjects had other family members who were not assessed. Second, case by case inspection of diary data revealed nine of the 18 headache subjects identified family problems or concerns as one of their most salient daily hassles. Finally, perhaps Henryk-Gutt & Rees (1973) were correct in suggesting that headache-prone individuals react maladaptively to stressors that would be experienced as innocuous by normals.

The severity of the headache problem, as measured by average headache index, was virtually unrelated to global measures of family distress and only mildly related to the targets' own global scores. A slightly different pattern emerged when daily self-monitoring data was correlated with headache activity. When mean diary ratings were compared, average headache activity was strongly correlated to the target's own mean hassle index. Family's mean hassle index, target's mean physical symptom index, and target's mean mood rating were weakly-to-moderately correlated to mean headache severity. And of these

comparisons, only average ratings of target hassles and family hassles were correlated with overall headache activity at a level that reached significance.

There is substantial agreement (heavily anecdotal) among clinicians that stressful experiences precede tension headaches. However, the relationship between the report of stress and onset of headache has not been adequately studied. Arena et al. (1984) had a mixed group of chronic headache sufferers record daily levels of anger, anxiety, and depression on visual analogue scales. A cross-lagged analysis failed to demonstrate any time-dependent relationship.

The present study was similar to the Arena et al. (1984) study in that it utilized diary data. However, this study differed in that all headache subjects had tension headache diagnoses. Also, this study assessed somatic and environmental variables in addition to affective states, and included family members in the assessment. In contrast to other studies, affect was broken down into simpler components (e.g., angry, worried, down or blue, stressed, happy, calm, energetic) for diary monitoring. Subjects were not asked to monitor levels of such complex constructs as depression or anxiety. This study attempted to determine through daily measurement if tension headache is related to affective states, physical symptoms, and idiosyncratic hassles, as either consequence or cause. Therefore, considerable attention was given to day-to-day fluctuations in diary measures.

Day-to-day fluctuations in headache activity were not shown to be significantly related to any of the target variables or family variables

on the same day. Cross-lagged correlations failed to demonstrate any time-dependent relationship between daily headache fluctuations and any of the independent variables. Thus, similar to the results of Arena et al. (1984), these findings fail to support the diathesis/stress theory that a headache-prone individual's stress level impacts his headache activity. In other words, the results here indicate that increased stress, as measured by this study's variables, does not precede increased headache activity. However, the cross-lagged correlations are difficult to interpret because the data are not truly independent. For example, 11 of the 18 headache subjects (61%) had a headache every day. All the headache subjects had headaches on at least seven of the 14 days monitored. Additionally, among the grand total of 252 days monitored by the 18 headache targets, only 29 days were headache-free. Thus, since day n , day $n-1$, and day $n+1$ are all likely to be headache days, correlations between variables on these days are bound to be confounded. Had targets experienced more, consecutive headache-free days results might be more confidently interpretable.

Psychosocial stress has long been implicated as a precipitating factor in tension headache. However, the evidence linking stress to headache has been mainly suggestive. This study attempted to isolate some of these factors and identify their relative influence on headache activity. However, the findings were less than encouraging. Although, average diary ratings of target and family hassles were significantly related to overall headache activity, these relationships were washed out when day-to-day variations were examined. This suggests that

hassles may have a cumulative effect. Perhaps the duration of hassles, as well as the level and type of hassles, is an important consideration. Perhaps the effects would have been stronger if the sample size had been larger, if diary data had been obtained from all family members, or if positive and negative moods had been more idiosyncratically defined, as was done with hassles.

Yet, despite the experimental limitations, several combinations (models) of the mean individual variables (hassles, symptoms, negative mood and positive mood) were highly predictive of average headache severity for the 14-day assessment period.

While there has been relatively little research attempting to identify and quantify factors exacerbating headache, even less emphasis has been placed on the identification of factors that maintain chronic headache. It is a plausible hypothesis that certain exacerbating factors may also operate to maintain the headache. For example, recurrent exposure to stressful environments might act as a maintaining factor. At the behavioral level, as with other disorders, a number of social learning factors may prolong the occurrence of tension headache (Fordyce, 1976; Wooley, Blackwell, & Winget, 1978). Preliminary evidence suggests that certain pain behaviors (e.g., verbal pain complaints, inactivity, frequent medication use) might be maintained through interaction of the sufferer with his/her environment. Specifically, attention (secondary gain) for symptoms, the pleasant subjective experience often accompanying certain analgesics, or use of the symptom to avoid unpleasant environmental demands are factors that

can increase the probability of subsequent pain, thus maintaining the problem. Support for the potential role of these factors has primarily been reported in the context of more traditional chronic-pain problems (Fordyce, 1976) rather than recurrent or intermittent pain such as headache. However, the research indicating the presence of tension headache in the absence of heightened skeletal muscle activity suggests the need to look at other areas, such as the possible contribution of such alternative behavioral factors (Philips, 1977b, 1978).

To explore the role of social learning factors in maintaining recurrent headache, this study employed the Illness Behavior Experience Questionnaire. Data from this questionnaire did not support the hypotheses concerning the effects of role models, positive reinforcers, or negative reinforcers on headache activity or illness behavior. These results are in contrast to the findings of Fordyce (1976) or Wooley et al. (1978), who have conducted several studies of the effects of learning on illness behavior. In summary, they found that the illness role is shaped by three types of influences: (1) vicarious learning via modeling, especially in childhood; (2) direct social reinforcement of illness behavior by family, friends, and health professionals; and (3) avoidance learning. Failure of this study to demonstrate learning effects might be due to the small sample size, the unknown psychometric properties of the instrument, or the dependence on subjects' awareness, perception, and childhood memory of reinforcers or models. Perhaps different information would have been obtained via interview of current

family and family-of-origin or via monitoring of illness behavior and family response.

Illness behavior associated with headache is more likely to be reinforced when others are aware of the headache. However, as potential social reinforcers, the family members, as a group, were only aware of the targets' headache 50% of the time. Greater family awareness was mildly to moderately related to greater number of physical symptoms experienced by the target and to family cohesiveness, or commitment to helping and supporting one another. The families who were more aware were not perceived to be more expressive, nor did their headache target emit more illness responses. Inspection of the data revealed that the headache sufferers tended not to withdraw from daily life involvements due to their headaches. Rather, they tended to persist in daily activities despite their pain. Such persistence in activity may explain why family members were unaware of half the headaches experienced by the targets during the 14-day monitoring period. Also, if family awareness of a member's headache is irregular, then most likely family reinforcement, in the form of attention or support, is also irregular. Based on learning theory, irregular reinforcement schedules may be more potent than predictable reinforcement schedules in maintaining illness responses and headache activity of the headache-prone member.

The targets were fairly accurate at estimating family awareness of their headache. As a group, the targets overestimated only 7.7% of the time and underestimated only 13.6% of the time. Only four targets overestimated more than 10% of the time, while only six underestimated

more than 10% of the time. With so little variance in estimation errors, it was difficult to explore with confidence the relationship of these errors to other target or family characteristics. However, the results tended to support the hypothesis that greater overestimation by the target of family awareness is related to greater distress in the target, as demonstrated by measures of target mood, greater marital dissatisfaction, greater family conflict, and lower life satisfaction ratings. That is, if the target overestimates family awareness of his/her headache, the target may not receive the amount of support he/she expects in times of pain. Such unmet expectations may lead to distress. While these results should be accepted guardedly, they suggest an interesting phenomenon which might be further explored with a larger sample group.

As previously summarized, the results of this study lend at least limited support to some of the hypotheses, but no support to others. Such disappointing results could be due, at least in part, to the small sample size. It is unfortunate that so few subjects were evaluated with so many different measures. Also, the lack of variance within some of the data (e.g., measures of overestimation and underestimation) may have diminished the possibility of finding strong results. Further, it is possible that some of the assessment tools (e.g., the diary, the Illness Behavior Experience Questionnaire) lacked adequate sensitivity to the variables intended for study. Or perhaps the subjects themselves lacked the capacity or motivation to be sensitive to the study variables. Blanchard, Andrasik, Neff, Jurish, & O'Keefe (1981) found that headache

patients may not be accurate reporters of their thoughts, feelings, or behaviors. Finally, some of the reported headache activity may have been analgesic-induced. There is accumulating evidence that all analgesics can provoke chronic headache if taken for a sufficiently long time and in a sufficiently high dosage (Diener, Dichgans, Scholz, Geiselhart, Gerber, & Bille, 1989; Kudrow, 1976; Medina & Diamond, 1977). Analgesic headache is a dull, diffuse headache which is present in the morning and lasts all day. Discontinuation of drug intake at first leads to an increase in headache activity (rebound headache) and to symptoms of autonomic dysfunction such as nausea, vomiting, tachycardia, and sleep disturbances. Fifteen of the eighteen headache targets endorsed daily use of some sort of analgesic, perhaps exacerbating their headache problem and confounding the results attributed to stress.

In retrospect, some suggestions could be made which would improve the current study or future related studies. For example, headache targets could be weaned off their analgesics prior to inception of diary monitoring, thus eliminating the confound of medication-rebound headache. However, potential subjects might resist such intervention and decline to participate, thus hampering acquisition of subject sample. Relatedly, the number of subjects should be increased to allow more confidence in results. More subjects may have eliminated problems of small variance and small cell size which hampered analyses.

Also, modifications to the diary could prove helpful. For example, the diary kept by the family could be modified to include their

reaction to the target's pain (e.g., how the family member recognized the target's pain, what the family member thought or felt about the target's pain, what the family member did in response to the target's pain, and rating of effectiveness of that response). Inclusion of such monitoring would serve to validate related responses in the Semi-structured Interview and the Illness-Behavior Experience questionnaire. The same inclusions would allow examination of patterns of interpersonal reactions (e.g., reciprocity, reinforcement, cycles) which the current study presumed influenced the pain experience. The study also presumed that early learning experiences contributed to the development of illness behaviors/responses. The Illness-Behavior Experience questionnaire, as previously stated, is arguably a weak tool for assessing presence/absence of models or reinforcers for illness behaviors. It could be eliminated, and questions concerning modeling and reinforcement history could be pursued during the Semi-structured Interview. The target's responses could be validated by interviewing the family of origin and the current family regarding these subjects.

