

# Relationship Between Panic Attacks and Health Locus of Control

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**Background.** Health locus of control has significant implications for treatment response, compliance, patient education, and health maintenance. Because of the association between locus of control and anxiety, this study was conducted to determine the health locus of control (HLOC) in patients with panic attacks, changes in HLOC through treatment of panic attacks, and the relationship between HLOC and phobic avoidance.

**Methods.** The HLOC and panic screening questionnaires were administered to 50 patients complaining of a panic-related symptom or condition known to be associated with panic, and to 119 randomly selected patients. Nineteen patients with panic attacks were later reevaluated to determine if there had been a change in locus of control.

**Results.** Stepwise multiple regression demonstrated

that panic attacks, educational level, and being divorced significantly predicted HLOC ( $F = 5.66, P \leq .0001$ ). An analysis of covariance (ANCOVA) showed that resolution of panic attacks was associated with a greater decrease in the HLOC score ( $F = 4.68, P \leq .05$ ). Phobic avoidance was also associated with greater levels of externality ( $r = .48, P \leq .05$ ) and correlated with HLOC in response to treatment.

**Conclusions.** This study suggests there is a significant relationship between HLOC and panic attacks, and between HLOC and phobic avoidance. Panic resolution is associated with a decrease in externality. Measurement of HLOC may be helpful in assessing the treatment response of patients who have panic attacks.

**Key words.** Internal-external control, phobic disorders, and anxiety disorders. *J Fam Pract* 1991; 32:391-396.

The concept of *cognitive style* means that each individual has a characteristic way of conceptually organizing the environment.<sup>1</sup> *Locus of control* (LOC) relates specifically to the location from which an individual perceives that control of his or her life is derived. Individuals with an internal LOC perceive control of events to rest within themselves, while individuals with an external LOC perceive control to rest with others.<sup>2</sup> The Health Locus of Control scale measures LOC beliefs as they relate specifically to health issues.<sup>3</sup>

Previous studies have found that, in general, the more severe the psychiatric pathology, the greater is the externality of LOC.<sup>4-7</sup> Higher levels of anxiety, in particular, are associated with externality.<sup>8-13</sup> This increased anxiety may be related to the expectancy of unsuccessfully controlling stress, which typifies the individual with an

external LOC. In general, internality is associated with a greater sense of psychological and physical well-being,<sup>14,15</sup> although extremes in either internality or externality may be detrimental to coping.<sup>16</sup>

Prompted by the extreme levels of anxiety and the spontaneous nature of panic attacks, this study was conducted to determine the relationship between panic attacks and the health locus of control (HLOC). It was hypothesized that (1) patients with panic attacks would have a more external HLOC than those without attacks, (2) improvement in the panic attacks would be associated with a commensurate reduction in externality, and (3) the presence of phobic avoidance would be associated with greater levels of externality.

## Methods

Patients presenting to the Family Practice Medical Group at the University of Texas Health Science Center with any unexplained panic-related symptom or condition known to be associated with panic attacks (spontaneous

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attacks of anxiety associated with at least four autonomic symptoms<sup>17</sup>) were asked to participate in the study. Fifty patients completed the Panic Screening Questionnaire (PSQ), the Health Locus of Control scale, and a demographic data sheet. In a previous study of 200 randomly selected patients in the Family Health Center at the Brady Green Community Health Center, the self-administered PSQ was compared with the Diagnostic Interview Schedule (DIS). The DIS diagnosed 45 patients with panic attacks, while the PSQ diagnosed 50 patients with panic attacks. With a false-positive rate of 6% and a false-negative rate of 3.5%, the PSQ has a sensitivity of 84.4% and a specificity of 92.3%. The HLOC scale is an 11-item questionnaire producing scores ranging from 11 (most internal LOC) to 66 (most external LOC). Those meeting the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R)<sup>17</sup> criteria for panic attacks additionally completed instruments describing their phobic avoidance behaviors (fear or avoidance of situations associated with panic or in which help is not readily available) and the characteristics of their panic attacks. Severity of panic and avoidance were assessed according to the DSM-III-R, and improvement with respect to panic attacks was determined by a review of pretreatment and posttreatment panic descriptions. Panic attacks were said to be "improved" if there had been a reduction in frequency or severity. All coding was done by the investigator, who was blinded to HLOC scores. Each patient was thus classified into one of five groups: panic attacks, simple phobia, limited-symptom attacks, exercise-induced attacks, and normal.

