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Relationship of Type a to Illness

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RELATIONSHIP OF TYPE A TO ILLNESS

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Abstract

Two hundred and ten undergraduates in Iceland (67 males, 143 females) responded to the Jenkins Activity Survey, Multidimensional Health Locus of Control questionnaire, Symptom Distress Checklist for Somatization, MMPI-scale for hostility, and AUDIT, a screening test for alcoholism, all transliterated to Icelandic. Alcoholism was found to be the most powerful predictor of somatic complaints. Alcoholism was correlated with hostility but not with the Type A factors of Hard Driving and Speed/Impatience. High scores on the Hard Driving factor predicted fewer somatic complaints. External locus of control predicted somatic complaints, but internal locus of control did not, even when it interacted with high scores of hostility, which has in other studies often been associated with illness. Explanations for this pattern of findings are discussed, and limitations and directions for future research are presented.

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CHAPTER 1

INTRODUCTION

Overview

This research investigates the link between Type A behavior (TAB) and somatic complaints. A study was conducted in which measures of TAB, locus of control, hostility and alcoholism were administered to Icelandic undergraduates. Hypotheses were then tested about associations of these measures with somatic complaints in the sample.

Type A Behavior

Type A behavior has been identified as a risk factor associated with the incidence and prevalence of various forms of CHD (Friedman & Rosenman, 1974). This behavior pattern is said to include excessive competitive and hard-driving behavior, hostility, impatience, and exaggerated speech mannerisms (loudness, rapid speech, and verbal competition). The Type B individual is relatively free of these TAB characteristics.

It is not certain which physiological aspects of the TAB pattern cause Type As to be particularly prone to CHD, but recent findings indicate that heightened peripheral noradrenergic activity may play a role here (Starkman, Cameron, Nesse, & Zelnik, 1988). Type As show enhanced noradrenergic responses in competitive laboratory tasks (Friedman, St. George, Byers, & Rosenman, 1960), and also in their natural environment

(Kahn, Gully, Cooper, Perumal, Thomas, & Klein, 1987). Byrne and Rosenman (1986) found TAB scales to be correlated with anxiety, and Starkman et al. (1988) found peripheral noradrenergic activity to be a measure of sympathetic nervous system stimulation by anxiety. This line of research suggests that anxiety is a central component of TAB.

Locus of Control

Some researchers believe that the motivation underlying TAB is a desire to gain control over salient events (Glass, 1977; Matthews, 1982). And yet, research comparing the locus of control of Type As and Type Bs has produced inconsistent results. Some studies have found Type As to have a stronger internal locus of control than Type Bs, whereas other studies have found no difference between the types (Musante, 1984). Although Heilbrun (1989) found no overall relationships between TAB and locus of control, he found that Type As with an external locus of control are much more stressed than Type Bs with an internal locus of control. It might therefore be assumed that internal locus of control will normally be more beneficial, both for Type As and Type Bs, at least for stress-related symptoms. The beneficial effects of internality may be moderated, however, by hostility. A high internal locus of control in combination with high scores on hostility, might actually be detrimental for health outcomes, as this combination might be a greater stressor than

others. Internal locus of control entails that people believe themselves to be in control of their destiny. Hostile individuals, whether Type As or Type Bs, might therefore turn their hostility toward themselves when their locus of control is internal. As hostility has in other studies been shown to be a decisive factor for longevity in and of itself (Fenkelmann, 1989), the combination of it and an internal locus of control might be more predictive of illness symptoms than others.

Hostility and Speed/Impatience

As hostility has been found to be a characteristic of TAB, it is interesting to note that the Cook-Medley Hostility scale from the MMPI test battery has been shown to correlate significantly with several types of neuroticism and with the Jenkins Activity Survey (JAS) subscale of Speed/Impatience, but not with the JAS subscales of Job Involvement and Hard Driving (Carmody, Crossen, & Wiens, 1989). The Speed/Impatience scale also correlated positively with measures of neuroticism. However, Speed/Impatience was not correlated with the JAS subscales of Job Involvement and Hard Driving, which is surprising, if these subscales are supposed to be representative of the same behavior pattern. Also of interest, feelings of internal and external overload correlated positively with hostility, but, as was true for the Speed/Impatience subscale, hostility did not correlate with Job Involvement and Hard Driving, and these

constructs seem intuitively likely to cause some overload. Carmody et al. (1989) did not test whether physical symptoms correlated with any of the JAS scales.