The present study included only one member of the headache target's family. Expanding the assessment to include most or all family members would give a fuller picture of the family "climate" (stresses, emotions), potentiating greater understanding of the impact of the family environment on headache activity. Interviews and diaries appropriate for older children and adolescents could be created to facilitate this expansion.

Despite these suggestions and criticisms, the current study offers some contribution to the headache literature. Unlike, much of the headache research, this study clearly defines its headache population and does not combine subjects with a variety of headache problems into one comparison group. Additionally, unlike many studies that consider only global measures, this study includes daily self-report of psychological variables, physiological variables, and actual behaviors.

While many studies have explored the effects of laboratory stressors on headache activity, relatively little empirical research exists on the role of naturally occurring stressors in the etiology and maintenance of chronic tension headache. In this study, subjects monitored a variety of affective responses, somatic symptoms, and environmental stressors. The temporal relationships between these naturally occurring stressors and headache activity were explored through cross-lagged correlations. Failure to find temporal relationships corresponds to the results of a similar study (Arena et al., 1984).

Unique to this study, is the evaluation of the family as a potential source of stress for a headache-prone member. No other study has reported actual assessment data on family members of chronic tension headache sufferers. Overall headache activity of the target was shown to be correlated to average family hassle ratings. The results of this study suggest that environmental stressors (hassles) within the entire family may be a potential stressor for the headache-prone individual.

Correlation and regression analyses in this study provide more questions than answers concerning the link between stress and headache

activity. The present findings suggest the occurrence of tension headache to be a function of factors other than, or in addition to, those assessed in this study.

References

- Ad Hoc Committee on Classification of Headache. (1962). Journal of American Medical Association, 179, 717-718.
- Anderson, C., & Franks, R. (1981). Migraine and tension headache: Is there a physiological difference? Headache, 21, 63-71.
- Andrasik, F., Blanchard, E., Arena, J., Teders, S., Teevan, R., & Rodichok, L. (1982). Psychological functioning in headache sufferers. Psychosomatic Medicine, 44, 171-182.
- Andrasik, F., Holroyd, K., & Abell, T. (1979). Prevalence of headache within a college student population. Headache, 19, 384-387.
- Arena, J., Blanchard, E., & Andrasik, F. (1984). The role of affect in the etiology of chronic headache. Journal of Psychosomatic Research, 28, 79-86.
- Attanasio, V., Andrasik, F., Blanchard, E., & Arena, J. (1984). Psychometric properties of the SUNYA Revision of the Psychosomatic Symptom Checklist. Journal of Behavioral Medicine, 7, 247-258.
- Bakal, D. (1975). Headache: A biopsychological perspective. Psychological Bulletin, 82, 369-382.
- Bakal, D. (1982). The psychobiology of chronic headache. New York: Springer.
- Bakal, D. & Kaganov, J. (1977). Muscle contraction and migraine headache: Psychophysiologic comparison. Headache, 17, 208-215.
- Beck, A. (1967). Depression: Clinical, experimental and theoretical aspects. New York: Harper & Row.

- Beck, A., Ward, C., Mendelsohn, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. Archives of General Psychiatry, 5, 561-571.
- Bellissimo, A. & Tunks, E. (1984). Chronic pain: The psychotherapeutic spectrum. New York: Praeger Publications.
- Blanchard, E. & Andrasik, F. (1985). Management of chronic headaches: A psychological approach. New York: Pergamon Press.
- Blanchard, E., Andrasik, F., Arena, J., Neff, D., Jurish, S., Teders, S., Barron, K., & Rodichok, L. (1983). Prediction of outcome from the non-pharmacological treatment of chronic headache. Neurology, 33, 1596- 1603.
- Blanchard, E., Andrasik, F., Neff, D., Arena, J., Ahles, T., Jurish, S., Barron, K., & Rodichok, L. (1982). Biofeedback and relaxation training with three kinds of headache: Treatment effects and their prediction. Journal of Consulting and Clinical Psychologists, 50, 562-575.
- Blanchard, E., Andrasik, F., Neff D., Jurish, S., & O'Keefe, D. (1981). Social validation of the headache diary. Behavior Therapy, 12, 711-715.
- Blanchard, E., Radnitz, C., Evans, D., Schwarz, S., Neff, D., & Gerardi, M. (1986). Psychological comparisons of irritable bowel syndrome to chronic tension and migraine headache and nonpatient controls. Biofeedback and Self-Regulation, 11, 221-230.
- Blalock, H.M. (1972). Social statistics. 2d ed. New York: McGraw-Hill.

- Covington, E. (1982). The management of chronic pain. In P.A. Keller & L.G. Ritt (Eds.), Innovations in Clinical Practice: A Source Book, Vol. 1. Sarasota, Fl: Professional Resource Exchange.
- Cox, D., Freundlich, A., & Meyer, R. (1975). Differential effectiveness of electromyographic feedback, verbal relaxation instructions, and medication placebo with tension headaches. Journal of Consulting and Clinical Psychologists, 43, 892-898.
- Dalessio, D. (1968). Some reflections on the etiologic role of depression in head pain. Headache, 8, 28-31.
- Diamond, S. (1964). Depression headaches. Headache, 4, 255-260.
- Diamond, S. & Baltes, B. (1971). Chronic tension headache treated with amitriptyline - A double blind study. Headache, 11, 110-116.
- Diener, H., Dichgans, J., Scholz, E., Geiselhart, S., Gerber W., & Bille, A. (1989). Analgesic-induced chronic headache: Long-term results of withdrawal therapy. Journal of Neurology, 236, 9-14.
- Eimer, B. (1989). Psychotherapy for chronic pain: A cognitive approach. In A. Freeman, K. Simon, L. Beuler, H. Arkowitz, (Eds.), Comprehensive handbook of cognitive therapy. Plenum: New York.
- Feuerstein, M., Adams, H., & Beiman, I. (1976). Cephalic vasomotor electromyograph feedback in the treatment of combined muscle contraction and migraine headaches in geriatric case. Headache, 16, 232-237.
- Fordyce, W. (1978). Behavioral methods for chronic pain and illness. St. Louis: C. V. Mosby.

- Fordyce, W., Fowler, R., & DeLateur, B. (1966). An application of behavior modification technique to a problem of chronic pain. Behaviour Research and Therapy, 6, 105-107.
- Fordyce, W., Fowler, R., Lehmann, J., & DeLateur, B., (1968). Some implications of learning in problems of chronic pain. Journal of Chronic Disease, 21, 179-190.
- Fordyce, W., Fowler, R., Lehmann, J., DeLateur, B., Sand, P., & Trieschmann, R. (1973). Treatment of chronic pain by operant condition. Archives of Physical Medicine and Rehabilitation, 54, 394-408.
- Freidman, A. (1964). Reflection on the problem of headache. Journal of the American Medical Association, 190, 121-123.
- Freidman, A. & Merritt, H. (1959). Headache: Diagnosis and treatment. Philadelphia: F. A. Davis.
- Goldberg, L. & Breznitz, S. (1986). Handbook of stress: Theoretical and clinical applications. New York: The Free Press.
- Harper, R. & Steger, J. (1978). Psychological correlates of frontalis EMG and pain in tension headache. Headache, 18, 215-218.
- Harrison, T. F. (1970). Principles of internal medicine. New York: McGraw Hill.
- Hendler, N. (1984). The chronic pain patient. In F.G. Guggenheim & M. F. Weiner (Eds.), Manual of psychiatric consultation and emergency care. New York: Jason Aronson.
- Henryk-Gutt, R., & Rees, W. (1973). Psychological aspects of migraine. Journal of Psychosomatic Research, 17, 141-153.

- Hinkle, D., Wiersma, W., & Jurs, S. Applied statistics for the behavioral sciences. Dallas: Houghton Mifflin.
- Holroyd, K., Andrasik, F., & Westbrook, T. (1977). Cognitive control of tension headache. Cognitive Therapy and Research, 1, 121-133.
- Holroyd, K. & Andrasik, F. (1982). Do the effects of cognitive therapy endure? A two-year follow-up of tension headache sufferers treated with cognitive therapy or biofeedback. Cognitive Therapy and Research, 6, 325-334.
- Hudson, W. (1982). The clinical measurement package: A field manual. Chicago: Dorsey Press.
- Kanner, A., Coyne, J., Schaefer, C., & Lazarus, R. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. Journal of Behavioral Medicine, 4, 1-33.
- Kashiwagi, T., McClure, J., & Wetzel, R. (1972). Headache and psychiatric disorders. Diseases of the Nervous System, 33, 659-663.
- Kiritz, S. & Moos, R. (1974). Physiological effects of social environments. Psychosomatic Medicine, 36, 96-115.
- Kudrow, L. (1976). Tension headache. Pathogenesis and treatment of headache. New York: Spectrum.
- Lachman, S. (1972). Psychosomatic disorders : A behavioristic interpretation. New York: John Wiley & Sons, Inc.
- Lefebvre, M. (1981). Cognitive distortions and cognitive errors in depressed psychiatric and low back pain patients. Journal of Consulting and Clinical Psychology, 49, 512-525.