The primary physician was informed of the patient's results and management recommendations. Consultation was available if requested. Patients with panic attacks were asked to follow up with the investigator in 1 to 2 months for a repeat assessment of their panic attack characteristics, efficacy of drug therapy, if any, and a follow-up evaluation of the HLOC. Those failing to follow up within 6 months were contacted by mail and telephone, if possible, to encourage follow-up. Chart audit of those who did not follow up was performed for the purpose of identifying drug therapy since the initial screening.

In an attempt to assess the impact of using such a select sample, a second sample of 119 patients was randomly obtained from the waiting room. They were asked to complete the HLOC scale and the Panic Screening Questionnaire in order to represent an unselected population.

Power analysis revealed that for an alpha of .05 and medium effect size, the powers were 95% for multiple regression analysis and 74% for one-way analysis of variance (ANOVA). For paired *t* test analysis of matched

unselected cohorts, the powers were 46% for medium effect sizes and 80% for large effect sizes. Statistical analysis was done using paired *t* tests, ANOVA with Scheffe's post hoc testing, analysis of covariance (ANCOVA), partial correlation analysis, and stepwise multiple regression. Nonparametric testing, using Spearman's correlation and Wilcoxon's test, was also performed.

## Results

Anxiety complaints were the reason for screening 10 of the 29 selected patients with panic attacks and 2 of the 10 normal patients. Similarly, complaints of depression were the reason for screening 8 of the patients with panic attacks and 4 of the normal patients. Panic-related symptoms were the reason for screening 6 of the patients with panic attacks and 2 of the normal patients.

Table 1 presents the demographic characteristics of both selected and unselected samples. Of particular importance are the panic attack prevalences of 58% (29) in the 50 selected patients and 17% (20) in the 119 unselected patients. Similarly, prevalence of panic disorder (panic attacks occurring with a frequency of at least three attacks in a 3-week period not secondary to an organic disorder) was 42% in the selected sample.

Of the 29 selected patients with panic attacks, 10 were lost to follow-up. Of these, 5 had moved, 2 refused, and 3 could not be contacted. Chart audit revealed that 6 of them had been seen following their initial screening, of which 2 received no medications, 2 received tricyclic antidepressants (TCAs), 1 received alprazolam, and 1 was placed on both metoprolol and lorazepam. Of the 19 patients completing follow-up, 6 were treated with TCAs and 5 with alprazolam. Statistical comparison of those lost to follow-up with those who completed the study revealed no significant differences for any variables. The mean time that elapsed from pretreatment to posttreatment assessment was 5.2 months; however, for 3 patients, the time elapsed was at least 12 months. For the remainder, less than 7 months elapsed between pretreatment and posttreatment.

The first hypothesis states that HLOC scores are expected to be higher for patients with panic attacks than for those without panic attacks. A sample from the unselected population consisting of the 20 patients with panic attacks was matched on a cohort basis with 20 normal patients, based on age, sex, race or ethnicity, marital status, occupation, and education. Paired *t* test analysis revealed that patients subject to panic attacks averaged 3.75 HLOC points higher than normal patients ( $t = 1.54, P = .069$ ). When all 169 patients were

Table 1. Sample Characteristics of Patients in Study

Characteristics	Study Sample	
	Selected (n=50)	Unselected (n=119)
Sex (% female)	78	61
Marital Status (%)		
Single	41	49
Married	45	38
Separated, divorced, widowed	14	13
Occupation (%)		
Executives and professionals	0	5
Managers and lesser professionals	22	17
Housewives and students	43	67
Unemployed and retired	8	1
Clerical and sales	16	8
Race/ethnicity (%)		
Non-Hispanic whites	61	73
Hispanic whites	33	17
Blacks	6	5
Age ( $\bar{x} \pm$ SD years)	35.1 $\pm$ 13.9	29.8 $\pm$ 9.8
Education ( $\bar{x} \pm$ SD years)	13.8 $\pm$ 2.7	15.9 $\pm$ 2.1
Diagnosis (%)		
Panic attacks	58	17
Normal	20	70

analyzed, ANOVA demonstrated that HLOC scores were highest in patients with panic attacks ( $\bar{x} = 34.6$ ) and lowest in those with simple phobias ( $\bar{x} = 28.1$ ), while normal patients averaged 30.3 points. These results were statistically significant ( $F = 4.61, P = .0015$ ), with Scheffe's post hoc testing demonstrating that the differences were between normal patients and panic-attack patients. To clarify these relationships and to take into consideration the potential confounding demographic variables, multiple regression analysis was used (Table 2). This statistical tool revealed that divorce and the number of years of education are inversely related to HLOC