Because TAB has been found to be a likely cause of CHD, it would be worthwhile to investigate whether some components of this behavior pattern are more cardiopathogenic than are other components of TAB, and whether the same pattern of results emerges for other illness symptoms. Along these lines, the American Heart Association has found evidence that hostility may be the crucial cause of heart disease among Type As, as well as a cause of other types of illness (Fenkelmann, 1989).

Although TAB has been found to be associated with CHD as a whole, it seems that effects from this behavior pattern are different for different parts of the pattern. Swan, Carmelli, and Rosenman (1991) found that the Cook-Medley Hostility scale correlated positively with the JAS subscales of Speed/Impatience and Hard Driving, but negatively with Job Involvement. The highest correlation was with Speed/Impatience. Greenglass (1991) found that Type A women experience more role conflict than Type B women. It is interesting to note that this overall correlation only holds for the subscale of Speed/Impatience as measured in the JAS scale. Career motivation does not correlate with Speed/Impatience, although it correlates significantly with both Job Involvement and Hard Driving scales. Thus it

seems that more negative emotions correlate with Speed/Impatience than with the other subscales. It is therefore interesting to probe whether this correlation also holds for health outcomes, or whether only hostility predicts illness (Fenkelmann, 1989).

TAB and Alcoholism

Other behavioral patterns than TAB have been associated with anxiety and control issues. One prime example is alcoholism. It is common knowledge that excessive use of alcohol requires a certain control over the immediate environment, if the abuser is to be able to continue abusing these substances (Cork, 1979; Black, Bucky & Wilder-Padilla, 1986; Deutsch, 1982). Outcomes of attempts to gain such control will of necessity be uncertain and therefore anxiety-invoking. Interestingly, anecdotal evidence indicates that people with alcohol related problems might share some of the behavioral characteristics of Type As.

If both alcoholics and Type As show a similar behavior pattern, it is tempting to speculate whether there is a confounding here. Is Type A associated with alcoholism? Unfortunately, there are inconsistencies among studies of the alcohol consumption of Type As. On the one hand, for example, Abbot and Sutherland (1991) found that Type As reduced their intake of alcohol in the face of stressors, whereas Type Bs increased their alcohol intake. On the other hand, Type As have been found to

consume more alcohol and drink more frequently than Type Bs (Folsom, Hughes, Buehler, Mittlemark, Jacobs & Grimm, 1985), and middle-aged Type A men report that they drink twice as much as Type Bs (Camargo, Vranizan, Thoresen & Wood, 1986). Anecdotal information from the author's work with alcoholics suggests that the Speed/Impatience and hostility characteristics of the TAB pattern are similar to what recovering alcoholics exhibit. One of the characteristics of Speed/Impatience is eating much faster than others. The author has observed alcoholics in a treatment center waiting for their meal with impatience and when it was ready, they cleared their plates in about 10 minutes. This behavior seemed extreme, relative to that of nonalcoholics. Also, one of the main areas of emphasis in treatments for alcoholics is getting through their hostile defense patterns so that healing can occur (Armor, Polich & Stambul, 1976; Robertson, 1988). The similarities between the behavior patterns of alcoholics and Type As may reflect similar underlying motivations and thought patterns. For example, a common component could be hostility or anxiety in general.

