A BRIEF TYPE-A SCALE AND THE OCCURRENCE
OF CARDIOVASCULAR SYMPTOMS

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ABSTRACT. A short Type-A behaviour pattern scale was tested on 3 221 Finnish state employees (65% men, mean age 38.7 years, and 22% with at least college-level vocational education). The Type-A sum score varied with age, sex and work status, but not with basic education. Respondents were further assigned to two extreme groups according to the Type-A sum score: the Type A's in the highest and -B's in the lowest quartile. Of those aged 40 years or more (*n*=1460), the persons with the Type-A behaviour pattern reported typical severe angina pectoris symptoms more frequently than the Type B's. There were no differences, however, in the frequency of typical mild angina pectoris symptoms between the Type A's and B's. The Type-A and -B men differed significantly in the frequency of a previous severe chest pain attack suggesting a possible myocardial infarction.

Key words: Type-A behaviour, cardiovascular symptoms.

Formulation of the Type-A behaviour pattern was originally based on clinical experience, and its validity has been subsequently ascertained in large scale prospective studies to be a specifically coronary-prone behaviour pattern (3, 6, 7, 16). Its components are, e.g., a chronic sense of time urgency; ambitiousness and a great need for achievement; an unusual degree of job involvement; and easily-provoked impatience and intolerance of frustration.

Conceptions of the Type-A behaviour pattern have greatly varied. For example, it has been regarded as a configuration of psychological traits (8) and as a set of overt behaviours resulting from the interaction of a specific set of predispositions with appropriately eliciting situations (12). The perspective which focuses on person–environment interaction has emphasized the possible relation of Type-A behaviour pattern to stress theories (11) where the pattern can be seen as an overreaction to challenge and stress, aiming to maintain control over environmental stressors.

The methods for measurement most frequently used for Type-A behaviour appear to assess different aspects of this pattern and there is relatively little overlap between them (e.g., 12). For example, while the Structured Interview (SI; e.g., 16) has been described as measuring a general hyperactivity in provocative situations, the Jenkins Activity Scale (JAS; e.g., 7) has been conceived as a predilection for a rapid pace of living and competitive achievement striving, and further still the Framingham scale (e.g., 5) as an awareness of the dissatisfaction associated with a lifestyle which is both competitive and time-pressured (1, 12). All these different patterns of behaviour referred to as "Type A" have been shown to correlate with the incidence of coronary heart disease. Different scales seem to correlate with each other in a statistically significant manner, though not greatly.

Type-A scores have been found to correlate strongly with education, and in European samples the means have often been essentially lower than in American ones representing middle and upper class populations (17, 19). On this basis, the applicability of Type-A measures for various socioeconomic groups and for various populations outside the United States has been questioned (17).

The present study is part of a larger project, which was designed to study the effects of an early rehabilitation program on Finnish state employees (cf. 18). The project has included a questionnaire survey at two experimental offices and two control ones at the beginning of the activity, and will include a follow-up survey five years hence. The aim of the survey has been to assess the state of health, the occurrence of illness symptoms, limitation of working capacity, and other accessory factors.

For the study, a brief Type-A scale was devised. The aim was to create a scale encompassing the essential components of Type-A behaviour but being as culture-free as possible. The items which were assumed to be influenced by the respondent's educational or cultural background were avoided. The

Table I. *Sociodemographic data with all the subjects and with those aged 40 years or over*

	All (n=3 221)			Aged 40 years or over (n=1 460)		
	Men	Women	All	Men	Women	All
Male (%)			65			59
Mean age (years)	38	41	39	48	51	49
Marital status (%)						
Single	21	18	20	5	11	7
Married	74	68	72	86	69	79
Others	6	14	8	10	29	14
Basic education (%)						
<9 years	50	25	42	72	35	57
9 years	30	47	36	19	52	32
>9 years	20	27	22	9	14	11
Work status (%)						
Management or admini- stration	6	4	5	11	7	9
Group supervisor	20	10	16	28	16	23
Employee, no subordinates	74	86	78	61	78	68

scale was designed to be filled in quickly by all occupational groups, from blue-collar workers to executives, and thus to be applicable in different populations. It was created to encompass components of time urgency, impatience, competitiveness and efficiency, as well as tenseness and an inability to "unwind" because of the challenges and strains emerging from work, i.e., components to be found in the JAS, the Bortner scale and the Framingham scale.

The present study reports the structure and feasibility of this Type-A scale as well as its validity using as criteria symptoms associated with coronary morbidity.

METHOD

A questionnaire was sent to 4 560 Finnish state employees, representing four institutes: the Customs Administration, two local branches of the Post and Telecommunications Establishment, and the Police Administration. The response rate was 70.6% ($n=3 221$).