Table 2. Stepwise Multiple Regression Prediction of Health Locus of Control (n=136)\*

Variable	Standardized Coefficient	F Value	P Value
Divorced	-0.180	5.14	.025
Panic attacks	0.200	4.79	.030
Selected sample	0.115	1.38	.243
Education	-0.253	7.15	.009
Sex	-0.113	1.73	.191
Age	-0.090	1.20	.275

Overall F value = 5.664 ( $P \leq .0001$ ).

Adjusted  $R^2 = 0.172$ .

\*Patients with missing data were excluded from this analysis.

Table 3. Comparison of HLOC Scores in Normal Patients (n = 93) and Posttreatment Scores in Panic-Attack Patients (n = 17)

Group	Number of Patients	Mean HLOC Scores Posttreatment*
Panic (no improvement)	4	41.0
Panic (some improvement)	3	33.0
Normal (selected sample)	10	32.7
Panic resolved	10	31.8
Normal (unselected sample)	83	30.0

\*ANOVA  $F = 2.93, P = .024$ .

HLOC—health locus of control.

scores, and panic attacks are positively associated with externality.

The second hypothesis was that the successful treatment of panic attacks would produce a reduction in the HLOC scores. Although the degree of improvement does correlate with the change in HLOC scores (Spearman  $r = -.43, P = .043$ ), the primary site of change is where total resolution of panic attacks is accomplished. Using ANCOVA to adjust for avoidance severity, the resolution of panic attacks produced a greater decrease in HLOC scores ( $F = 4.68, P = .0497$ ). Posttreatment HLOC scores were also lower in those who experienced panic resolution (ANCOVA  $F = 4.83, P = .0467$ ), when adjustments were made for educational level.

Table 3 shows the ANOVA results of posttreatment HLOC scores compared with scores of normal patients in both selected and unselected samples. There is a progressive reduction in HLOC scores, such that HLOC scores in those with resolved panic attacks are actually lower than those of the normal patients in the selected sample. Post hoc testing revealed a difference between panic-attack patients without improvement and unselected normal patients.

The third hypothesis was that phobic avoidance would be associated with a higher HLOC score. Because only those patients in the selected sample with panic attacks were screened for phobic avoidance, the numbers were insufficient for multiple regression analysis. However, partial correlation analysis of those with panic attacks demonstrated that avoidance severity was associated with a higher HLOC score ( $r = .48, P = .018$ ). A gradual increase in HLOC scores is seen between no avoidance and moderate avoidance, with a marked increase between moderate and severe avoidance (ANOVA,  $F = 3.42, P = .0359$ ); this was verified with post hoc analysis. Normal patients in the selected sample had HLOC scores similar to those of the panic-attack patients with no avoidance. There was no relationship between HLOC and sex, age, race, age of onset of panic or avoidance, panic frequency or duration, or whether the patient uses avoidance to control his or her life.

## Discussion

Although the relationship between anxiety disorders and LOC has generally not been investigated, the relationship with another measure of cognitive style, field dependence-independence, has been studied. Indeed, field dependence-independence is associated with agoraphobia,<sup>18</sup> hysteria,<sup>19,20</sup> and obsessive-compulsive disorder.<sup>19</sup> These findings are in agreement with Witkin's theoretical construct of field dependence.<sup>21</sup>

Similarly, LOC is related to psychiatric disorders. Externality does correlate with depression.<sup>8,22-26</sup> In fact, Scott and Severance<sup>24</sup> found that externality was associated with depression, anxiety, psychasthenia, hypochondriasis, and social introversion. Conversely, Goss and Morosko<sup>27</sup> noted that alcoholics with an internal LOC had low levels of both anxiety and depression. To date, however, cognitive style has not been assessed in patients with panic disorder. The first hypothesis, that there is an association between externality and panic attacks, was supported by this study. Multiple regression analysis suggests that divorce and educational level are the only factors other than panic that independently contribute to an external HLOC.