Positive Rewards for Type As

Even if TAB seems to lead to more negative outcomes in health than Type B behavior, some studies have found that Type As may lead a more rewarding life than Type Bs. For example, Margiotta, Davilla, and Hicks

(1990) found that Type A students reported significantly more daily hassles, but also significantly more daily uplifts than their Type B peers. Type As seem thus to lead more intense, event-filled lives than Type Bs. In related work, Bryant and Yarnold (1991) found that Type As report higher levels of positive experience than Type Bs, although the groups did not differ in their report of negative experience. Thus TAB seems to be related to heightened positive experience. With the thought in mind that it would be nice to "have the cake and eat it too", the present study attempts to find which aspects of TAB are harmless and which are not. If the behavior pattern is so rewarding, then eliminating all of it in order to lead a longer life might actually make life less rewarding.

Hypotheses

The present study was designed to test the following three hypotheses:

H1: Because hostility correlates with neuroticism and Speed/Impatience, the question of whether hostility and Speed/Impatience are more detrimental for Type A's physical health than the other components of the TAB will be probed. It is predicted that a stronger negative relationship will be found between Speed/Impatience and somatic complaints than between other subscales of TAB and somatic complaints.

H2: Internal locus of control interacting with high scores of hostility is a hypothesized predictor of stress-related symptoms, because hostile

individuals, both Type A and Type B, might turn their hostility inwards with an internal locus of control.

H3: A positive correlation is hypothesized between alcoholism, Speed/Impatience and hostility, because some aspects of the behavioral patterns of Type As and alcoholics seem to be similar, and might be indicative of similar underlying motivations and thought patterns, such as general hostility and/or anxiety.

Exploratory probing of predictors of somatic complaints

In order to find which combination shows the most illness symptoms three successive regression analysis will be performed: (1) alcoholism, hostility, Speed/Impatience and hostility x Speed/Impatience; (2) hostility and internal locus of control; or (3) Speed/Impatience and Hard Driving.

CHAPTER 2

METHOD

Subjects and Procedures

Subjects were 210 undergraduates, 67 males and 143 females, attending the University of Iceland. They were approached during the last minutes of lectures, according to agreements with professors, and asked to fill out a set of questionnaires (see below) as part of a Master's thesis study. Informed consent was obtained first. Mean age was 26 years (SD= 7.6 years). The age distribution was a bit positively skewed (skewness=2.21), as is seen by the median being 23 years.

Instruments

The following questionnaires were used:

(1) *Student Jenkins Activity Survey, short version, SJAS;* (Bryant & Yarnold, 1989). This is a 21-item questionnaire for measuring TAB, where people are asked to rate themselves, for example on their responses to pressure or stress, and how fast they usually eat and talk. Various factors have been found to underlie this scale, but among the most common factors are Hard Driving, Job Involvement and Speed/Impatience. For American students completing the SJAS, Cronbach's alpha has been estimated for total and subscale scores at between .45 and .72 (Yarnold & Mueser, 1989; Yarnold, Mueser, Grau, & Grimm, 1986).

(2) *Multidimensional Health Locus of Control* (Wallston & Wallston, 1981). This is a 22-item questionnaire measuring four dimensions of health locus of control in which people respond to statements on a 6- point Likert scale from 1 (strongly disagree) to 6 (strongly agree). These four dimensions are internal locus of control, locus of powerful others, locus of fate, and value placed on health. Internal locus of control is measured with 6 statements, such as "I am responsible for my own health." External locus of control is also measured by 6 statements, such as "Medical personnel keeps me healthy." Locus of fate is likewise measured by 6 statements, such as "When I get sick, I can only wait to get better." Value of health is measured by 4 statements, such as "Nothing is more important than good health." Alpha reliabilities for the scales range from .67 to .77.

(3) *Symptom Distress Checklist* (SCL-90), subscale for somatization (Shutty, DeGood & Schwartz, 1986). The SCL-90 is a multidimensional self-report inventory, originally developed from the Hopkins Symptoms Checklist, composed of 90 items, each describing a physical or psychiatric symptom. The instructions require the respondent to indicate on a 5-point scale, ranging from *not at all* (0) to *extremely* (4), how much a given symptom, such as a backache or chest pain, has caused discomfort during the past 2 months. The instrument consists of nine subscales, of which

only the scale for Somatization was used. This 12-item scale has consistently been found to load on a single factor (Clark & Friedman, 1983; Evenson, Holland, Mehta & Yasin, 1980; Hoffman & Overall, 1978; Holcomb, Adams & Ponder, 1983). Responses to the scale of Somatization has been found to have a reliability of .77 for anxiety responses and .74 for complaints of pervasive, muscular quality (Shutty et al., 1986).