65% of the respondents were men. About a quarter of the respondents were aged 30 years and under and a fifth 50 years and over. 22% of the respondents had graduated from higher secondary school with 12 years or more of basic education, 36% had finished their secondary school and the others had a lower level of basic education. 15% had no vocational training; 4% had received their vocational education at a university, 20% at a vocational school or college, and others had a shorter vocational training.

Some demographic data on all the subjects and the subjects aged from 40 to 64 ($n=1 460$) are given in Table I.

The questionnaire included the following measures:
1) *A brief Type-A scale* (9) which consisted of 15 items (Appendix).
2) A Finnish version of the *Rose cardiac pain question-*

naire (14, 15), which was used to classify reported chest pain symptoms as follows:

(i) those reporting severe typical angina pectoris symptoms (occurring even in slow walking),

(ii) those reporting mild typical angina pectoris symptoms (occurring only when hurrying or walking uphill),

(iii) those reporting having never had chest pain symptoms,

(iv) those reporting having had a severe attack of chest pain lasting for 30 min or more (suggesting a possible acute myocardial infarction),

(v) those reporting having never had a severe attack of chest pain.

The reliability of the Type-A scale was assessed using Coefficient Alpha (13). A factor analysis (principal components analysis, varimax rotation) was computed in order to check still further the scale's internal structure.

Two- and three-way analyses of variance were used in studying the effects of age, sex, education and work status on the Type-A scores. Pearson's correlation coefficients were computed.

The validity of the Type-A scale was analyzed on the basis of the relationship between the Type-A scores and the symptoms suggesting coronary morbidity. For the purposes of this analysis, two sub-groups were formed on the basis of the Type-A scores, each of which included as near as possible a quartile of the subjects. In the following, those in the upper quartile (44 points or more) are referred to as *Type A's* and those in the lowest quartile (less than 36 points) as *Type B's.*

The relationship between the Type-A scores and coronary symptoms was studied in the sub-group of those aged 40 and over ($n=1 460$). Statistical analyses included Chi^2-tests when testing the differences between the occurrence of chest pain symptoms with Type A's and Type B's, and independent-groups t-tests when testing the differences between the Type-A scale and sub-scale mean values in the afore-mentioned chest pain groups.

Table II. *Mean scores, standard deviations and theoretical ranges of the Type-A scale and its sub-scales*

	M	SD	Range
Type-A scale	39.78	7.02	14–70
IMP	7.21	2.61	3–15
EFF	12.75	3.13	4–20
COMP	8.54	2.57	3–15
TENS	11.28	3.05	4–20

Fig. 1. Type-A mean scores by sex and age.

RESULTS

Analysis of the Type-A scale. Using coefficient alpha, the reliability of the 15-item scale was found to be 0.60. After deleting the first item the reliability increased to 0.69.

The factor analysis of the 14 items yielded four factors which were interpreted as follows:

Factor I: impatience, irritability and speed (the IMP; items in the descending order of their factor loadings: 13, 2, 4: see Appendix),

Factor II: efficiency and activeness (the EFF; items 15, 8, 12, 7),

Factor III: competitiveness and aspiration (the COMP; items (–)3, 10 (–)6),

Factor IV: tenseness and inability to relax (the TENS; items (–)14, (–)11, (–)5, (–)9).

The Type-A scale and the sub-scale scores were formed as simple sum scores of the proper items. Some characteristics of the scales are presented in Tables II and III.

Type-A scores according to sex, age, basic education and work status. In Fig. 1, the mean values of the Type-A scale are presented by sex and age.

With women, the Type-A mean value was highest at the age of 30–39 years, slowly decreasing after this age. With men, the mean value was lowest with the youngest age group, and increased with age. The main and interaction effects were tested using two-way analyses of variance. Both the interaction effect $(F(3, 3145)=2.89, p<0.05)$ and the two main effects (sex: $F(1, 3148)=30.86, p<0.01$; age: $F(3, 3148)=3.38, p<0.05$) were statistically significant.

In the sub-group of over 40-year-olds, age did not correlate with the Type-A scale $(r=-0.01)$.