Although the concept of cognitive style implies an immutable quality, studies have suggested that LOC may change during group therapy, becoming more internal.<sup>28,29</sup> In addition, the degree of externality tends to decrease as the severity of depression<sup>30</sup> and alcoholism decrease.<sup>31</sup> Therefore, previous work has raised the possibility of using LOC as a measure of disease activity and treatment response. The second hypothesis of this study was that a decrease in panic attacks would be associated with a decrease in externality. This hypothesis was at least in part supported by the results. Mere decrease was not sufficient to produce a reduction in externality; complete resolution of attacks was needed. ANCOVA demonstrated this reduction when controlling for potential confounders. This finding further supports the use of the HLOC scale as a measure of disease activity and treatment response in panic attacks. In specific treatment modalities, alprazolam appeared superior to TCAs in reducing HLOC scores and posttreatment HLOC scores.

The third hypothesis was that HLOC would be related to phobic avoidance. This study found that the severity of phobic avoidance did correlate with externality. In addition, the HLOC scores of panic-attack patients without avoidance did not differ from those of normal patients. This suggests that phobic avoidance may increase the patient's externality. It also raises the possibility that the relationship noted between panic and HLOC may, in reality, reflect the relationship between

avoidance and HLOC. However, resolution of panic did produce greater decreases in HLOC scores, even when controlled for avoidance severity.

Little research on the relationship between cognitive style and agoraphobia has been done. Hebenstreit et al<sup>32</sup> found that even though panic-disorder patients were more group dependent, the presence or absence of agoraphobia was unrelated to this dependence. However, the dependent personality traits of individuals appear to correlate with avoidance.<sup>33,34</sup> Previous work has found that the degree of avoidance is related to the patient's anticipated ability to cope with a panic attack, as well as to the anticipated social and loss-of-control consequences.<sup>35</sup> Women with external LOC do tend to have higher levels of social support,<sup>36</sup> perhaps enabling the maintenance of avoidance behaviors.

The relationship between panic attacks and HLOC has clinical relevance. Patients with an external LOC, in general, respond better to highly structured, directive treatment modalities.<sup>3,37-44</sup> Although there are conflicting results, some studies have found that patients with an external LOC are generally less compliant.<sup>45,46</sup> Patient education is also an issue. Externally controlled individuals generally know less about their illnesses and are less likely than individuals with internal LOC to seek information.<sup>47-49</sup> Externally controlled patients are also less likely to employ health maintenance behaviors such as avoidance of smoking,<sup>50-55</sup> use of seat belts,<sup>56</sup> exercise,<sup>57</sup> and preventive dental care.<sup>58</sup> Hence, the association of externality with panic attacks has clinical relevance to their management and overall health care.

Knowledge that patients with panic attacks tend to be externally controlled can help the clinician understand that these patients may be less compliant than desired and may not participate in health maintenance behaviors. Assessment of LOC may also be useful as a measure of treatment response. Efforts by the clinician directed at internalizing LOC are probably unnecessary. Resolution of panic through medication should reduce externality without the need for directive therapy.

This study has several limitations. First, only selected patients with panic attacks were screened for phobic avoidance. Consequently, the relationship between panic and externality may simply reflect the agoraphobia-externality relationship. Second, even though those lost to follow-up do not appear to differ from the rest, the high dropout rate is still cause for concern. Third, the relationship between phobic avoidance and change in HLOC may represent the regression to the mean that is due to extremes in externality that are potentially seen in agoraphobic patients. Comorbidity is also a potential confounder in these results. Depression is not only associated with panic but with externality as well. The fre-

quency of depression as a reason for screening was similar between normal and panic-attack patients, but this is only mildly reassuring because no objective instrument or structured interview was used. Therefore, the presence of missed depression in the panic group may account for the observed relationship with HLOC. Finally, the small sample size suggests caution in interpretation. Therefore, these data must be considered as preliminary and suggest the need for additional research that would include a larger sample and objectively measure both depression and phobic avoidance.

In conclusion, in both selected and unselected populations, panic attacks are associated with higher HLOC scores (greater externality), and resolution of panic attacks is associated with decreases in externality. Therefore, HLOC scores may represent a measure of disease activity in panic disorder. Phobic avoidance is also correlated with externality. This study suggests that following the HLOC score may be useful in the panic-agoraphobic patient during treatment.

