TYPE A BEHAVIOUR WITH *ERCTA* SCALE IN NORMAL SUBJECTS AND CORONARY PATIENTS

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This paper presents new research on the Type A behaviour scale ERCTA (Escala Retiro de Patrón de Conducta Tipo A), developed with a Spanish population. The scale, with eight items, was applied to two groups: normal subjects, and subjects with cardiovascular disorders. We show the validity and reliability of the scale by means of: alpha coefficients, factor analysis and means differences, to demonstrate its internal consistency, construct validity and criterion-related validity. Factor analysis (principal components, varimax rotation) shows a structure of two factors. Factor 1 would be related with a positive work orientation, while Factor 2 may be related to work stress. Item 8 (emotional expression), which in other studies appeared isolated from this bifactorial structure, is now related to the second factor.

En este artículo se presenta una nueva investigación con la escala de conducta Tipo A, ERCTA, desarrollada con una población española. Esta escala, de ocho ítems, se ha aplicado a sujetos normales y a pacientes con enfermedades cardíacas. Mostramos la validez y fiabilidad de la escala mediante los coeficientes alfa, análisis factorial, y significación de diferencias de medias, para demostrar su consistencia interna, así como su validez de constructo y de criterio. El análisis factorial (componentes principales, rotación varimax) muestra una estructura de dos factores. El Factor 1 podría relacionarse con una orientación positiva hacia el trabajo, mientras que el Factor 2 puede estar relacionado con tensión o estrés laboral. El ítem 8 (expresión de las emociones), que en otros estudios apareció aislado de esta estructura bifactorial, aparece aquí relacionado con el segundo factor.

INTRODUCTION

Type A behaviour pattern (TABP) has its origin in Friedman and Rosenman's (1974) description of behaviours made from observations carried out in the 1950s. These authors propose that the TABP implies trait characteristics in the person which, in interaction with certain environmental events, result in certain behaviours.

Among the characteristics included in the TABP are: competitiveness, aggressiveness, irritability, work orientation, worrying about deadlines, urgency, etc. From a physical point of view this manifests itself in general tension, an explosive style of speech, a state of alertness, urgent behavior style and irritability, among other characteristics (cf. Friedman and Rosenman, 1974; Matthews, 1988). In recent years, it has been attempted to integrate the vectors of isolated behaviour patterns in more organised models –or typologies– that include also, for example, behaviours that supposedly increase

the probability of cancer (Grossarth-Maticek and Eysenck, 1990, Grossarth *et al*., 1988: cf. the review by Eysenck, 1991). These models, however, have yet to be tested in wide-ranging and well-controlled studies (Amelang *et al*., 1996).

Among the TABP scales that have been translated and used extensively in our country, we should mention that of Bortner (Bortner Rating Scale) (Bortner, 1969; cf. Flores and cols., 1985; Del Pino and cols., 1992), the Framingham Type A Scale (Haynes *et al*., 1978; cf. Del Pino and cols., 1990; García Fernández-Abascal, 1994), and that of Jenkins (Jenkins Activity Survey) (Jenkins, Zyzanski and Rosenman, 1979; cf. García Fernández-Abascal, 1994).

Based on the existing measures, we developed a new instrument (see Appendix), with a small number of items, 8, and a short application time, around five minutes, and whose main objective is the detection (*screening*) of TABP in large groups of subjects (Rodríguez Sutil *et al*., 1996).

A measure of Type A, as Powell (1987) points out, may be considered as valid if it demonstrates its relationship to other validated measures of the TABP, and if it can be shown that it helps to predict the appearance of a coronary disorder. Nevertheless, it should be stressed

that the validity of the TABP for predicting coronary illness has been seriously questioned in recent years (cf. Foreyt, 1990; Miller *et al.*, 1991).

We attempt to show the validity of our instrument, on the one hand, through its construct and factorial validity, and on the other, by means of the simultaneous application to a group of subjects of our questionnaire and the Framingham scale, mentioned above. Subsequently, we compare the scores of two different groups of subjects: normal, and with various cardiovascular illnesses.

METHOD
Subjects
The total sample comprises 476 subjects in two groups. The first and most numerous (*Group 1*) consists of 316 incidental subjects, with a mean age of 23.5 years (S.D. = 4.58), due to the presence of a large number of students.

The second group (*Group 2*) is made up of patients that were examined by the Cardiology Unit of the *Gregorio Marañon* Hospital in Madrid by the two last-named authors of this article (individual heteroapplication). The subjects in this group are 154 in- or out-patients suffering from well-documented coronary disorders or other cardiovascular complaints. Their mean age is 57.9 (S.D. = 13.3). In terms of gender the sample is for the most part feminine (300, as against 176 males), especially in Group 1, made up mostly of students; in Group 2 the ratio was 117 men to 38 women.

Measures
The measurement instrument used was the ERCTA-a, the "screening" instrument of the TABP, designed by the first two authors of the research team. It comprises 8 items with a 5-point response scale (see APPENDIX 1). The difficulty observed on applying the first tests to the clinical sample with regard to the understanding of the language used to formulate the questions led us to design a parallel form, ERCTA-b (see APPENDIX 2), using simpler language. The correlation between the two scales, obtained with 163 subjects from Group 1, is sufficiently high (r = .880), with the two scales showing, for these subjects, similar means and standard deviations, as it can be observed in Table 1.