(4) *MMPI, scale for hostility* (Cook & Medley, 1954). Greenglass and Julkunen (1989) factor analysed the Cook-Medley scale from the well known Minnesota Multi-Phasic Inventory, and then formed a new subscale from the nine items with the highest loadings on the factor relating to distrust and cynicism. The reliability of this scale was .75. Responses to statements such as "It is safer to trust nobody" were measured on a Likert scale ranging from *strongly disagree* (0) to *strongly agree* (6).

(5) *A screening test for alcoholism,* AUDIT (Alcohol Use Disorders Identification Test), developed by the World Health Organization (Babor & Grant, 1989). This is a 10-item questionnaire developed in six countries from a 150-item instrument for screening of alcoholism. Responses to questions such as "How often do you have six or more drinks on one occasion?" were measured from *never* (0) to *daily or almost daily* (4). Of known alcoholics in a group of 2000 patients attending health

care facilities in the six countries, 99% had scored 10 or higher on this scale.

Transliterations

All the questionnaires were first translated from English into Icelandic, and then the Icelandic version was translated back into English. The later English version was compared to the original one. Differences were minimal, but where they occurred, they were examined, and phrasing of questions was changed accordingly. An example of this procedure was the word "aggressive," which has a double meaning in English, one being negative, synonymous with "violent," the other being positive, meaning "getting ahead." No Icelandic word captures both meanings. When the Icelandic version was translated back to English, this word came back as "violent," with a footnote, saying the translator supposed that if the English word was "aggressive," it would be better to choose another Icelandic word for it. The meaning of the word "aggressive" in the original English questionnaire lies nearer to the notion of "getting ahead" than to "violent," so a word closer to that meaning was chosen in the final version.

CHAPTER 3

RESULTS

Classification in Type As and Type Bs

Type As and Type Bs were classified by a median-split on SJAS total score, which revealed a median of 7. Those scoring above 7 were classified as Type As and those scoring below 7 were classified as Type Bs. There were 88 Type As and 88 Type Bs.

Table 1 presents the reliabilities (i.e., Cronbach's alphas) for each of the composite indices used in the present study. In general, reliabilities for the scales were good.

Table 1

Observed Reliability for Scales in the Study (N=210)

Name of scale	Reliability
SJAS total score	.63
Subscales of SJAS: Hard Driving	.67
Rapid Eating	.57
Rapid Speaking	.50
(Rapid Eating+Rapid Speaking)=Speed/Impatience	.40

Name of scale	Reliability
BSRI total score	.81
Subscales of BSRI: Instrumentality	.86
Expressiveness	.83
MHLC scale, total score	.57
Subscales of MHLC: Internal locus of control	.65
External locus of control	.68
Fate locus of control	.72
Value of health	.63
Somatization scale from SCL-90	.81
Hostility scale from MMPI, short version	.80
AUDIT, screening test for alcoholism	.83

Hypothesis Testing

The first hypothesis was that when Hostility interacted with Speed/Impatience, it would be associated with increased somatic complaints, and that more negative effects on health would be found for Speed/Impatience than for the other subscales of TAB. Because these variables may share common variance, they were first checked for multicollinearity. An assessment of multicollinearity indicated that Rapid Eating and Rapid Speaking share substantial variance with Speeed/

Impatience and Hostility, as can be seen in Table 2. Although there is a significant negative correlation between Hard Driving and Speed/Impatience x Hostility, it is rather low.