## References

- Goldstein KM, Blackman S. Cognitive style. New York: John Wiley & Sons, 1978.
- Rotter JB. Social learning and clinical psychology. Englewood Cliffs, NJ: Prentice-Hall, 1954.
- Wallston BS, Wallston KA, Kaplan GD, Maides SA. Development and validation of the Health Locus of Control Scale. *J Consult Clin Psychol* 1976; 44:580-5.
- Croft RG, Johnson WG, Fox SH. Locus of control in psychiatric patients. *Newsletter Res Mental Health Behav Sci* 1975; 17:17-20.
- Cash TF, Stack JJ. Locus of control among schizophrenics and other hospitalized psychiatric patients. *Genet Psychol Monogr* 1973; 87:105-22.
- Levenson H. Multidimensional locus of control in psychiatric patients. *J Consult Clin Psychol* 1973; 41:397-404.
- Smith CE, Pryer MW, Disterfano MK. Internal-external locus of control and severity of emotional impairment among psychiatric patients. *J Clin Psychol* 1971; 27:449-50.
- Naditch MP, Gargan MA, Michael LB. Denial, anxiety, locus of control, and the discrepancy between aspirations and achievements as components of depression. *J Abnorm Psychol* 1975; 84:1-9.
- Archer RP. Relationship between locus of control and anxiety. *J Pers Assess* 1979; 43:617-26.
- Feather NT. Some personality correlates of external control. *Aust J Psychol* 1967; 19:252-60.
- Platt JJ, Eisenman R. Internal-external control of reinforcement, time perspective, adjustment, and anxiety. *J Gen Psychol* 1968; 79:121-8.
- Strassberg DS. Relationships among locus of control, anxiety, and valued goal expectations. *J Consult Clin* 1973; 2:319.
- Watson D. Relationship between locus of control and anxiety. *J Pers Soc Psychol* 1967; 6:91-2.
- Gfeller BM, Finlayson C. Loneliness, personality, and well-being in older women. *Percept Mot Skills* 1988; 67:143-6.
- Goldsmith-Cwikel JM, Dielman TE, Kirscht JP, Israel BA. Mechanisms of psychosocial effects on health. *Health Educ Q* 1988; 15:151-73.
- Krause N. Stress and coping. *J Gerontol* 1986; 41:617-22.
- Diagnostic and statistical manual of mental disorders. 3rd ed. Washington, DC: American Psychiatric Association, 1980.
- Rook MH, Godberger L. Relationship between agoraphobia and field dependence. *J Nerv Ment Dis* 1978; 166:781-6.
- Lawrence DM, Morton V. Associating Embedded Figures Test performance with extreme hysteria and psychasthenia MMPI scores in a psychiatric population. *Percept Mot Skills* 1980; 50:432-4.
- Bendefeldt F, Miller LL, Ludwig AM. Cognitive performance in conversion hysteria. *Arch Gen Psychiat* 1976; 33:1250-4.
- Witkin HA. Psychological differentiation and forms of pathology. *J Abn Psychol* 1965; 70:317-36.
- Lefkowitz MM, Tesiny EP, Gordon NH. Childhood depression, family income, and locus of control. *J Nerv Ment Dis* 1980; 108:732-5.
- Calhoun LG, Cheney T, Dawes AS. Locus of control, self-reported depression, and perceived causes of depression. *J Consult Clin Psychol* 1974; 42:736.
- Scott DP, Severance LJ. Relationships between the CPI, MMPI, and locus of control in a nonacademic environment. *J Pers Assess* 1975; 39:141-5.
- Richman J, Flaherty J. Coping and depression. *J Nerv Ment Dis* 1985; 173:590-5.
- Richman JA, Flaherty JA. Childhood relationships, adult coping resources and depression. *Soc Sci Med* 1986; 23:709-16.
- Goss A, Morosko T. Relation between a dimension of internal-external control and the MMPI with an alcoholic population. *J Consult Clin Psychol* 1970; 34:189-92.
- Daimond MJ, Shapiro JL. Changes in locus of control as a function of encounter group experience. *J Abnorm Psychol* 1973; 82:514-8.
- Kilmann PR, Howell RJ. Effects of structure of marathon group therapy and locus of control on therapeutic outcome. *J Consult Clin Psychol* 1974; 42:912.
- Leggett J, Archer RP. Locus of control and depression among psychiatric inpatients. *Psychol Rep* 1979; 45:835-8.
- Obitz FW, Oziel LJ. Change in general and specific perceived locus of control in alcoholics as a function of treatment response. *Int J Addict* 1978; 13:995-1001.
- Hebenstreit M, Buller R, Maier W, et al. Personality sphere in patients with panic attacks. *Pharmacopsychiatry* 1988; 21:463-4.
- Mavissakalian M, Hamann MS. DSM-III personality disorder in agoraphobia. *Compr Psychiatry* 1987; 28:356-61.
- Reich J, Noyes R Jr, Troughton E. Dependent personality disorder associated with phobic avoidance in patients with panic disorder. *Am J Psychiatry* 1987; 144:323-6.
- Telch MJ, Brouillard M, Telch CF, et al. Role of cognitive appraisal in panic-related avoidance. *Behav Res Ther* 1989; 27:373-83.
- Flaherty J, Richman J. Gender differences in the perception and utilization of social support. *Soc Sci Med* 1989; 28:1221-8.
- Strickland BR. Internal-external expectancies and health-related behaviors. *J Consult Clin Psychol* 1978; 46:1192-1211.
- Rosenbaum M, Argon S. Locus of control and success in self-initiated attempts to stop smoking. *J Clin Psychol* 1979; 35:870-2.
- Best JA, Steffy RA. Smoking modification procedures for internal and external locus of control clients. *Can J Behav Sci* 1975; 7:155-65.
- Chapman SL. Processes in the maintenance of weight loss with behavior therapy. *Behav Res Ther* 1979; 10:566-70.
- Cohen NL, Alpert M. Locus of control as a predictor of outcome in treatment of obesity. *Psychol Res* 1978; 42:805-6.
- Kinsey J. Internal-external control of weight loss in the obese. *J Clin Psychol* 1981; 37:100-3.
- Jeffrey DB, Christensen ER. Relative efficacy of behavior therapy, will power and no-treatment control procedures for weight loss. Presented at the Association for Advancement of Behavior Therapy, New York, 1972.

