

A Comparison of Tension Headache Sufferers and Nonpain Controls on the State-Trait Anger Expression Inventory: An Exploratory Study with Implications for Applied Psychophysiolgists

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Studies that have examined the relationship between personality characteristics and tension headache have arrived at conflicting and, for the most part, negative results. In recent years, a number of investigators have begun examining the relationship between anger and psychophysiological disorders, focusing mostly on anger which is suppressed or held in rather than expressed behaviorally. The present study explored the relationship between anger in 59 tension headache subjects and compared their results to 33 nonpain controls. Materials consisted of the revised research edition of the Spielberger State-Trait Anger Expression Inventory. As predicted, tension headache sufferers were found to have significantly more anger held inward than nonpain controls. Implications for applied psychophysiology treatment and future research directions are discussed.

KEY WORDS: headache; anger; assessment; tension headache; biofeedback.

INTRODUCTION

Studies that have examined the relationship between personality characteristics and tension headache have arrived at conflicting and, for the most part, negative results (e.g., Andrasik, Blanchard, Arena, Teders, Teevan, & O'Keefe, 1982; Arena, Andrasik, & Blanchard, 1985; Arena, Blanchard, & Andrasik, 1984; Arena, Blanchard, Andrasik, & Applebaum, 1986; Blanchard, Andrasik, & Arena, 1984). In recent years, a number of investigators have begun examining the relationship between anger and psychophysiological disorders. Most of this research has focused

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on a specific type of anger expression—that which is suppressed or held in rather than expressed outwardly towards others or objects in one's environment. There is a strong body of evidence, beginning with the pioneering works of Diamond (1982) and Johnson (1984), suggesting that anger held inward is implicated in the etiology and maintenance of essential hypertension. Recently, investigators have begun to examine the relationship between anger and chronic pain (e.g., Burns, Johnson, Mahoney, Devine, & Pawl, 1996; Fernandez & Milburn, 1994; Gaskin, Greene, Robinson, & Geisser, 1992; Kerns, Rosenberg, & Jacob, 1994; Reinking, Tempkin, & Tempkin, 1995); however, all of these studies have the same methodological limitation of comingling a number of chronic pain types, preventing definitive conclusions. [The reader is referred to a seminal article by Fernandez and Turk (1995) for an excellent overview of the scope and significance of anger in the experience of chronic pain.]

Only one study to our knowledge in the chronic pain literature has not combined various types of chronic pain patients. Ham, Andrasik, Packard, and Bundrick (1994) employed a number of psychometric instruments including the Spielberger State-Trait Anger Expression Inventory (STAXI) with four groups: post-traumatic headache, mixed migraine and tension headache, chronic low back pain, and non-pain controls. Results of analysis on the STAXI indicated differences between the various groups only on the *State Anger Scale*. This study, however, did not include pure tension or migraine headache groups.

Psychophysiological assessment research has demonstrated that tension headache sufferers respond to a standard psychophysiological assessment (which includes conditions such as relaxation, stressful task, etc.) with increased anger compared to nonpain controls (Hatch, Moore, Borcharding, Cyr-Provost, Boutros, & Seleshi, 1992). To our knowledge, no previous study has examined the relationship between tension headache and the various types of anger and its expression as defined by the STAXI. The present study was conducted to explore further self-reported anger in tension headache sufferers as compared to nonpain controls.

METHOD

Subjects

Subjects were 59 individuals with tension headache and 33 healthy nonpain controls. All tension headache subjects met the criteria for chronic tension headache as set forth by the Ad Hoc Committee of the American Neurological Association on the Classification of Headache (1962), as well as the criteria of the newer Headache Classification Committee of the International Headache Society (1988) for episodic or chronic tension headache.

There were 10 male and 49 female headache subjects, ranging in age from 21 to 76, with an average age of 38.2 and a standard deviation of 12.8. Headache sufferers had suffered from tension headache for an average of 14.4 years, with a standard deviation of 11.8. Physical and neurological examination (by KJM) were normal. Controls were 33 normal individuals who had never experienced head pain to a sig-

nificant extent (<6 minor headaches a year). There were 16 male and 17 female controls ranging in age from 19 to 70, with an average age of 33.2 and a standard deviation of 12.6. They were recruited from staff at a VA Medical Center or from the surrounding community. All subjects received \$250 for participation in a study on headache. This sum was contingent on subjects finishing a number of tasks during an assessment phase of a research project on tension headache, which included such procedures as two laboratory psychophysiological assessments, completing the STAXI, and wearing an ambulatory EMG recorder for 5 consecutive days.

Controls and headache subjects did not differ on age ($f(88) = 3.23, p = .076$) but did differ significantly on gender ($\chi^2(1) = 10.4, p = .001$). As a result, all analyses conducted below included gender in addition to diagnosis as a between-subjects factor.

Materials

Materials consisted of the revised research edition of the Spielberger State-Trait Anger Expression Inventory (Spielberger, 1991). The STAXI is composed of 44 items, from which are derived six scales and two subscales: The *State Anger Scale* measures the magnitude of angry feelings at the time the test is taken. The *Trait Anger Scale* measures how an individual is disposed characterologically to react to anger. It has two subscales—*Angry Temperament* and *Angry Reaction*. The *Angry Temperament* subscale involves an individual's propensity to react angrily to events without any specific provocation (i.e., how "quick tempered" or impulsive an individual is concerning anger), whereas the *Angry Reaction* subscale measures how likely one is to react with an angry response to a provocation such as criticism. The *Anger-In Scale* measures the frequency of angry feelings which are contained or held in. The *Anger-Out Scale* measures the frequency that an individual will express aggressive behavior toward other persons or objects in the environment. The *Anger Control Scale* measures the frequency that an individual attempts to contain the expression of anger. Finally, the *Anger Expression Scale* is a composite scale which provides a general index of the frequency that anger is expressed, regardless of whether the anger is expressed inward or outward.