Table 2

Correlations among Predictors Testing Hypothesis 1 (N=210)

	1	2	3
1 Rapid Speaking			
2 Rapid Eating	0.06		
3 Hard Driving	-0.12	-0.20	
4 Speed/Impatience x Hostility	0.56**	0.69**	0.26*

* $p<.05$

** $p<.01$

To evaluate the first hypothesis, somatic complaints were used as a dependent variable in a regression analysis and factors of TAB from previous research, Rapid Eating, Rapid Speaking, the combination of those interacting with Hostility, and finally Hard Driving, were entered as predictors. Results did not quite reach statistical significance, $R^2= .06$, $F(4,81) = 2.28$, $p = .07$ (see Table 3).

Table 3

Contributions of Rapid Speaking, Rapid Eating, Hard Driving and Speed/Impatience x Hostility to Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Rapid Speaking	-0.11	-0.08	n.s.
Rapid Eating	0.83	0.55	n.s.
Hard Driving	- 0.62	- 3.16	<.05
Speed/Impatience x Hostility	- 0.01	-0.21	n.s.

As can be seen in Table 3, Rapid Speaking and Rapid Eating do not contribute significantly to the results. The only significant predictor to emerge is Hard Driving, which correlates negatively with somatic complaints and Type A. Overall variance explained is 6%. When Rapid Eating and Rapid Speaking are removed from the equation, similar results emerge. As can be seen in Table 4, so little variance is explained by Rapid Speaking and Rapid Eating that it does not make much overall difference if they are removed from the regression equation.

Table 4

Contributions of Speed/Impatience and Hard Driving to Somatic Complaints

Predictors	Beta weights	t	p
Hard Driving	-0.63	-3.29	<.01
Speed/Impatience x Hostility	0.00	-0.31	n.s.

The second hypothesis was that internal LOC interacting with hostility is a predictor of stress-related symptoms. This hypothesis was also addressed with multiple regression. The dependent variable was somatic complaints and the predictors were internal LOC, external LOC and the interaction of internal LOC and hostility. Correlations of these variables were first checked for multicollinearity, with results presented in Table 5.

Table 5

Correlations among Predictors Testing Hypothesis 2 (N=210)

	1	2
1 Internal LOCxHostility		
2 External LOC	.15*	
3 Internal LOC	.47**	.01

*p<.05

**p<.01

The hypothesis that internal LOC interacting with hostility was predictive of somatic complaints was not confirmed. Results from regression analysis for this hypothesis did not quite reach statistical significance, R^2=.04, F (3,191) = 2.43, p= .07.

Table 6

Contributions of LOC Interacting with Hostility on Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Internal LOC x hostility	0.00	1.50	n.s.
External LOC	0.23	1.96	.05
Internal LOC	-0.12	-0.91	n.s.

Contrary to predictions, none of these variables showed a statistically significant relationship with somatic complaints, although external LOC came close (see Table 6). When internal LOC was removed from the equation, the same results emerged, as displayed in Table 7.

Table 7

Contributions of Internal LOC x Hostility and External LOC to Somatic Complaints (N=210)

Predictors	2	Beta weights	t	p
External LOC		0.24	2.04	<.05
Internal LOC x Hostility		0.00	1.22	n.s.

Contrary to predictions, only external LOC contributed significantly to somatic complaints in the sample, R^2=.03, F (2,192)=3.24, p<.05, and even the internal LOC x Hostility interaction did not add to explanations of somatic complaints. However, effects of external locus of control only explained 3% of the variance. When internal LOC and Hostility were used as predictors for somatic complaints and tested with multiple regression, results did not reach statistical significance, R^2=.02, F (2,195) = 1.75, n.s..

As Table 8 shows, Hostility was associated with more somatic complaints than was internal LOC, although results did not reach statistical significance, and the two predictors explained only 2% of the variance. External LOC contributed to added somatic complaints, much more than did interactions of internal LOC and Hostility.

Table 8

Contributions of Internal LOC and Hostility to Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Internal LOC	-0.04	-0.34	n.s.
Hostility	0.13	1.85	.07

It was intended that multivariate analysis of variance (MANOVA) be used to test the third hypothesis that alcoholics, compared to nonalcoholics, will exhibit more TAB, especially Speed/Impatience and Hostility. The dependent variables were to be Hostility and Speed/Impatience, and the independent variable was to be alcoholic status (alcoholics versus nonalcoholics). Cell means are shown in Table 9.