- Leviton, A. (1978). Epidemiology of Headache. In B. S. Schoenberg (Ed.) Advances in neurology. New York: Raven Press.
- Levor, R., Cohen, M., Naliboff, B., McArthur, D., Heuser, G. (1986). Psychosocial Precursors and correlates of migraine headache. Journal of Consulting and Clinical Psychologists, 54, 347-353.
- Martin, P. & Mathews, A. (1978). Psychophysiological investigation and treatment. Journal of Psychosomatic Research, 22, 389-399.
- Medina, J. & Diamond, S. (1977). Drug dependency in patients with chronic headaches. Headache, 17, 12-14.
- Mitchell, K. & White, R. (1976). Self-management of tension headache: A case study. Journal of Behavior Therapy and Experimental Research, 7, 387-389.
- Ogden, H. (1952). Headache studies. Statistical data. I.: Procedure and sample distribution. Journal of Allergy, 23, 58-75.
- Olesen, J., Tfelt-Hansen, P., Henriksen, L., Lauritzen, M., & Larsen, B. (1982). Difference between cerebral blood flow reactions in classic and common migraine. In F. Rose (Ed.) Advances in migraine research and therapy. New York: Raven Press.
- Onel, Friedman, & Grossman. (1961). Muscle blood flow studies in muscle contraction headaches. Neurology, 11, 935-939.
- Ostfeld, A., Reis, D. & Wolff, H. Studies on headache: Bulbar conjunctival ischemia and muscle contraction headache. Archives of Neurology and Psychiatry, 77, 113-119.
- Philips, C. (1977a). Headache in general practice. Headache, 16, 322-329.

- Philips, C. (1977b). A psychological analysis of tension headache. In S. Rachman (Ed.), Advances in medical psychology. Oxford: Pergamon.
- Philips, C. (1978). Tension headache: Theoretical problems. Behaviour Research and Therapy, 16, 249-261.
- Philips, C. & Hunter, M. (1982). A psychophysiological investigation of tension headache. Headache, 22, 173-179.
- Philips, H. & Johanshahi, M. (1986). The components of pain behavior report. Behaviour Research and Therapy, 24, 117-125.
- Rimm, D. & Masters, J. (1979). Behavior therapy techniques and empirical findings, 2nd ed. New York: Academic Press.
- Rosenstiel, A. & Keefe, F. (1983). The use of coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. Pain, 17, 33-44.
- Speilburger, C., Gorsuch, R., Lushene, R., Vagg, P., Jacobs, G. (1983). Manual for the state-trait anxiety inventory. Palo Alto: Consulting Psychologists Press.
- Sternbach, R., Dalessio, D., Kunzel, M., & Bowman, G. (1980). MMPI patterns in common headache disorders. Headache, 20, 311-315.
- Stevens. (1986). Applied multivariate statistics for the social sciences. New York: Lawrence Earlbaum Associates, Inc.
- Turk, D., Meichenbaum, D., & Genest, M. (1983). Pain and behavioral medicine: A cognitive-behavioral perspective. New York: Guilford Press.

- Turkat, I. (1982). An investigation of parental modeling in the etiology of diabetic illness behavior. Behaviour Research and Therapy, 20, 537-552.
- Turkat, I. & Noskin, D. (1983). Vicarious and operant experiences in the etiology of illness behavior: A replication with healthy individuals. Behaviour Research and Therapy, 21, 169-172.
- Turner, S., Calhoun, K., & Adams, H. (1981). Handbook of clinical behaviour therapy. New York: John Wiley & Sons.
- Waters, W. (1970). Community studies of prevalence of headache. Headache, 9, 178-186.
- Wolff, J. (1963). Headache and other head pain. New York: Oxford University Press.
- Wooley, S., Blackwell, B., & Winget, C. (1978). A learning theory model of chronic illness: Theory, treatment, and research. Psychosomatic Medicine, 40, 379-401.
- Ziegler, D. (1979). Headache syndromes: Problems of definition. Psychosomatics, 20, 443-447.

APPENDIX A

CONSENT FORM FOR HEADACHE SUBJECTS

Informed Consent Form
for Headache Member

I understand that I am participating in a study designed to investigate muscle contraction (tension) headaches and its relationship to family-functioning. I understand that my participation is voluntary and that I can discontinue my participation at any time.

I understand that I will be asked to:

1. Keep daily records of headache symptoms and other bodily symptoms. Daily diary sheets will be provided. I will make daily recordings which will take approximately five minutes to complete, for three weeks. I will not discuss my diary information with other family members.
2. I will give consent to have my physician contacted to request that he give medical information about my diagnosis and medical treatment. In order for me to be eligible for treatment, I understand my physician must confirm a diagnosis of headaches and indicate there are no contraindications to my participation.
3. I will be interviewed concerning my medical history and my problem with headaches. This interview will take approximately 30-45 minutes.
4. I will be given several psychological tests to assess my current psychological status. I will also be given questionnaires to assess my family environment. These tests will take no more than 1 1/2 hours. Some of the questions may be of a personal nature, and I am not required to answer questions that cause me to be uncomfortable.
5. My family members will also participate in this study. They will be asked to give information about my headache problem. Their participation is required for me to receive treatment for headaches at a reduced fee.

There are no major risks associated with this study other than the possible mild discomfort involved in answering some of the questions.

As a result of my participation in this assessment study, I will become eligible for treatment designed for tension headache. I may also benefit by gaining a better understanding of myself.

My participation in the study may be terminated at the discretion of the experimenter because:

1. I regularly fail to keep appointments and fail to make up missed appointments;
2. I fail to keep adequate records of my daily physical symptoms and

medication use; or

3. if other physical or psychological problems preclude my participation.

I understand that it is the intent of the investigator to maintain confidentiality. Information will be kept in a locked file cabinet. I will be seen at the Psychological Services Center, and my participation as a client for this clinic will all be kept confidential.

This research project has been approved by the Human Services Research Committee. Questions about the project should be directed to the co-principal investigators: Dr. Debby Neff, or Susan Broyles, or Dr. Steve Zaccaro, chair of the Human Studies Committee, or Mr. Charles Waring, chair of the Institutional Review Board,

If I have any questions about the project, they are written below.

I have read and do understand the above and freely consent to the procedures described.

Date

Participant

Experimenter

APPENDIX B

CONSENT FORM FOR ORTHOPEDIC SUBJECTS

Informed Consent Form
for Injured Member

I understand that I am participating in a study designed to investigate injury-related pain and its relationship to family-functioning. I understand that my participation is voluntary and that I can discontinue my participation at any time.

I understand that I will be asked to:

1. Keep daily records of pain symptoms and other bodily symptoms. Daily diary sheets will be provided. I will make daily recordings which will take approximately five minutes to complete, for two weeks. I will not discuss my diary information with other family members.
2. I will give consent to have my physician contacted to request that he give medical information about my diagnosis and medical treatment.
3. I will be interviewed concerning my medical history and my injury. This interview will take approximately 30 minutes.
4. I will be given several psychological tests to assess my current psychological status. I will also be given questionnaires to assess my family environment. These tests will take no more than 1 hour. Some of the questions may be of a personal nature, and I am not required to answer questions that cause me to be uncomfortable.
5. My family will also participate in this study. They will be asked to give information about my injury.

There are no major risks associated with this study other than the possible mild discomfort involved in answering some of the questions.

As a result of my participation in this assessment study, I may also benefit by gaining a better understanding of myself.

My participation in this study may be terminated at the discretion of the experimenter because:

1. I fail to keep adequate records of my daily physical symptoms and medication use; or
2. if other physical or psychological problems preclude my participation.

I understand that it is the intent of the investigator to maintain confidentiality. Information will be kept in a locked file cabinet. I will be seen at the Psychological Services Center, and my participation in this project will be kept

confidential. If however any information is presented that indicates I am a danger to myself or others, appropriate therapeutic intervention will be taken.

This research project has been approved by the Human Services Research Committee. Questions about the project should be directed to the co-principle investigators: Dr. Debby Neff, or Susan Broyles, Dr. Steve Zaccaro, chair of the Human Studies Committee, or Mr. Charles Waring, chair of the Institutional Review Board, :

If I have any questions about the project, they are written below.

I have read and do understand the above and freely consent to the procedures described.

Date

Participant

Experimenter

APPENDIX C
RELEASE OF RECORDS

Release of Records

I, _____, hereby request
that _____ furnish the medical records
relating to the diagnosis and/or treatment of my headache
problem and/or other medical problems to:

Dr. Debra F. Neff
Psychological Services Center
Department of Psychology
Virginia Tech
Blacksburg, Va. 24061

Address

Date

Witness

Date

APPENDIX D

PHYSICIAN EVALUATION FORM

Physician Evaluation Form

Re: _____ Physician: _____
 _____ Signature

Date: _____ Phone: _____

1. Is there any medical information which would indicate that this person should not be permitted to participate in the program outlined in the accompanying letter? No Yes

If yes, please specify. _____

2. Diagnosis of headache problem. Check all which apply.

migraine

tension (muscle contraction)

mixed (tension-migraine)

cluster

other medical problem (please indicate) _____

3. What diagnostic tests have been conducted? Results?

x-rays

neurological tests

brain scans

EEG

others (please specify)

4. What medications have been prescribed? (Please list.) How effective were they? _____

5. Date of last complete physical examination _____

6. Is there anything else of importance you can tell us about this patient? _____

APPENDIX E

CONSENT FORM FOR NON-HEADACHE MEMBER

Informed Consent Form for
Non-headache Member

I understand that I am participating in a study designed to investigate tension (muscle-contraction headache) and its relationship to family functioning. I understand that my participation is voluntary, and I can discontinue my participation at any time.

I understand that I will be asked to:

1. keep daily records of headache symptoms and other bodily symptoms. Daily diary sheets will be provided. I will make daily recordends which will take approximately five minutes to complete for two weeks. I will not discuss my diary information with other family members.
2. I will be interviewed about my medical history, my own headaches (if any), and the headache experience of the family member who is seeking help for problem headaches. This interview will take 30-45 minutes.
3. I will be given several psychological tests to assess my psychological status. I will also be given questionnaires to assess my psychological status. I will also be given questionnaires to assess my family environment. These tests will take approximately 1 1/2 hours. Some of the questions may be of a personal nature, and I am not required to answer questions that cause me to be uncomfortable.
4. my participation makes it possible for a member of my family to receive treatment for tension headaches at a reduced fee.