We also applied the Framingham Type A Scale (Haynes *et al.*, 1978) to Group 1 subjects, in conjunction with the scales ERCTA-a (N=243) and ERCTA-b (N=155).

Subjects were also asked to respond to a brief questionnaire on general health matters (smoking, weight, etc.), whose relationship to the scores in the scales will be analysed in a later work.

RESULTS
Scores on the total scale
In a previous study (Rodríguez Sutil, *et al.*, 1994), the distribution of scores on the ERCTA scale for the total sample –after eliminating Item 8, for which the theoretical score for each individual may range from 7 to 35– was approximately normal, with a mean of 24.36 that coincided with the median, 24.00, and a standard deviation of 3.81. If we consider, as in other works (cf. Miller *et al.*, 1991) that the proportion of TABP in the population is around 50%, we could take a score of 24 as orientative. In the current sample, the mean is slightly lower (22.94; s.d.= 3.73), perhaps due to the high proportion of young people and women, with an approximately normal distribution. As for the parallel form (ERCTA-b) the mean is 24.60 (S.D. 3.86), somewhat higher due to the abundance of clinical subjects.

Table 1
Comparison between the scales ERCTA-a and ERCTA-b

ERCTA-a		ERCTA-b	
Mean	S.D.	Mean	S.D.
23.27	3.80	23.28	3.29
N = 163; Pearson = .880, p < .001			

Factorial analysis
The construct validity of the scales was established by means of an analysis of principal components with varimax rotation, using the SPSS program FACTOR. With the ERCTA-a –applied to 397 subjects– we obtained, in a first analysis, 2 factors, following Kaiser's criterion of eigenvalues greater than 1. Overall, these explained 49.8% of total variance. Table 2 shows this factorial solution.

In Factor 1, items with relevant weight are numbers 2, 4 and 7, which we may consider as making up a positive feature of work orientation (activity, professional goals, attention to work). Factor 2, on the other hand, may represent a negative feature of work tension (stress, perfectionism, competitiveness, hurry). Item 8, which in previous studies appeared to be isolated, saturates positively in Factor 2 and negatively in Factor 1, a result that appears to be coherent with the above descriptions. That is, subjects that experience stress are those that also have greater difficulty in expressing their emotions

The ERCTA-b scale –applied to 252 subjects– also gave us 2 factors, again following Kaiser's criterion of eigenvalues greater than 1. Overall, these two factors could explain 48.9% of the total variance. Table 3 shows this factorial solution.

As it can be observed, this second table repeats point by point the factorial structure of the first one, thus giving additional support to the previously proposed interpretation. According to these data, moreover, Item 8 appears to be even more clearly associated with Factor 2.

The analyses of elements and the calculation of the alpha coefficient of reliability-internal consistency were carried out using the SPSS program RELIABILITY. The homogeneity scores of the elements attained high values for both scales. The alpha coefficient, with Item 8 eliminated, reached a value of .6834, for ERCTA-a, and .7073, for ERCTA-b, which are quite high values, if we consider that it is a short-length test. When we combine the two scales –with 171 subjects– the alpha coefficient rises to .8389, considering 14 items.

Table 2
Rotated factorial matrix. Varimax. ERCTA-a

	Factor 1	Factor 2
P1. Experience of stress	.25579	.74185
P2. Activity level	.80868	.11122
P3. Perfectionism	.08173	.59321
P4. Desire for maximum professional and/or social success	.84451	.12670
P5. Level of competitiveness	-.01309	.52186
P6. Sensation of urgency/lack of time	.20239	.70497
P7. Preoccupation with work	.81112	.25540
P8. Difficulty to communicate emotions	-.37306	.39151

Table 3
Rotated factorial matrix. Varimax. ERCTA-b

	Factor 1	Factor 2
P1. Experience of stress	.21137	.56038
P2. Activity level	.79244	.20390
P3. Perfectionism	.22568	.70195
P4. Desire for maximum professional and/or social success	.81315	.20899
P5. Level of competitiveness	.24517	.55014
P6. Sensation of urgency/lack of time	.18554	58151
P7. Preoccupation with work	.84667	.33058
P8. Difficulty to communicate emotions	-.25769	.50059

Correlations with the Framingham scale

In Table 4 it can be seen that the ERCTA scales correlate in a moderate and significant way with one of the commonest TABP measurement instruments, Framingham's Type A Behaviour Scale. It is noteworthy, nevertheless, that the highest correlations occur for Factor 2. This seems to suggest that it is this factor, and the items making it up, that best represents the characteristics of the TABP, so that this pattern should be understood, above all, as a negative feature of self-induced work stress.

Intergroup comparisons

Finally, in Table 5, we present the differences of means between the two study groups. These differences, as indicated, are significant. They are, in fact, sufficiently important for us to consider their utility for the clinical field. We should, however, qualify this situation: according to the direct experience of the last two authors with patients, these subjects may have been given ample information by health staff about the possible causes of their illness, lifestyle, and how they should change for the good of their future health. We still lack, therefore, the best form of criteria validation, which would be the prediction of coronary disorders.