Table 9

Means for Alcoholics and Nonalcoholics on Hostility and Speed/Impatience

Scale	Sample	N	Mean	SD
Hostility	Nonalcoholics	165	23.93	6.52
	Alcoholics	29	28.69	8.17
	Pooled sample	194	24.64	6.98

Scale	Sample	N	Mean	SD
Speed/Impatience	Nonalcoholics	165	0.88	0.97
	Alcoholics	29	1.03	0.91
	Pooled sample	194	0.90	0.96

Stem-and-leaf displays of the raw data in Table 9 showed a resonably normal distribution of Hostility. However, Speed/Impatience had a markedly skewed distribution. Most of the sample had a very low score of Speed/Impatience, except for a few outliers scoring extremely high, all of them alcoholics. Bartlett's test of sphericity, $X^2(1)=3.37$, p=n.s., revealed that the variables could not be considered sufficiently related to compare them in a multivariate test. For this reason, the third hypotesis was tested using univariate analyses of variance. External LOC contributed to added somatic complaints, much more than did interactions of internal LOC and Hostility.

As can be seen in Table 10, alcoholics are characterized by greater Hostility than are nonalcoholics, but Speed/Impatience is not a characteristic of alcoholics in general. These results partially support the third hypothesis.

Table 10

Univariate F-tests for Effects of Hostility and Speed/Impatience on Alcoholics (N=29)

Predictors	SS	MS	df	F	p
Hostility	557.99	557.99	1,192	12.11	< .01
Speed/Impatience	0 .60	0.60	1,192	0.64	n.s.

A final purpose of this study was to conduct exploratory analyses to find which combination shows the most illness symptoms: (1) alcoholism, hostility, Speed/Impatience and Speed/Impatience x hostility; (2) hostility and internal LOC; or (3) Speed/Impatience and Hard Driving. These analyses were performed using three separate regression analyses, one for each set of predictors, to determine which of them explained the most variance.

Each of these three analyses included somatic complaints as the dependent variable. The first analysis had as predictors alcoholism, hostility, Speed/Impatience and interactions of Speed/Impatience and hostility. Multicollinearity testing showed correlations between variables as shown in Table 11.

Table 11

Correlations among Speed/Impatience x Hostility, Alcoholism, Hostility and Speed/Impatience (N=210)

	1	2	3
1 Speed/Impatience x Hostility			
2 Alcoholism	.13		
3 Hostility	.38**	.24**	
4 Speed/Impatience	.93**	.06	.14

**p<.01

Speed/Impatience and Hostility correlated strongly with interaction of Speed/Impatience and Hostility, as was to be expected. Those variables share too much common variance to analyze their independent effects. Hostility also correlated with alcoholism. However, Speed/Impatience did not correlate with alcoholism, disconfirming notions of associations between those scales.

Results from the regression analysis were significant, R^2= .07, F(4,185) =3.25, p<.05. As can be seen in Table 12, alcoholism, hostility and Speed/Impatience all contributed to somatic complaints. Overall explanation of variance is 7%. The interaction of Hostility and Speed/Impatience was associated with fewer somatic complaints.

Table 12

Effects of Hostility, Speed/Impatience, Speed/Impatience x Hostility and Alcoholism on Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Speed/Impatience x Hostility	-0.13	-2.06	<.05
Alcoholism	2.87	2.17	<.05
Hostility	0.23	2.46	<.05
Speed/Impatience	3.65	2.06	<.05

The interaction was probed with an ANOVA, revealing that high scores on Speed/Impatience and low scores on Hostility predicted fewer somatic complaints (see Table 13).

Table 13

Effects of Speed/Impatience x Hostility on Somatic Complaints

Speed/Impatience	Hostility	Mean	N
Low	Low	8.17	40
Low	High	10.90	30
High	Low	11.64	11
High	High	7.60	25

When Speed/Impatience was removed from the analysis to correct for multicollinearity, alcoholism was the only variable that predicted somatic complaints (see Table 14). Results from this analysis were significant, $R^2 = .04$, $F(3,186) = 2.86$, $p < .05$. Overall explained variance was 4%. As this analysis did not show any effects for interaction of Speed/Impatience and Hostility, that connection will not be probed or discussed further.