The level of basic education did not correlate with the Type-A scale $(r=0.00)$. The same result was given by a three-way analysis of variance, using sex, age, and basic education as explanatory variables.
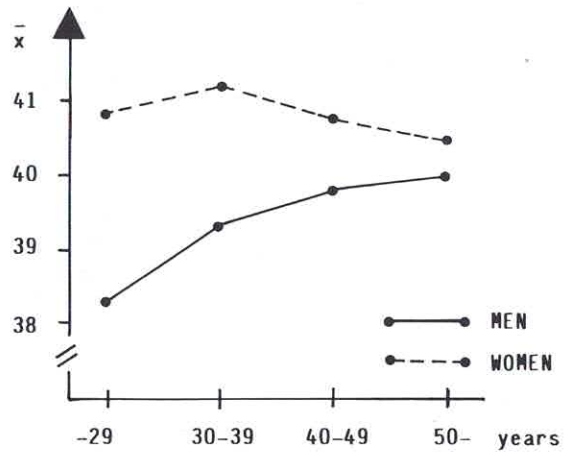
Work status was, however, related to the Type-A scores. A two-way analysis of variance (with age and work status as explaining variables) showed that those in managerial, administrative, or superordinate positions got higher scores than those with no subordinates $(F(1, 3089)=19.39, p<0.01)$. One-way analysis of variance, made in each age group separately, showed statistically significant differences only in the oldest age groups. The main trend was found both with men and women.

Type-A scores and cardiovascular problems. Fig. 2 depicts the occurrence of chest pain symptoms with Type A's and Type B's in the over 40-year-old age group. Type A's reported typical severe angina pectoris symptoms more frequently than the Type B's $(Chi^2=4.01, df=1, p<0.05)$. The Type A's and Type B's did not differ in their reports on mild angina pectoris symptoms.

Type A's reported more often a previous severe chest pain attack $(Chi^2=8.22, df=1, p<0.01)$. The difference was statistically significant with men

Table III. *The correlations between the Type-A scale and its sub-scales*

	IMP	EFF	COMP	TENS
IMP	–			
EFF	.272	–		
COMP	.053	.126	–	
TENS	.287	.113	.176	–
Type-A	.638	.643	.519	.657
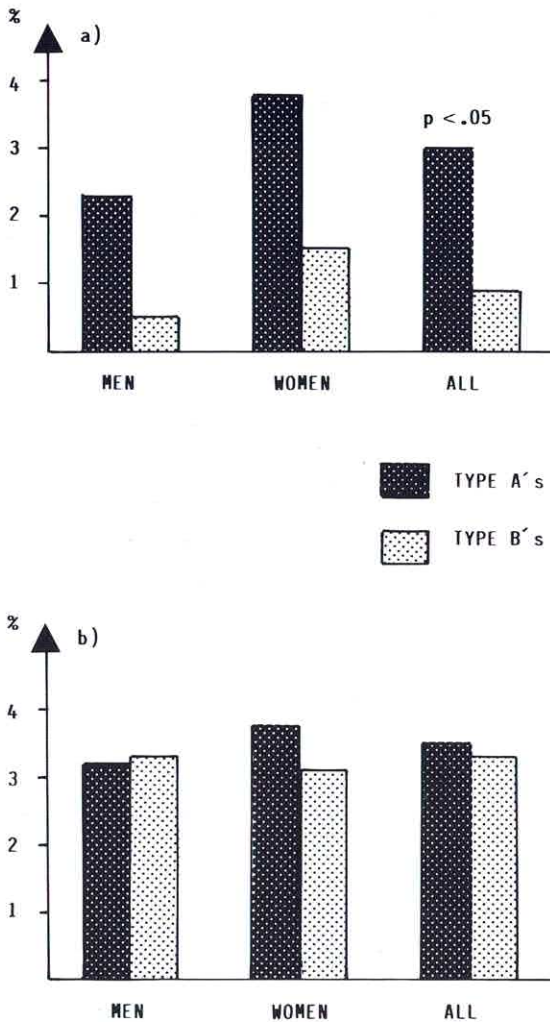
Fig. 2. Prevalence of (a) severe and (b) mild angina pectoris symptoms among Type A's and Type B's.

(Chi^2=10.61, df=1, $p<0.01$), but not with women (Fig. 3).

Table IV shows the mean values of the Type-A scale and its four sub-scales in groups with and without chest pain symptoms. Those with typical severe angina pectoris symptoms had significantly higher Type-A scores when compared to those with no chest pain symptoms (t_{787}=2.44, $p<0.01$), and also higher IMP scores (t_{787}=2.61, $p<0.01$) and TENS scores (t_{787}=1.99, $p<0.05$). Those with mild angina pectoris symptoms did not differ from the symptomless group in any of the scales.

Those having had a severe attack of chest pain differed from the symptomless group according to the Type-A scale (t_{1273}=3.22, $p<0.01$), The IMP scale (t_{1273}=4.33, $p<0.001$), and the EFF and the TENS scales (t_{1273}=1.36 and 1.53, $p<0.10$).

DISCUSSION

The reliability of the brief Type-A scale was 0.69, based on the internal consistency of the items. It is of the same magnitude as, for instance, the Framingham scale (5), and was regarded as marginally satisfactory. Although the scale included four different components, the simple sum indexes correlated to each other positively.