DISCUSSION AND CONCLUSIONS

The results of the factorial matrix suggest that there are two main variables relevant to the TABP, which we have called: *orientation towards work* and *work tension* or *work stress*. These two components are similar to those of "competitive drive" and "impatience", which, according to Matthews (1982), are the only two components associated with the subsequent appearance of coronary disorders, on the Framingham scale, of a total of five factors. As it has been seen, the relationship with this scale is especially obvious in Factor 2. This leads us to think that the TABP, as an indicator of coronary risk, is impregnated chiefly by stress and hostile tendencies. Item 8, which in previous studies appeared isolated, saturates positively in Factor 2 and negatively in Factor 1,

Table 4
Correlation between the ERCTA scales (a and b) and the Framingham scale*

	Factor 1	Factor 2	TOTAL
ERCTA-a	.2280	.5329	.4603 (243)**
ERCTA-b	.2140	.5339	.4715 (155)**

* All of the correlations in the table are significant to a level higher than p = .001
** In brackets the number of subjects that completed both tests

Table 5
Comparison of results between patients and non-patients

	ERCTA-a		ERCTA-b	
	Mean	S.D	Mean	S.D.
GROUP 1	22.35	3.48	23.36	3.40
GROUP 2	25.69*	3.61	26.69**	4.69

* Significant differences with respect to Group 1 (F = 25.7449, TAE = .3431, p < .0001)
** Significant differences with respect to Group 1 (F = 20.3252, TAE = .3766, p < .0001)

suggesting that those subjects that experience stress, are those that also have greater difficulty in expressing their emotions. Let us refer to two studies coming from Scandinavian countries. In the most recent, carried out in Sweden by Orth-Gomer in 1994, it was found that the relationship between TABP and coronary risk is only effective in those subjects that lack appropriate social support. Finns Venalainen and Salonen (1992), meanwhile, from a psychodynamic perspective, showed that Type A subjects usually have a more narcissistic, exploitative and distant personality than other people. In view of this data, it does not seem appropriate to eliminate Item 8, in spite of what other authors (cf. Del Pino *et al.*, 1992) suggest, or we ourselves have suggested in earlier works.

One of the general conclusions we can draw is that, as several authors point out (Powell, 1987; Matthews, 1988, Miller *et al.*, 1991, among others), it is necessary to separate the components of the TABP in order to make a more precise prediction of the appearance of cardiovascular disorders in the studied population.

Finally, we should emphasise the ample support the ERCTA scales (a and b) have received, given their factorial structure, their correlation with other TABP measures and their capacity for differentiating diagnostic groups.

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APPENDIX 1

ERCTA-a INTERVIEW

This questionnaire is part of a wider study that attempts to discover the relationships between behaviour patterns and cardiovascular illness. We THANK you for your co-operation and ask you to answer as HONESTLY as possible.

FULL NAME: .... AGE: ....

SEX: Male/Female: .... Are you overweight?: /no/ /yes/

SMOKER: /no / /yes/ .... less than 15 cigarettes per day: .... more than 15 cigarettes per day: ....

Years smoking: .... Have you suffered from any HEART COMPLAINT?: /no / /yes/ (specify: ....)

(How long ago?): (years: .... months: .... days: ....) Occupation: ....

Mark with an X the option that applies to you.

1. Do you feel that your level of stress is ...?
   ❏ zero   ❏ low   ❏ normal   ❏ high   ❏ very high

2. Is your activity level ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

3. Is your tendency to perfectionism ...?
   ❏ very low   ❏ low   ❏ normal   ❏ high   ❏ very high

4. Is your desire to reach the maximum professional and/or social levels ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

5. Is your level of competitiveness ...?
   ❏ very low   ❏ low   ❏ normal   ❏ high   ❏ very high

6. Is your sensation of being in a hurry or short of time ...?
   ❏ very low   ❏ low   ❏ normal   ❏ high   ❏ very high

7. Is your preoccupation with your work or the jobs you have to do ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

8. Is your difficulty to communicate your emotions ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

APPENDIX 2

ERCTA-a INTERVIEW

Mark with an X the option that applies to you.

1. Do you feel pressurised by circumstances ...?
   ❏ not at all   ❏ a little   ❏ a normal amount   ❏ quite a lot   ❏ a lot

2. Is your level of activity ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

3. Do you like everything you do to be perfect ...?
   ❏ not at all   ❏ a little   ❏ a normal amount   ❏ quite a lot   ❏ a lot

4. Is your desire to go as far as you can in your work or in your relationships with others ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

5. Is your desire to do things better than other people ..?
   ❏ very low   ❏ low   ❏ normal   ❏ high   ❏ very high

6. Is your sensation of being in a hurry or short of time ...?
   ❏ very low   ❏ low   ❏ normal   ❏ high   ❏ very high

7. Is your preoccupation with your work or the jobs you have to do ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low

8. Is your difficulty to talk about your feelings ...?
   ❏ very high   ❏ high   ❏ normal   ❏ low   ❏ very low