There are no major risks associated with this study other than the possible mild discomfort involved in answering some of the questions.

I may benefit from this study by gaining a better understanding of my family member's headache problem.

My participation in the study may be terminated at the discretion of the experimenter because:

1. I regularly fail to keep appointments and fail to make up missed appointments;
2. I fail to keep adequate records of my own daily symptoms and my family's symptoms.
3. If other physical or psychological problems preclude my participation.

I understand that it is the intent of the investigator to maintain confidentiality. Information will be kept in a locked file cabinet. I will be seen at the Psychological Services Center, and my participation as a client for this clinic will all be kept confidential.

This research project has been approved by the Human Subjects Research Committee. Questions about the project should be directed to the co-principal investigators: Dr. Debby Neff, or Susan Broyles, Dr. Steve Zaccaro, chair of the human studies Committee, or Mr. Charles Waring, chair of the Institutional Review Board,

If I have any questions about the project, they are written below.

I have read and do understand the above and freely consent to the procedures described.

Date

Participant

Experimenter

APPENDIX F

CONSENT FORM FOR NON-INJURED MEMBER

Informed Consent Form for
Non-Injured Member

I understand that I am participating in a study designed to investigate injury-related pain and its relationship to family functioning. I understand that my participation is voluntary, and I can discontinue my participation at any time.

I understand that I will be asked to:

1. Keep daily records of headache symptoms and other bodily symptoms. Daily diary sheets will be provided. I will make daily recordings which will take approximately five minutes to complete for two weeks. I will not discuss my diary information with other family members.
2. I will be interviewed about my medical history, my headaches (if any), and the experience of the family member who is injured. This interview will take 20-30 minutes.
3. I will be given several psychological tests to assess my psychological status. I will also be given questionnaires to assess my family environment. These tests will take approximately 1 hour. Some of the questions may be of a personal nature, and I am not required to answer questions that cause me to be uncomfortable.

There are no major risks associated with this study other than the possible mild discomfort involved in answering some of the questions.

I may benefit from this study by gaining a better understanding of my family member's injury-related difficulties.

My participation in the study may be terminated at the discretion of the experimenter because:

1. I fail to keep adequate records of my own daily symptoms and my family's symptoms.
2. If other physical or psychological problems preclude my participation.

I understand that it is the intent of the investigator to maintain confidentiality. Information will be kept in a locked file cabinet. I will be seen at the Psychological Services Center, and my participation in this research will all be kept confidential.

This research project has been approved by the Human Subjects Research Committee. Questions about the project should be directed to the co-principle investigators: Dr. Debby Neff, or Susan

Broyles, Dr. Steve Zaccaro, Chair of the Human Studies
Committee, ; or Mr. Charles Waring, chair of the Institutional
Review Board,

If I have any questions about the project, they are written below.

I have read and do understand the above and freely consent to the
procedures described.

Date

Participant

Experimenter

APPENDIX G

BECK DEPRESSION INVENTORY

BECK INVENTORY

Name _____ Date _____

On this questionnaire are groups of statements. Please read each group of statements carefully. Then pick out the one statement in each group which best describes the way you have been feeling the PAST WEEK, INCLUDING TODAY! Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

- | | |
|---|---|
| <p>1 0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and I can't snap out of it.
3 I am so sad or unhappy that I can't stand it.</p> <p>2 0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things cannot improve.</p> <p>3 0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of failures.
3 I feel I am a complete failure as a person.</p> <p>4 0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.</p> <p>5 0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.</p> <p>6 0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.</p> <p>7 0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.</p> <p>8 0 I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.</p> <p>9 0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.</p> <p>10 0 I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even though I want to.</p> <p>11 0 I am no more irritated now than I ever am.
1 I get annoyed or irritated more easily than I used to.
2 I feel irritated all the time now.
3 I don't get irritated at all by the things that used to irritate me.</p> | <p>12 0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.</p> <p>13 0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.</p> <p>14 0 I don't feel I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.</p> <p>15 0 I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.</p> <p>16 0 I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.</p> <p>17 0 I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.</p> <p>18 0 My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.</p> <p>19 0 I haven't lost much weight, if any, lately.
1 I have lost more than 5 pounds. I am purposely trying to lose weight
2 I have lost more than 10 pounds. by eating less. Yes _____ No _____
3 I have lost more than 15 pounds.</p> <p>20 0 I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
2 I am very worried about physical problems and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.</p> <p>21 0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.</p> |
|---|---|

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APPENDIX H

STATE-TRAIT ANXIETY INVENTORY

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, at *this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	MODERATELY	VERY MUCH
1. I feel calm	①	②	③
2. I feel secure	①	②	③
3. I am tense	①	②	③
4. I am regretful	①	②	③
5. I feel at ease	①	②	③
6. I feel upset	①	②	③
7. I am presently worrying over possible misfortunes	①	②	③
8. I feel rested	①	②	③
9. I feel anxious	①	②	③
10. I feel comfortable	①	②	③
11. I feel self-confident	①	②	③
12. I feel nervous	①	②	③
13. I am jittery	①	②	③
14. I feel "high strung"	①	②	③
15. I am relaxed	①	②	③
16. I feel content	①	②	③
17. I am worried	①	②	③
18. I feel over-excited and "rattled"	①	②	③
19. I feel joyful	①	②	③
20. I feel pleasant	①	②	③



CONSULTING PSYCHOLOGISTS PRESS
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SELF-EVALUATION QUESTIONNAIRE
STAI FORM X-2

NAME _____ DATE _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	Ⓐ	Ⓑ	Ⓒ	Ⓓ
22. I tire quickly	Ⓐ	Ⓑ	Ⓒ	Ⓓ
23. I feel like crying	Ⓐ	Ⓑ	Ⓒ	Ⓓ
24. I wish I could be as happy as others seem to be	Ⓐ	Ⓑ	Ⓒ	Ⓓ
25. I am losing out on things because I can't make up my mind soon enough	Ⓐ	Ⓑ	Ⓒ	Ⓓ
26. I feel rested	Ⓐ	Ⓑ	Ⓒ	Ⓓ
27. I am "calm, cool, and collected"	Ⓐ	Ⓑ	Ⓒ	Ⓓ
28. I feel that difficulties are piling up so that I cannot overcome them	Ⓐ	Ⓑ	Ⓒ	Ⓓ
29. I worry too much over something that really doesn't matter	Ⓐ	Ⓑ	Ⓒ	Ⓓ
30. I am happy	Ⓐ	Ⓑ	Ⓒ	Ⓓ
31. I am inclined to take things hard	Ⓐ	Ⓑ	Ⓒ	Ⓓ
32. I lack self-confidence	Ⓐ	Ⓑ	Ⓒ	Ⓓ
33. I feel secure	Ⓐ	Ⓑ	Ⓒ	Ⓓ
34. I try to avoid facing a crisis or difficulty	Ⓐ	Ⓑ	Ⓒ	Ⓓ
35. I feel blue	Ⓐ	Ⓑ	Ⓒ	Ⓓ
36. I am content	Ⓐ	Ⓑ	Ⓒ	Ⓓ
37. Some unimportant thought runs through my mind and bothers me	Ⓐ	Ⓑ	Ⓒ	Ⓓ
38. I take disappointments so keenly that I can't put them out of my mind	Ⓐ	Ⓑ	Ⓒ	Ⓓ
39. I am a steady person	Ⓐ	Ⓑ	Ⓒ	Ⓓ
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	Ⓐ	Ⓑ	Ⓒ	Ⓓ

APPENDIX I

PSYCHOSOMATIC SYMPTOM CHECKLIST

SYMPTOM CHECKLIST

DIRECTIONS: In the blanks to the right of the symptoms, indicate the frequency and intensity of the symptoms, according to the scales below.

Frequency Scores

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

Intensity Scores

1. not a problem
2. slightly bothersome when it occurs
3. moderately bothersome when it occurs
4. severely bothersome when it occurs
5. extremely bothersome when it occurs

	<u>Frequency Score</u>	<u>Intensity Score</u>
Headaches	1. _____	2. _____
Backaches	3. _____	4. _____
Gastric ulcer	5. _____	6. _____
Stomach pain	7. _____	8. _____
Asthma	9. _____	10. _____
Spastic colitis	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	27. _____	28. _____
Diarrhea/constipation	29. _____	30. _____
Dizziness	31. _____	32. _____
Weakness	33. _____	34. _____

APPENDIX J

ILLNESS-BEHAVIOR EXPERIENCES

ILLNESS - BEHAVIOR EXPERIENCES

1. When either of your parents were ill, did either one have to stop work, chores, or other activities?
2. When you feel ill, do you often have to stop what you are doing - - such as household chores, tasks at job/school, or other activities?
3. When you were ill as a child, did you often miss school, chores, or work?
4. When either parent was ill, did he/she receive special support, attention, or encouragement to help him/her with the illness?
5. When you feel ill, is there anyone who provides special support, attention, or encouragement to help you feel better?
6. When you were ill as a child, was there anyone who provided special support, attention, or encouragement to help you feel better?

APPENDIX K

HASSLES SCALE

The Hassles Scale

Directions: Hassles are irritants that can range from minor annoyances to fairly major pressures, problems, or difficulties. They can occur few or many times.

Listed in the center of the following pages are a number of ways in which a person can feel hassled. First, circle the hassles that have happened to you in the past month. Then look at the numbers on the right of the items you circled. Indicate by circling a 1, 2, or 3 how SEVERE each of the circled hassle has been for you in the past month. If a hassle did not occur in the last month do NOT circle it.