Table 14

Effects of Speed/Impatience x Hostility, Hostility and Alcoholism on Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Speed/Impatience x Hostility	-0.01	-0.29	n.s.
Hostility	0.11	1.49	n.s.
Alcoholism	2.77	2.08	<.05

In the second regression analysis, the predictors were Hostility, Internal LOC and interaction of Internal LOC with Hostility (see Table 15). Results were not significant, $R^2 = .01$, $F(3,80) = .20$, n.s. None of the predictions were statistically significant, and as overall explained variance by this equation was only 0.01%, no multicollinearity testing was deemed necessary.

Table 15

Contributions of Internal LOC, Hostility and Internal LOC x Hostility to Predictions of Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Internal LOC x Hostility	0.00	0.15	n.s.
Internal LOC	- 0.10	-0.24	n.s.
Hostility	- 0.57	0.12	n.s.

The third multiple regression analysis had as predictors the previously found factors of Type A, Speed/Impatience and Hard Driving. The overall regression equation was statistically significant, $R^2 = .06$, $F(2,192) = 5.37$, $p < .01$. As can be seen in Table 16, Speed/Impatience does not contribute significantly to somatic complaints, at least not when examined in conjunction with the effects of Hard Driving, which emerge as significant in this equation. Overall explanation of variance is 6%. Multicollinearity test shows a correlation of .15, $p < .05$, between the variables. However, Speed/Impatience hardly contributes anything to the outcome, as can be seen in its Beta weight in Table 16, so its variance is probably not a very decisive factor in the effects of Hard Driving.

Table 16

Contributions of Type A Behavior to Somatic Complaints (N=210)

Predictors	Beta weights	t	p
Speed/Impatience	0.15	0.32	n.s.
Hard Driving	-0.63	-3.27	<.01

Results from these exploratory analyses show that alcoholism contributes significantly to somatic complaints. Hostility and Speed/Impatience were predictive of somatic complaints. However, when low hostility interacted with high scores of Speed/Impatience, this was predictive of fewer somatic complaints. Hard Driving was associated with fewer somatic complaints as well. No effects were found from LOC or the interaction of LOC and Hostility. The largest amount of variance in somatic complaints is explained by the protective effects of Hard Driving, followed by alcoholism. The LOC construct explains hardly any variance.

CHAPTER 4

DISCUSSION

Three sets of findings emerge as important in this study. The first one is that alcoholism is the most powerful predictor of somatic complaints of the Type As in this sample, and that it correlates with hostility much more strongly than do the Type A factors of Hard Driving and Speed/Impatience. Hostility on its own is not a powerful predictor of somatic complaints in Type As, although it correlates strongly with alcoholism, which is decisive in producing somatic complaints.

Why should alcoholics be more likely to complain about illness symptoms than others? One possible reason is that alcoholism is a pathological condition, and as such, harmful to the body. Is being a Type A then not a pathological condition? According to Friedman and Rosenman (1974), it is. Type As react to stressors with hostility, a sense of time urgency, and an increased effort to work harder. As a result, they are more likely than others to develop coronary heart disease. But in this study, they did not complain about more illness symptoms than did others in the sample.

A possible reason for the failure to find an association between TAB and illness is that conditions in this study are not sufficient to activate the

Type A characteristic of hostility (see Smith & Rhodewalt, 1986). However, if Type As reliably react to oncoming stressors with hostility, one would assume that their hostility is not a state, but rather a trait that a hostility scale would be likely to pick up. But the Type A factors of Hard Driving and Speed/Impatience did not correlate with hostility in this study, so Type As seem not to be characterized by hostility, at least not as these variables were measured in the present study.