RESULTS

Table I presents the raw score means and standard deviations for the six STAXI scales and two subscales of the STAXI. Two multivariate analyses of variance (MANOVAs) were conducted, both with diagnosis and gender as between-subject factors. In the first MANOVA, the raw score values of the six scales were entered as the dependent variables; in the second, the two subscales of the *Trait Anger Scale*—*Angry Temperament* and *Angry Reaction*—were entered as the dependent variables.

Results of the MANOVA on the six STAXI scales indicated a significant diagnosis main effect (Wilks' Lambda = 0.850, $p = .031$); further decomposition of the effects using univariate analyses of variance (ANOVA) revealed a significant diagnosis effect for the *Anger Expression—In Scale* only ($F(1,88) = 8.57, p = 0.004$),

Table I. Means for Six Scales and Two Subscales of the Spielberger State-Trait Anger Expression Inventory

Scale	Non-Pain Controls		Tension Headache	
	M	SD	M	SD
State Anger Scale	10.52	2.08	10.49	1.02
Trait Anger Scale:	15.09	4.84	16.68	3.73
Angry Temperament Subscale	5.58	2.59	6.10	2.28
Angry Reaction Subscale	7.61	3.48	8.34	2.95
Anger Expression—In Scale	13.46	3.55	15.36	3.60
Anger Expression—Out Scale	14.58	4.37	13.70	2.95
Anger Expression—Control Scale	25.36	5.82	23.39	5.09
Anger Expression Scale	19.03	9.00	21.75	7.40

with tension headache subjects demonstrating significantly more anger held in (mean = 15.36, approximate mean percentile score = 54) than nonpain controls (mean = 13.46, approximate mean percentile score = 43). There was also a significant MANOVA diagnosis by gender interaction (Wilks' Lambda = .848, $p = .030$). Further decomposition of the effect using ANOVA revealed a significant interaction only for the *State Anger Scale* ($F(1,88) = 5.02$, $p = 0.028$), with nonpain males having lower mean *State Anger Scale* raw scores than tension headache males (10.06 versus 11.10, approximate mean percentile = 69 versus 80.5), whereas there was no significant difference found between tension headache females and nonpain control females (10.94 versus 10.37, approximate mean percentile = 60 versus 54).

Finally, the MANOVA on the two *Trait Anger* subscales (*Angry Temperament* and *Angry Reaction*) revealed no significant main effects or interactions.

DISCUSSION

As in the hypertension research and most of the limited chronic pain literature, results of the present study indicate that anger that is held in or contained, rather than being expressed through overt physical or verbal behavior, may be implicated in the etiology or maintenance of chronic tension headache: Tension headache sufferers have significantly higher scores on the STAXI *Anger-In Scale* than nonpain controls. They tend to contain the expression of their anger and keep their angry feelings to themselves rather than expressing them. As Thomas (1993) states, they "try to act as though nothing much happened" (p. 44), rather than venting their anger through either an appropriate (e.g., discussion, assertive) or inappropriate (e.g., attacking or blaming others) fashion.

Interestingly, tension headache males had significantly higher *State Anger Scale* scores than nonpain controls, whereas there was no significant difference between

the headache and nonheadache female subjects on this scale. The *State Anger Scale* measures how angry an individual is while taking the test. Apparently, the assessment condition provoked a higher degree of self-reported anger in tension headache males as compared to control males.

There are two factors which limit definitive interpretations of the present study's results. The first is the lack of a control group or groups of medically ill patients, such as individuals with diabetes, or of a different pain disorder, such as people suffering from lower back pain. Without a second control group of patients, it is possible that the observed differences may have resulted from the presence of chronic illness in general or of the chronic pain experience, rather than being specific to individuals with tension headache. Another methodological limitation is our inability to compare the two groups on additional demographic variables such as education, income, socioeconomic status, marital status, etc., due to our failure to obtain this information from our nonpain controls. Clearly, future research must attend to these methodological oversights on our part.

The results of the present study suggest that both basic and applied psychophysiologicalists may wish to assess the role of anger more carefully in tension headache sufferers. For example, basic psychophysiologicalists may decide to include both an anger-in and anger-out negative imagery condition when comparing the psychophysiological responses of tension headache subjects to other headache groups and nonpain controls. And both basic and applied psychophysiologicalists may wish to employ paper and pencil measures of various types of anger, such as the STAXI.

The findings of the present study are likely to have direct treatment implications for applied psychophysiologicalists. Psychophysiological intervention for chronic tension headache significantly reduces headache activity by at least 50%, in 40% to 75% of patients (Arena & Blanchard, 1996; Blanchard & Arena, in press). This means that a substantial proportion of tension headache sufferers are not achieving clinically significant reductions in their headache activity through standard biofeedback and relaxation therapy procedures. Our results suggest that the addition of interventions specifically designed to counteract the negative impact of anger held inward by teaching individuals to express anger appropriately may enhance psychophysiological treatment effectiveness with tension headache sufferers.

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