SEVERITY

	SEVERITY		
	1.	2.	3.
	1. Somewhat severe		
	2. Moderately severe		
	3. Extremely severe		
(1) Misplacing or losing things	1	2	3
(2) Troublesome neighbors	1	2	3
(3) Social obligations	1	2	3
(4) Inconsiderate smokers	1	2	3
(5) Troubling thoughts about your future	1	2	3
(6) Thoughts about death	1	2	3
(7) Health of a family member	1	2	3
(8) Not enough money for clothing	1	2	3
(9) Not enough money for housing	1	2	3
(10) Concerns about owing money	1	2	3
(11) Concerns about getting credit	1	2	3
(12) Concerns about money for emergencies	1	2	3
(13) Someone owes you money	1	2	3
(14) Financial responsibility for someone who doesn't live with you	1	2	3
(15) Cutting down on electricity, water, etc.	1	2	3
(16) Smoking too much	1	2	3
(17) Use of alcohol	1	2	3

1. Slightly severe
2. Moderately severe
3. Extremely severe

(18) Personal use of drugs	1	2	3
(19) Too many responsibilities	1	2	3
(20) Decisions about having children	1	2	3
(21) Non-family members living in your house	1	2	3
(22) Care for pet	1	2	3
(23) Planning meals	1	2	3
(24) Concerned about the meaning of life	1	2	3
(25) Trouble relaxing	1	2	3
(26) Trouble making decisions.	1	2	3
(27) Problems getting along with fellow workers	1	2	3
(28) Customers or clients give you a hard time	1	2	3
(29) Home maintenance (inside)	1	2	3
(30) Concerns about job security	1	2	3
(31) Concerns about retirement	1	2	3
(32) Laid-off or out of work	1	2	3
(33) Don't like current work duties	1	2	3
(34) Don't like fellow workers	1	2	3
(35) Not enough money for basic necessities	1	2	3
(36) Not enough money for food	1	2	3
(37) Too many interruptions	1	2	3
(38) Unexpected company	1	2	3
(39) Too much time on hands	1	2	3
(40) Having to wait	1	2	3
(41) Concerns about accidents	1	2	3
(42) Being lonely	1	2	3
(43) Not enough money for health care	1	2	3

1. Slightly severe
2. Moderately severe
3. Extremely severe

(44) Fear of confrontation	1	2	3
(45) Financial security	1	2	3
(46) Silly practical mistakes	1	2	3
(47) Inability to express yourself	1	2	3
(48) Physical illness	1	2	3
(49) Side effects of medication	1	2	3
(50) Concerns about medical treatment	1	2	3
(51) Physical appearance	1	2	3
(52) Fear of rejection	1	2	3
(53) Difficulties with getting pregnant	1	2	3
(54) Sexual problems that result from physical problems	1	2	3
(55) Sexual problems other than those resulting from physical problems	1	2	3
(56) Concerns about health in general	1	2	3
(57) Not seeing enough people	1	2	3
(58) Friends or relatives too far away	1	2	3
(59) Preparing meals	1	2	3
(60) Wasting time	1	2	3
(61) Auto maintenance	1	2	3
(62) Filling out forms	1	2	3
(63) Neighborhood deterioration	1	2	3
(64) Financing children's education	1	2	3
(65) Problems with employees	1	2	3
(66) Problems on job due to being a woman or man	1	2	3
(67) Declining physical abilities	1	2	3
(68) Being exploited	1	2	3
(69) Concerns about bodily functions	1	2	3

	1.	2.	3.
	Moderately severe		
	Extremely severe		
(70) Rising prices of common goods	1	2	3
(71) Not getting enough rest	1	2	3
(72) Not getting enough sleep	1	2	3
(73) Problems with aging parents	1	2	3
(74) Problems with your children	1	2	3
(75) Problems with persons younger than yourself	1	2	3
(76) Problems with your lover	1	2	3
(77) Difficulties seeing or hearing	1	2	3
(78) Overloaded with family responsibilities	1	2	3
(79) Too many things to do	1	2	3
(80) Unchallenging work	1	2	3
(81) Concerns about meeting high standards	1	2	3
(82) Financial dealings with friends or acquaintances	1	2	3
(83) Job dissatisfaction	1	2	3
(84) Worries about decisions to change jobs	1	2	3
(85) Trouble with reading, writing or spelling abilities	1	2	3
(86) Too many meetings	1	2	3
(87) Problems with divorce or separation	1	2	3
(88) Trouble with arithmetic skills	1	2	3
(89) Gossip	1	2	3
(90) Legal problems	1	2	3
(91) Concerns about weight	1	2	3
(92) Not enough time to do the things you need to do	1	2	3
(93) Television	1	2	3
(94) Not enough personal energy	1	2	3

2. Moderately severe
3. Extremely severe

(95) Concerns about personal energy	1	2	3
(96) Feel conflicted over what to do	1	2	3
(97) Regrets over past decisions	1	2	3
(98) Menstrual (period) problems	1	2	3
(99) The weather	1	2	3
(100) Nightmares	1	2	3
(101) Concerns about getting ahead	1	2	3
(102) Hassles from boss or supervisor	1	2	3
(103) Difficulties with friends	1	2	3
(104) Not enough time for family	1	2	3
(105) Transportation problems	1	2	3
(106) Not enough money for transportation	1	2	3
(107) Not enough money for entertainment and recreation	1	2	3
(108) Shopping	1	2	3
(109) Prejudice and discrimination from others	1	2	3
(110) Property, investments or taxes	1	2	3
(111) Not enough time for entertainment and recreation	1	2	3
(112) Yardwork or outside home maintenance	1	2	3
(113) Concerns about news events	1	2	3
(114) Noise	1	2	3
(115) Crime	1	2	3
(116) Traffic	1	2	3
(117) Pollution	1	2	3

Have we missed any of your hassles? If so, write them in below:

(118) _____ 1 2 3

One more thing: Has there been a change

in your life that affected how you
answered this scale? If so, tell what
it was:

APPENDIX L

FAMILY ENVIRONMENT SCALE

FAMILY ENVIRONMENT SCALE
Form R

Instructions

There are 90 statements in this test. They are statements about families. You are to decide which statements are true of your family and which are false. Make all your marks on the test form. If you think the statement is true or mostly true of your family, place a check on the first line (under "True") following the statement. If you think the statement is false or mostly false of your family, place a check on the second line (under "False") following the statement.

You may feel that some statements are true for some family members and false for others. Answer true if the statement is true for most members. Mark false if the statement is false for most members. If the members are evenly divided, decide what is the strong overall impression and answer accordingly.

Remember, we would like to know what your family seems like to you. So do not try to figure out how other members see your family, but do give us your general impression of your family for each statement.

	<u>True</u>	<u>False</u>
1. Family members really help and support one another.	_____	_____
2. Family members often keep their feelings to themselves.	_____	_____
3. We fight a lot in our family.	_____	_____
4. We don't do things on our own very often in our family.	_____	_____
5. We feel it is important to be the best at whatever you do.	_____	_____
6. We often talk about political and social problems.	_____	_____
7. We spend most weekends and evenings at home.	_____	_____
8. Family members attend church, synagogue, or Sunday School fairly often.	_____	_____
9. Activities in our family are pretty carefully planned.	_____	_____
10. Family members are rarely ordered around.	_____	_____
11. We often seem to be killing time at home.	_____	_____
12. We say anything we want to around home.	_____	_____
13. Family members rarely become openly angry.	_____	_____
14. In our family, we are strongly encouraged to be independent.	_____	_____
15. Getting ahead in life is very important in our family.	_____	_____
16. We rarely go to lectures, plays, or concerts.	_____	_____
17. Friends often come over for dinner or to visit.	_____	_____
18. We don't say prayers in our family.	_____	_____
19. We are generally very neat and orderly.	_____	_____
20. There are very few rules to follow in our family.	_____	_____
21. We put a lot of energy into what we do at home.	_____	_____
22. It's hard to "blow off steam" at home without upsetting somebody.	_____	_____
23. Family members sometimes get so angry they throw things.	_____	_____
24. We think things out for ourselves in our family.	_____	_____
25. How much money a person makes is not very important to us.	_____	_____

	<u>True</u>	<u>False</u>
26. Learning about new and different things is very important in our family.	_____	_____
27. Nobody in our family is active in sports, Little League, bowling, etc.	_____	_____
28. We often talk about the religious meaning of Christmas, Passover, or other holidays.	_____	_____
29. It's often hard to find things when you need them in our household.	_____	_____
30. There is one family member who makes most of the decisions.	_____	_____
31. There is a feeling of togetherness in our family.	_____	_____
32. We tell each other about our personal problems.	_____	_____
33. Family members hardly ever lose their tempers.	_____	_____
34. We come and go as we want to in our family.	_____	_____
35. We believe in competition and "any the best man win."	_____	_____
36. We are not that interested in cultural activities.	_____	_____
37. We often go to movies, sports events, camping, etc.	_____	_____
38. We don't believe in heaven or hell.	_____	_____
39. Being on time is very important in our family.	_____	_____
40. There are set ways of doing things at home.	_____	_____
41. We rarely volunteer when something has to be done at home.	_____	_____
42. If we feel like doing something on the spur of the moment, we often just pick up and go.	_____	_____
43. Family members often criticize each other.	_____	_____
44. There is very little privacy in our family.	_____	_____
45. We always strive to do things just a little better the next time.	_____	_____
46. We rarely have intellectual discussions.	_____	_____
47. Everyone in our family has a hobby or two.	_____	_____

	<u>True</u>	<u>False</u>
48. Family members have strict ideas about what is right and wrong.	_____	_____
49. People change their minds often in our family.	_____	_____
50. There is a strong emphasis on following rules in our family.	_____	_____
51. Family members really back each other up.	_____	_____
52. Someone usually gets upset if you complain in our family.	_____	_____
53. Family members sometimes hit each other.	_____	_____
54. Family members almost always rely on themselves when a problem comes up.	_____	_____
55. Family members rarely worry about job promotions, school grades, etc.	_____	_____
56. Someone in our family plays a musical instrument.	_____	_____
57. Family members are not very involved in recreational activities outside work or school.	_____	_____
58. We believe there are some things you just have to take on faith.	_____	_____
59. Family members make sure their rooms are neat.	_____	_____
60. Everyone has an equal say in family decisions.	_____	_____
61. There is very little group spirit in our family.	_____	_____
62. Money and paying bills is openly talked about in our family.	_____	_____
63. If there's a disagreement in our family, we try hard to smooth things over and keep the peace.	_____	_____
64. Family members strongly encourage each other to stand up for their rights.	_____	_____
65. In our family, we don't try that hard to succeed.	_____	_____
66. Family members often go to the library.	_____	_____
67. Family members sometimes attend courses or take lessons for some hobby or interest (outside of school).	_____	_____
68. In our family, each person has different ideas about what is right and wrong.	_____	_____