The alcoholics in this study were characterized by hostility, but not by Speed/Impatience. However, a few outliers of alcoholics scored extremely high on Speed/Impatience. It is possible that those alcoholics that are characterized by Speed/Impatience are so noticeable that the author's representativeness heuristic makes them into the majority of her clients in an alcoholics' treatment center. It is also possible that alcoholics seek out other alcoholics as social references, so that they do not report themselves to be more characterized by Speed/Impatience than others in their reference group. A third possibility is that the alcoholics who are characterized by Speed/Impatience are the ones worst off and that they would be the first to seek treatment for their condition. A fourth possibility is of course that alcoholics in general simply are not especially characterized by this behavior.

A second important set of findings is that Hard Drivingness, which is

a core characteristic of Type A, seems to predict fewer somatic complaints rather than more somatic complaints. One reason for the reduced symptoms among hard-driving Type As may be that they are so involved in their continuous striving that they suppress their somatic symptoms and simply go on about their business as usually, until they become seriously ill (see Matthews, 1982). Another possibility is that Hard Drivingness is a rewarding part of the behavior pattern that is not associated with illness unless it is coupled with illness predictors such as hostility or external locus of control (see below).

A final important set of findings is that external locus of control is predictive of somatic complaints, but internal locus of control is not. Furthermore, no support was found for the hypothesis that locus of control and hostility interact to affect somatic complaints. Several explanations are possible for this. One is that the translation of the questionnaire obscured the meaning of the questions. However, the questionnaire had been carefully translated before this administration of it and had been successfully used in Iceland after cross-translation of it by an Icelandic speaking Englishman. Some results were found then, and some results were also found now, even if they were not the ones specifically hypothesized.

Another potential explanation for the lack of support for the second

hypothesis is that there is simply no variation in the sample, that all participants either have an external or an internal locus of control. However, although more people have internal locus of control (mean=27.28, SD=4.13) than external locus of control (mean=14.37, SD=4.28), both frequency distributions are normally distributed.

A third possible explanation, and perhaps the most likely one, is that there simply are no detrimental effects of having an internal locus of control, not even when it interacts with a high score of hostility.

Unfortunately, it is impossible for the present study to distinguish among these different explanations. Further research is needed to resolve this uncertainty.

The typical, healthy Icelandic undergraduate is then not an alcoholic, also having the Hard Driving qualities of Type As and an internal locus of control. The typical unhealthy one is a hostile alcoholic with an external locus of control, lacking the protection that Hard Drivingness seems to provide.

Limitations and future studies

There are several limitations to this study. First of all, the sample size is limited, as was obvious when the effects of alcoholism were probed. There were only 9 Type A alcoholics and 15 Type B alcoholics. This

number of alcoholics was simply too small to generalize from the findings with confidence.

Second, the sample consisted of undergraduate students. It is questionable how representative these subjects are of the general population, being younger and better educated than most. It is, for example, likely that proportions of alcoholics would be higher in other samples, as it might be difficult to pursue educational goals with that condition.

Third, when the effects of Type A are considered, it is unclear how confident one can be in generalizing from self-reports about the less socially desirable aspects of this behavior pattern. Even so, people in this study seemed to readily report the condition of alcoholism, which has some stigma associated with it as well.

As alcoholism seemed in this study to be intertwined with hostility, which is supposed to be a characteristic of Type As, it would be interesting to probe that connection further in future studies. An interesting question, for example, is: As Type A alcoholics complain more about somatic symptoms than other alcoholics, will they then be more likely than other Type As to develop coronary heart disease? Another interesting question: Are Type A alcoholics also the most hostile Type As?

Conclusions

The findings in this study cast some doubt on the general belief that Type A behavior per se is a pathological condition. Rather, it seems that some aspects of that behavioral pattern, for example hard drivingness, are associated with reduced somatic complaints; whereas when Type A is combined with alcoholism, with an external locus of control, and with hostility, it becomes predictive of illness. If Type As make sure none of the illness predictors apply to them, then perhaps they can reap the benefits of a highly rewarding behavior pattern, along with a long and healthy life. That would truly be "having the cake and eating it too."

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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Masters of Art.

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Date

Director's Signature