Women got higher scores in the Type-A scale than men, especially young ones. Also in the studies by Koskenvuo et al. (10) and Bernet et al. (2) women manifested more of the Type-A behaviour than men, though some studies show opposite results (e.g., 5). The difference between the sexes in our study could not be put down to differences in education or work status.
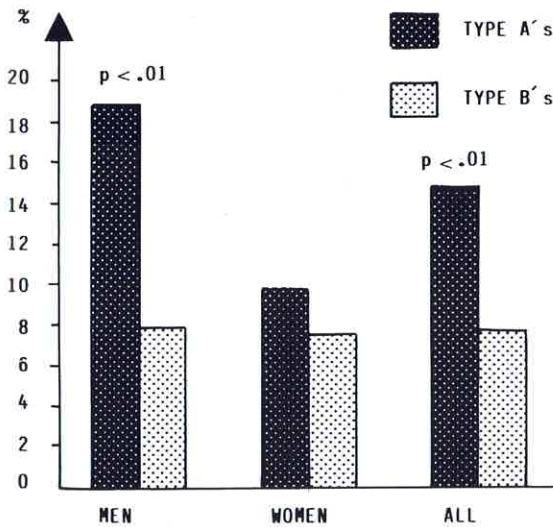
Table IV. *Means of the Type-A scale and its sub-scales in groups with or without chest pain symptoms suggesting cardiovascular disease*

		IMP	EFF	COMP	TENS	Type-A
(i)	Typical severe angina pectoris (n=26)	8.58**	13.27	8.38	12.58*	42.81**
(ii)	Typical mild angina pectoris (n=47)	7.49	13.30	7.94	11.51	40.23
(iii)	No chest pain (n=763)	7.16**	12.77	8.10	11.30*	39.33**
(iv)	Severe chest pain attack (n=115)	8.55***	13.37[(*)]	8.30	11.90[(*)]	42.12**
(v)	No instance of severe chest pain attack (n=1 160)	7.38***	12.94[(*)]	8.10	11.43[(*)]	39.84**

*** $p<0.001$, ** $p<0.01$, * $p<0.05$, [(*)] $p<0.10$. Subgroups (i) and (ii) are compared to group (iii) and group (iv) to group (v).

Fig. 3. Reports on a previous severe chest pain attack among Type A's and Type B's.

What is remarkable is that education did not correlate with Type-A scores in our sample. This gives some indication that this scale is less influenced by cultural background than other Type-A scales. Instead, those in managerial or superordinate positions scored higher than those with no subordinates. It should be noted that our sample only included state employees with relatively long and stable employment, which may have its influence on patterns of behaviour.

The Type-A behaviour was clearly related to a previous attack of severe chest pain, but its relation to angina pectoris symptoms was less clear. With men, the differences between Type A's and Type B's were more evident than with women. In a study by Koskenvuo et al. (10), using the Bortner scale, the results were quite similar. In another Finnish study (4), however, the JAS failed to distinguish between men with a history of myocardial infarction or angina pectoris and those with no history of CHD.

All these studies were cross-sectional in nature, and the results of the follow-ups will be reported later. Cross-sectional data must always be interpreted with extra caution, since the behaviour pattern may change after the incidence of the disease. In our study, all the subjects were employed, and we may therefore suppose that the disease had not altered their behavioural patterns or self-perceptions as greatly as, for instance, with hospital patients (19).

Even though the results of a cross-sectional study cannot ensure the validity of the Type-A scale, the resemblance between our results and those of Koskenvuo et al. (10) gives clear indications of the validity of the present scale. The factor distinguishing most clearly between those with chest pain and the "healthy ones" seems to be the IMP, including components of impatience, irritation and speed. The tendency is, however, the same with all four factors.

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APPENDIX

The brief Type-A scale

The following questions concern your ways of acting in different situations. Please check the most suitable alternative in each question using the following scale: 1. strongly agree; 2. agree somewhat; 3. don't know; 4. disagree somewhat; 5. strongly disagree.

(1. I am often unpunctual and late for appointments.)
2. I get impatient when I have to wait in line.
3. I don't like competing or setting hard goals.
4. I usually eat faster than others and people have sometimes pointed it out to me.
5. I am very seldom in a hurry.
6. I don't usually compare my achievements or myself with others.
7. I generally walk fast even if I am not in a hurry.
8. I usually do many things at once if it is possible.
9. My attitude towards life is casual and I am not easily irritated.
10. I am ambitious and always strive for new and better results/things.
11. I am calm and easy going by nature.
12. I always try to be energetic and efficient in my actions.
13. I often get impatient in discussions; I may interrupt others or finish their sentences when they are speaking slowly.
14. I relax fully during my leisure time; work problems do not even cross my mind.
15. I enjoy life most when I have lots of work and activity.