	<u>True</u>	<u>False</u>
69. Each person's duties are clearly defined in our family.	_____	_____
70. We can do whatever we want to in our family.	_____	_____
71. We really get along well with each other.	_____	_____
72. We are usually careful about what we say to each other.	_____	_____
73. Family members often try to one-up or outdo each other.	_____	_____
74. It's hard to be by yourself without hurting someone's feelings in our household.	_____	_____
75. "Work before play" is the rule in our family.	_____	_____
76. Watching TV is more important than reading in our family.	_____	_____
77. Family members go out a lot.	_____	_____
78. The Bible is a very important book in our home.	_____	_____
79. Money is not handled very carefully in our family.	_____	_____
80. Rules are pretty inflexible in our household.	_____	_____
81. There is plenty of time and attention for everyone in our family.	_____	_____
82. There are a lot of spontaneous discussions in our family.	_____	_____
83. In our family, we believe you don't ever get anywhere by raising your voice.	_____	_____
84. We are not really encouraged to speak up for ourselves in our family.	_____	_____
85. Family members are often compared with others as to how well they are doing at work or school.	_____	_____
86. Family members really like music, art, and literature.	_____	_____
87. Our main form of entertainment is watching TV or listening to the radio.	_____	_____
88. Family members believe that if you sin you will be punished.	_____	_____
89. Dishes are usually done immediately after eating.	_____	_____
90. You can't get away with much in our family.	_____	_____

APPENDIX M

INDEX OF MARITAL SATISFACTION

IMS

This questionnaire is designed to measure the degree of satisfaction you have with your present marriage. It is not a test, so there are no right or wrong answers. Answer each item as carefully and as accurately as you can by placing a number beside each one as follows:

- 1 = Rarely or none of the time
- 2 = A little of the time
- 3 = Some of the time
- 4 = Good part of the time
- 5 = Most or all of the time

- ___ 1. I feel that my partner is affectionate enough.
- ___ 2. I feel that my partner treats me badly.
- ___ 3. I feel that my partner really cares for me.
- ___ 4. I feel that I would not choose the same partner if I had it to do over.
- ___ 5. I feel that I can trust my partner.
- ___ 6. I feel that our relationship is breaking up.
- ___ 7. I feel that my partner doesn't understand me.
- ___ 8. I feel that our relationship is a good one.
- ___ 9. I feel that ours is a very happy relationship.
- ___ 10. I feel that our life together is dull.
- ___ 11. I feel that we have a lot of fun together.
- ___ 12. I feel that my partner doesn't confide in me.
- ___ 13. I feel that ours is a very close relationship.
- ___ 14. I feel that I cannot rely on my partner.
- ___ 15. I feel that we do not have enough interests in common.
- ___ 16. I feel that we manage arguments and disagreements very well.
- ___ 17. I feel that we do a good job of managing our finances.
- ___ 18. I feel that I should never have married my partner.
- ___ 19. I feel that my partner and I get along very well together.
- ___ 20. I feel that our relationship is very stable.
- ___ 21. I feel that my partner is pleased with me as a sex partner.
- ___ 22. I feel that we should do more things together.
- ___ 23. I feel that the future looks bright for our relationship.
- ___ 24. I feel that our relationship is empty.
- ___ 25. I feel there is no excitement in our relationship.

APPENDIX N

SEMI-STRUCTURED INTERVIEW FOR HEADACHE SUBJECTS

AND THEIR FAMILY MEMBERS

Name _____ Age _____

Instructions: ** Ask every subject * Ask target subjects only

- ** 0. Are headaches a problem for you?
- * 1. a. When did you first notice that you suffered frequent headaches?
- b. When did headaches first become a problem for you?
- * 2. At what age did you first seek medical help for your headache?
- * 3. How often have you visited the doctor concerning your headache? past 3 months
 past year
 lifetime
- ** 4. How often have you visited the doctor concerning your general health? past 3 months _____
 past year _____
 lifetime _____
- ** 5. How frequently do you have a headache? _____ per week
 _____ per month
- * 6. a. Have there been periods when headaches were more frequent? If so, when?
- b. Less frequent? If so, when?
- c. What was going on then, physically and psychologically?
- d. Have there been months when you were headache-free? When?
- e. What kinds of diagnostic procedures have you experienced?

X-rays? _____
 EEG? _____
 Neurologic exam? _____
 Brain scan? _____
 Other? _____

- * 7. How long do your headaches usually last?
- * 8. What makes them worse?
- * 9. What makes them better?
- ** 10. When you have a headache, what do you do?

When you have a headache or feel bad in general, how often do you do the following: (in times per week)

	Headache	In General
--	----------	------------

- | | | |
|---|--|--|
| a. Go to bed | | |
| 1. Lay down or take nap | | |
| 2. Go to bed early | | |
| b. Leave work/school | | |
| c. Not go to work/school | | |
| d. Slow down or become less active | | |
| e. Forego activities (sex, outings, etc) | | |
| * 11. Can members of your family tell if you have a headache? | | |
| If yes, | | |
| a. How can they tell? | | |
| b. Do they express concern? | | |
| c. Do they offer special help or support? | | |
| d. Do they do things for you or help out in any way? | | |
| e. How do you think your family members would answer these questions? | | |

- * 12. Using the scale provided, rate the degree to which your headaches have interfered with your life.

0 ————— 1 ————— 2 ————— 3 ————— 4 ————— 5
 not at very much
 all so

- a. your career
 b. your education
 c. your personal life
 d. family relations
 e. general homelife satisfaction
 f. marital satisfaction, if married
- * 13. Using the same scale, how do you think your family members would respond if asked how your headaches interfered with their lives?
- a. career
 b. education
 c. personal life
 d. family relations
 e. general homelife satisfaction
 f. marital satisfaction, if married

- * 14. Do you do things to try and prevent having headaches?

- * 15. Using the scale provided, how would you rate the quality of your life (a.) overall?

(b.) currently?

0 ————— 1 ————— 2 ————— 3 ————— 4 ————— 5
 very extremely
 Unsatisfying satisfying

- * 16. Are you taking any prescription or non-prescription

drugs for headache?

If yes,

(a.) How much of each drug do you take daily?

(b.) Weekly?

** 17. (a.) How much alcohol do you consume daily?

(b.) Weekly?

** 18. (a.) How many cigarettes do you smoke daily?

(b.) Weekly?

IF TARGET, SKIP TO QUESTION 21 !!!!!. IF NON-TARGET, CONTINUE WITH ALL REMAINING QUESTIONS!!!!!!

19. Can you tell when (target's name) has a headache?

If yes,

a. How can you tell?

b. Do you express concern? How?

c. Do you offer special help or support? How?

d. Do you do things for (target's name) or help out in any way?

e. How do you think (target's name) would answer these questions?

20. Using the scale provided, rate the degree to which (target's) headaches have interfered with your life.

0 1 2 3 4 5
not at all very much so

- a. your career
- b. your education
- c. your personal life
- d. family relations
- e. general homelife satisfaction
- f. marital satisfaction, if married

ALL SUBJECTS ANSWER THE REMAINING QUESTIONS.

**21. Have you ever received any psychological or psychiatric treatment for mental or emotional problems? ___Yes ___No

If yes, include when, approximate number of sessions, helpfulness, and circumstances under which treatment was sought. _____

**22. Have you ever been depressed? ___Yes ___No
 If yes, are you depressed now? ___Yes ___No

**23. Have you ever had a problem with alcohol? ___Yes ___No
 or with other drugs? ___Yes ___No If yes, what? _____

**24. These questions are somewhat different from the previous questions .

a. What is today's date? _____ The day of the week _____

b. Do you remember my name? _____

c. I am going to say some numbers. Listen carefully, then repeat them back to me. (Give digits approximately one per second.)

(i) 5-8-2 (ii) 6-4-3-9- (iii) 4-2-7-4-1 (iv) 6-9-4
 (v) 7-2-8-6 (vi) 7-5-8-3-6

d. Who is the President of the U.S.? _____

e. Who is the Governor of Virginia? _____

f. Have you ever had any strange experiences? _____

-
- g. Have you ever heard things other people could not hear or heard things when no one was around? _____
-
- h. Have you ever seen things other people could not see? _____
-
- i. Do you believe that you have special powers? _____
-
- j. Have you ever felt or thought people were out to get you? _____

APPENDIX 0

SEMI-STRUCTURED INTERVIEW FOR ORTHOPEDIC SUBJECTS

SEMI-STRUCTURED INTERVIEW FOR ORTHOPEDIC SUBJECT

Name _____ Age _____

- * 0. Please describe your injury. ___break ___sprain
 - a. Describe the pain. ___dull ache? or
 ___intense throbbing?
 ___other?
 - b. Describe the regularity. ___constant
 ___intermittent
- * 1. a. When did the injury occur? _____days ago
 - b. When did (injury) pain first become a problem for you?
- * 2. When did you first seek medical help for your injury/pain?
- * 3. How often have you visited the doctor concerning your injury or its related problems (e.g., pain)?
- * 4. How often have you visited the doctor concerning your general health?
 - past 3 months
 - past year
 - lifetime
- * 5. How frequently do you have pain related to your injury?
 - _____days per week
 - _____days per month
- * 6. a. Have there been periods when the pain was more intense? If so, when?
 - b. Less intense? If so, when?
 - c. What was going on then, physically and psychologically?
 - d. Have there been days when you were pain-free? When?