44. Balch P, Ross AW. Predicting success in weight reduction as a function of locus of control. *J Consult Clin Psychol* 1975; 43:119.
45. Cromwell RL, Butterfield EC, Brayfield FM, et al. Acute myocardial infarction. St Louis: CV Mosby, 1977.
46. Weaver R. Internality, externality, and compliance as related to chronic home dialysis patients. Atlanta: Emory University, 1972. Thesis.
47. Seeman M, Evan JW. Alienation and learning in a hospital setting. *Am Soc Rev* 1962; 27:772-83.
48. Lowery BJ, DuCette JP. Disease-related learning and disease control in diabetes as a function of locus of control. *Nurs Res* 1976; 25:358-62.
49. Ireland RE. Locus of control among hospitalized pulmonary emphysema patients. *Diss Abstr Intl* 1973; 33:6091A.
50. Coan RW. Personality variables associated with cigarette smoking. *J Pers Soc Psychol* 1973; 26:86-104.
51. James WH, Woodruff AB, Werner W. Effect of internal and external control upon changes in smoking behavior. *J Consult Psychol* 1965; 29:184-6.
52. Mlott SR, Mlott YD. Dogmatism and locus of control in individuals who smoke, stopped smoking, and never smoked. *J Comm Psychol* 1975; 3:53-7.
53. Steffy RA, Meichenbaum D, Best JA. Aversive and cognitive factors in the modification of smoking behavior. *Behav Res Ther* 1970; 8:115;25.
54. Straits B, Sechrest L. Further support of some findings about the characteristics of smokers and nonsmokers. *J Consult Pyschol* 1963; 27:282.
55. Williams AF. Personality and the other characteristics associated with cigarette smoking among young teenagers. *J Health Soc Behav* 1973; 14:374-80.
56. Williams AF. Factors associated with seat belt use in families. *J Safety Res* 1972; 4:133-8.
57. Sonstroem RJ, Walker MI. Relationship of attitude and locus of control to exercise and physical fitness. *Percept Mot Skills* 1973; 36:1031-4.
58. Williams AF. Personality characteristics associated with preventive dental health practices. *J Am Coll Dent* 1972; 39:225-34.

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