- e. What kinds of diagnostic procedures have you experienced?
 X-rays?
 Other?

- * 7. How long does your pain usually last?
- * 8. What makes it worse?
- * 9. What makes it better?
- * 10. When you have (injury) pain, what do you do?

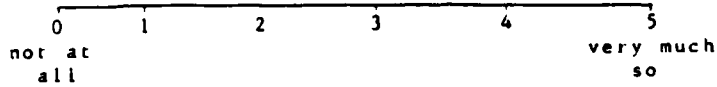
When you have (injury) pain or feel bad in general, how often do you do the following: (in times per week)

	Injury Pain	In General
--	-------------	------------

- | | | |
|--|--|--|
| a. Go to bed | | |
| 1. Lay down or take nap | | |
| 2. Go to bed early | | |
| b. Leave work/school | | |
| c. Not go to work/school | | |
| d. Slow down or become less active | | |
| e. Forego activities (sex, outings, etc) | | |
| * 11. Can members of your family tell if you have (injury) pain? | | |
| If yes, | | |
| a. How can they tell? | | |
| b. Do they express concern? | | |
| c. Do they offer special help or support? | | |
| d. Do they do things for you or help out in any way? | | |

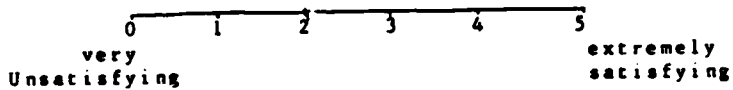
e. How do you think your family members would answer these questions?

- * 12. Using the scale provided, rate the degree to which your (injury) pain has interfered with your life.



- a. your career
 - b. your education
 - c. your personal life
 - d. family relations
 - e. general homelife satisfaction
 - f. marital satisfaction, if married
- * 13. Using the same scale, how do you think your family members would respond if asked how your pain interfered with their lives?
- a. career
 - b. education
 - c. personal life
 - d. family relations
 - e. general homelife satisfaction
 - f. marital satisfaction, if married
- * 14. Do you do things to try and prevent having (injury) pain? Be specific.
- * 15. Using the scale provided, how would you rate the quality of your life (a.) overall?

(b.) currently?



- * 16. Are you taking any prescription or non-prescription drugs for (injury) pain?
If yes,

(a.) How much of each drug do you take daily?

(b.) Weekly?

* 17. (a.) How much alcohol do you consume daily?

(b.) Weekly?

* 18. (a.) How many cigarettes do you smoke daily?

(b.) Weekly?

IF INJURY IS TO ARM/HAND

- * 19. a. Is injury to the dominant arm/hand? ___no ___yes
 b. Can you still write? ___no ___yes
 c. Can you still lift? ___no
 ___only light weight
 ___as much weight as always

IF INJURY IS TO LEG/FOOT

- * 20. Has your mobilization been affected? ___no ___yes
 If yes, circle all appropriate descriptors.
 a. Walks with crutche(s)
 b. Walks with cane.
 c. Walks without assistance.
 d. Can put full weight on limb.
 e. Can put only light weight on limb
 f. Other. (describe)

* 21. Have you ever received any psychological or psychiatric treatment for mental or emotional problems? ___Yes ___No

If yes, include when, approximate number of sessions, helpfulness, and circumstances under which treatment was sought. _____

* 22. Have you ever been depressed? ___Yes ___No
 If yes, are you depressed now? ___Yes ___No

* 23. Have you ever had a problem with alcohol? ___Yes ___No
 or with other drugs? ___Yes ___No If yes, what? _____

* 24. These questions are somewhat different from the previous questions .

- a. What is today's date? _____ The day of the week _____
- b. Do you remember my name? _____
- c. I am going to say some numbers. Listen carefully, then repeat them back to me. (Give digits approximately one per second.)
- (i) 5-8-2 (ii) 6-4-3-9- (iii) 4-2-7-4-1 (iv) 6-9-4
(v) 7-2-8-6 (vi) 7-5-8-3-6
- d. Who is the President of the U.S.? _____
- e. Who is the Governor of Virginia? _____
- f. Have you ever had any strange experiences? _____

- g. Have you ever heard things other people could not hear or heard things when no one was around? _____

- h. Have you ever seen things other people could not see? _____

- i. Do you believe that you have special powers? _____

- j. Have you ever felt or thought people were out to get you? _____

APPENDIX P

SEMI-STRUCTURED INTERVIEW FOR FAMILY
OF ORTHOPEDIC SUBJECT

SEMI-STRUCTURED INTERVIEW FOR FAMILY OF ORTHOPEDIC SUBJECT

Name _____ Age _____

Instructions: ** Ask every member * Ask only members with headache problems

** 0. Are headaches a problem for you?
IF NO, SKIP TO QUESTION 4.

- * 1. a. When did you first notice that you suffered frequent headaches?

b. When did headaches first become a problem for you?
- * 2. At what age did you first seek medical help for your headache?
- * 3. How often have you visited the doctor concerning your headache?
past 3 months
past year
lifetime
- ** 4. How often have you visited the doctor concerning your general health?
past 3 months
past year
lifetime
- ** 5. How frequently do you have a headache? _____ per week
_____ per month
- * 6. a. Have there been periods when headaches were more frequent? If so, when?

b. Less frequent? If so, when?

c. What was going on then, physically and psychologically?

d. Have there been months when you were headache-free? When?

e. What kinds of diagnostic procedures have you experienced?

X-rays?
 EEG?
 Neurologic exam?
 Brain scan?
 Other?

- * 7. How long do your headaches usually last?
- * 8. What makes them worse?
- * 9. What makes them better?
- ** 10. When you have a headache, what do you do?

When you have a headache or feel bad in general, how often do you do the following: (in times per week)

- | | Headache | In General |
|---|----------|------------|
| a. Go to bed | | |
| 1. Lay down or take nap | | |
| 2. Go to bed early | | |
| b. Leave work/school | | |
| c. Not go to work/school | | |
| d. Slow down or become less active | | |
| e. Forego activities (sex, outings, etc) | | |
| * 11. Can members of your family tell if you have a headache? | | |
| If yes, | | |
| a. How can they tell? | | |
| b. Do they express concern? | | |
| c. Do they offer special help or support? | | |
| d. Do they do things for you or help out in any way? | | |
| e. How do you think your family members would answer these questions? | | |

(b.) Weekly?

** 17. (a.) How much alcohol do you consume daily?

(b.) Weekly?

** 18. (a.) How many cigarettes do you smoke daily?

(b.) Weekly?

** 19. Can you tell when (target's name) has (injury) pain?

If yes,

a. How can you tell?

b. Do you express concern? How?

c. Do you offer special help or support? How?

d. Do you do things for (target's name) or help out in any way?

e. How do you think (target's name) would answer these questions?

** 20. Using the scale provided, rate the degree to which (target's) injury pain has interfered with your life.

0 1 2 3 4 5
not at all very much so

- a. your career
- b. your education
- c. your personal life
- d. family relations
- e. general homelife satisfaction
- f. marital satisfaction, if married

ALL SUBJECTS ANSWER THE REMAINING QUESTIONS.

** 21. Have you ever received any psychological or psychiatric treatment for mental or emotional problems? ___Yes ___No

If yes, include when, approximate number of sessions, helpfulness, and circumstances under which treatment was sought. _____

** 22. Have you ever been depressed? ___Yes ___No
 If yes, are you depressed now? ___Yes ___No

** 23. Have you ever had a problem with alcohol? ___Yes ___No
 or with other drugs? ___Yes ___No If yes, what? _____

** 24. These questions are somewhat different from the previous questions .

a. What is today's date? _____ The day of the week _____

b. Do you remember my name? _____

c. I am going to say some numbers. Listen carefully, then repeat them back to me. (Give digits approximately one per second.)

(i) 5-8-2 (ii) 6-4-3-9- (iii) 4-2-7-4-1 (iv) 6-9-4
 (v) 7-2-8-6 (vi) 7-5-8-3-6

d. Who is the President of the U.S.? _____

e. Who is the Governor of Virginia? _____

f. Have you ever had any strange experiences? _____

g. Have you ever heard things other people could not hear or heard things when no one was around? _____

h. Have you ever seen things other people could not see? _____

i. Do you believe that you have special powers? _____

j. Have you ever felt or thought people were out to get
you? _____

APPENDIX Q

DAILY HEADACHE DIARY

Name _____ Week beginning _____

1. Using the scale below, rate your headache four times a day.

- 0 = no headache
- 1 = very mild headache, aware of it only when attending to it
- 2 = mild headache, could be ignored at times
- 3 = moderate headache, pain is noticeably present
- 4 = severe headache, difficult to concentrate, can do undemanding tasks
- 5 = extremely intense headache, incapacitated

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Date:	_____	_____	_____	_____	_____	_____	_____
Breakfast	_____	_____	_____	_____	_____	_____	_____
Lunch	_____	_____	_____	_____	_____	_____	_____
Dinner	_____	_____	_____	_____	_____	_____	_____
Bedtime	_____	_____	_____	_____	_____	_____	_____

2. Using the scale below, rate your feelings and physical symptoms.

0 _____ 1 _____ 2 _____ 3 _____ 4 _____ 5 _____
 not at all _____ extremely so

angry	_____	_____	_____	_____	_____	_____	_____
happy	_____	_____	_____	_____	_____	_____	_____
worried	_____	_____	_____	_____	_____	_____	_____
calm	_____	_____	_____	_____	_____	_____	_____
down or blue	_____	_____	_____	_____	_____	_____	_____
energetic	_____	_____	_____	_____	_____	_____	_____
stressed	_____	_____	_____	_____	_____	_____	_____
nausea/vomiting	_____	_____	_____	_____	_____	_____	_____
diarrhea/constipation	_____	_____	_____	_____	_____	_____	_____
stomach pain	_____	_____	_____	_____	_____	_____	_____
fatigue	_____	_____	_____	_____	_____	_____	_____
fever/flu	_____	_____	_____	_____	_____	_____	_____
cold/allergy	_____	_____	_____	_____	_____	_____	_____
other _____	_____	_____	_____	_____	_____	_____	_____

3. Using the same scale (above), rate the severity of today's hassles.

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

4. # cigarettes _____

5. # of drinks _____

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7

6. medication consumed for headache

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

7. Did any family members experience (choose letter representing family member)

a. b. c. d. e. f. g.

headache	_____	_____	_____	_____	_____	_____	_____
other physical symptoms:	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

If you had a headache today, complete the next three questions.

1. If you had a headache today, who knew? (choose letter representing family member)

a. b. c. d. e. f. g.

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

2. In response to your headache, which of the following did you do that you would not typically do?

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7

took non-prescription medication	_____	_____	_____	_____	_____	_____	_____
took prescription medication	_____	_____	_____	_____	_____	_____	_____
rest or go to bed (how long)	_____	_____	_____	_____	_____	_____	_____
interrupted activities (list activities, e.g., work)	_____	_____	_____	_____	_____	_____	_____
interrupted plans (list)	_____	_____	_____	_____	_____	_____	_____
spoke about headache to someone (list who--e.g., friend, co-worker)	_____	_____	_____	_____	_____	_____	_____
did nothing; carried on as usual	_____	_____	_____	_____	_____	_____	_____

3. Were there any special circumstances that contributed to your headache?

APPENDIX R

ORTHOPEDIC PAIN DIARY

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7

6. Medication consumed for _____ pain

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

7. According to the choices below, indicate if any family members have experienced headache or other physical symptoms.

a. _____ b. _____ c. _____ d. _____ e. _____

headache	_____	_____	_____	_____	_____	_____	_____
other physical symptoms	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

If you had _____ pain today, complete the next three questions.

1. If you had _____ pain today, who knew? (Choose letter from #7 above representing family member.)

2. In response to your _____ pain, which of the following did you do that you would not typically do?

Took non-prescription medicine	_____	_____	_____	_____	_____	_____	_____
Took prescription medicine	_____	_____	_____	_____	_____	_____	_____
Rested or went to bed (for how long?)	_____	_____	_____	_____	_____	_____	_____
Interrupted activities (list them; e.g., work)	_____	_____	_____	_____	_____	_____	_____
Spoke about pain to someone (list who -e.g., friend, co-worker)	_____	_____	_____	_____	_____	_____	_____
Did nothing; carried on as usual	_____	_____	_____	_____	_____	_____	_____

3. Were there any special circumstances that contributed to your pain?

APPENDIX S

INTRAPERSONAL CORRELATIONS OF EACH SUBJECT HEADACHE
INDEX WITH NEGATIVE MOOD

Intrapersonal Correlations of Each Subject Headache
Index with Negative Mood

Subj	Target			Family		
	n-1	n	n+1	n-1	n	n+1
1	0.1159	0.1036	-0.4095	-0.5279	0.1930	0.0038
2	-0.0981	0.0319	-0.1789	0.5134	0.1000	0.0318
3	0.5286	0.1709	-0.1105	-0.1076	0.5608	-0.0737
4	0.3209	0.0450	-0.4673	0.1426	-0.2565	-0.6403
5	0.5151	0.4503	0.5162	-0.2932	0.2118	0.3551
6	0.0475	0.1532	-0.2432	0.0231	0.2301	-0.4125
7	0.3465	-0.1124	-0.1269	0.6166	-0.1730	-0.0262
8	-0.3899	-0.0035	0.2766	0.1231	-0.2331	-0.4099
9	-0.3527	0.0535	-0.3425	0.4152	0.4840	0.3408
10	0.6646	0.6091	0.3587	0.3886	0.1467	0.0624
11	-0.2084	0.3967	0.2758	0.0226	0.0509	0.0509
12	-0.3424	0.1024	0.1866	0.0240	0.0130	0.0021
13	0.0085	0.1239	0.0493	0.1498	-0.0997	0.0474
14	0.3551	-0.2814	-0.3004	0.0372	0.1376	0.4854
15	-0.1516	0.6375	-0.6657	0.0161	0.1680	0.2461
16	-0.2015	0.4234	0.2018	0.0059	0.6873	0.1688
17	0.6723	0.7797	0.6223	0.0018	0.0776	0.2497
18	0.2315	0.2853	0.1719	0.1598	-0.2006	-0.8363

APPENDIX T

INTRAPERSONAL CORRELATIONS OF EACH SUBJECT HEADACHE
INDEX WITH POSITIVE MOOD

Intrapersonal Correlations of Each Subject Headache
Index with Positive Mood

Subj	Target			Family		
	n-1	n	n+1	n-1	n	n+1
1	0.2162	-0.5583	0.4872	0.4145	-0.0669	-0.0038
2	0.1156	-0.4432	0.1923	-0.4211	-0.1357	0.0648
3	-0.6055	-0.3676	-0.1799	-0.3931	-0.3687	0.0455
4	-0.2752	-0.3982	0.4017	0.1423	0.4402	0.1331
5	0.2119	-0.1196	-0.5022	-0.4112	-0.4803	-0.2451
6	0.2268	-0.7601	0.2454	0.1272	0.1275	0.6921
7	-0.0796	-0.0011	0.2295	0.0493	-0.0705	0.0533
8	-0.2443	0.1062	0.3453	-0.1675	0.0903	0.3023
9	0.0809	-0.2357	-0.0111	-0.0313	0.4302	-0.3201
10	-0.1515	-0.1273	0.0609	-0.5056	-0.0399	0.0055
11	-0.1358	0.1355	0.2670	-0.5814	-0.4360	-0.4695
12	-0.0240	0.2120	0.3823	0.4221	-0.0967	-0.5221
13	0.0637	-0.6598	-0.0409	-0.3453	0.3302	-0.0813
14	0.0800	0.0596	0.1928	0.2558	0.3538	0.2012
15	-0.0050	-0.3993	0.6966	-0.1092	-0.0262	-0.1298
16	-0.1126	-0.2924	0.0537	0.3392	0.5273	0.2108
17	-0.3641	-0.3038	0.0939	0.0448	-0.0986	-0.1211
18	-0.0257	-0.4318	-0.4252	-0.5474	0.4356	0.2457

APPENDIX U

INTRAPERSONAL CORRELATIONS OF EACH SUBJECT HEADACHE
INDEX WITH PHYSICAL SYMPTOMS

Intrapersonal Correlations of Each Subject Headache
Index with Physical Symptoms

Subj	Target			Family		
	n-1	n	n+1	n-1	n	n+1
1	0.2162	0.1512	-0.0989	-0.0939	0.0463	-0.1336
2	-0.2072	0.3791	-0.1073	0.3189	0.2577	0.2469
3	0.6833	0.2377	-0.1100	-0.0392	-0.0783	0.6395
4	-0.1525	0.0863	-0.2283	-0.0365	0.1603	0.0797
5	0.2239	0.7185	0.2440	-0.2374	-0.3315	-0.1138
6	-0.1239	0.1389	0.3316	0.3055	0.2839	-0.4235
7	0.1085	-0.0860	-0.1338	-0.3381	0.5757	-0.1702
8	-0.1877	-0.4301	0.4612	-0.3008	0.2814	0.7587
9	-0.3754	-0.2621	-0.2159	0.5346	0.3736	0.0815
10	0.0303	0.1231	0.0760	-0.1942	-0.5489	-0.1165
11	0.1449	0.3139	-0.1392	-0.1516	-0.3748	0.0944
12	0.0617	0.2762	0.7110	0.5601	0.0131	-0.1167
13	0.0568	0.3880	-0.1807	0.4671	-0.0997	-0.0951
14	0.0461	0.6181	-0.0084	0.0884	0.4342	0.4854
15	-0.0351	0.3213	-0.2004	0.1464	-0.4086	-0.1129
16	0.1217	0.4705	-0.1564	0.6985	0.1286	0.7059
17	-0.1984	0.1409	-0.1070	0.0013	0.0040	0.0011
18	0.4161	-0.0467	-0.2348	0.2679	-0.4765	-0.4997

APPENDIX V

INTRAPERSONAL CORRELATIONS OF EACH SUBJECT HEADACHE
INDEX WITH HASSLES

Intrapersonal Correlations of Each Subject Headache
Index with Hassles

Subj	Target			Family		
	n-1	n	n+1	n-1	n	n+1
1	0.2600	0.0942	-0.0265	-0.0174	0.3046	0.5607
2	0.0061	0.4475	0.0516	-0.2072	-0.1702	0.2317
3	0.2586	0.2755	-0.0692	0.0020	0.0012	0.0003
4	-0.0459	0.1323	0.0151	-0.5696	-0.0294	-0.1228
5	0.1970	0.4996	-0.2043	0.0801	-0.0448	-0.0546
6	0.0106	0.4381	-0.2376	-0.0534	0.1597	-0.8035
7	0.1875	-0.1373	0.0046	0.3122	0.0412	0.3787
8	-0.0925	0.1404	0.1267	0.3288	-0.0414	-0.1159
9	0.2564	0.5196	0.1781	0.0455	0.6326	0.3089
10	0.7755	0.4121	0.1866	-0.0004	0.2210	-0.1178
11	0.3936	-0.1305	-0.4090	0.2274	-0.0333	0.2126
12	0.0415	0.3981	0.2108	0.0003	0.0010	0.0012
13	0.1326	0.0682	-0.0256	0.0820	0.0579	0.2464
14	-0.1990	-0.2034	-0.1521	0.1981	0.5583	0.4529
15	-0.0515	0.2234	-0.6754	-0.2556	0.4035	-0.1312
16	-0.2377	-0.0958	-0.4569	0.7228	0.4472	0.0287
17	0.0833	0.0845	0.1199	0.2638	0.3443	0.0396
18	-0.3137	-0.0501	0.4440	-0.6227	0.0683	0.0661

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