

PREDICTION OF TYPE A BEHAVIOUR: A STRUCTURAL EQUATION MODEL

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ABSTRACT

The predictability of Type A behaviour was measured in a sample of 375 professionals with a shortened version of the Jenkins Activity Survey (JAS). Two structural equation models were constructed with the Type A behaviour achievement sub-scale and global (total) Type A as the predictor variables. The indices showed a reasonable-to-promising fit with the data. Type A achievement was reasonably predicted by service-career orientation, internal locus of control, power self-concept and economic innovation. Type A global was also predicted by internal locus of control, power self-concept and the entrepreneurial attitude of achievement and personal control.

INTRODUCTION

The cardiology researchers Friedman and Rosenman (1959) coined the concept of Type A behaviour when they discovered a typical behaviour pattern in most cardiology patients, namely an intense drive towards (1) poorly defined goals, (2) competitiveness, (3) persistence in the pursuit of advancement and recognition, (4) involvement in multiple tasks, (5) working at an accelerated mental and physical rate and (6) high physical alertness.

Since the identification of Type A behaviour by Friedman and Rosenman (1959), inconsistent results have been reported concerning the relationship between Type A behaviour and coronary heart disease (CHD) (Catipovic, Glavas, Kristek & Sram, 2001; Denollet, 2004).

Opposing views on Type A

On the one hand, there is some evidence that Type A behaviour is not really very toxic and that it does not necessarily lead to CHD (Ben-Zur, 2002; Dembroski & Costa, 1988; Dembroski, MacDougall, Costa & Grandits, 1989; Haynes & Matthews, 1988; Huysamen, 1994; Lutz, Holmes & Cramer 1987; Williams, Barefoot, Haney & Harrell, 1988).

On the other hand, sufficient evidence indicates that Type A behaviour should not be ignored, owing to its significant relationships with various physical and psychological symptoms, such as:

- **CHD** (Del Pino Perez, Meizoso & Gonzalez, 1999; Gallacher, Sweetnam, Yarnell, Elwood & Stansfeld, 2003; Jin-Fu, De-Sen & Shui-Yuan, 2005; Sehgal, 2000), such as a modest increase in coronary stenosis (Yoshimasu *et al.*, 2000), high cardiac reactivity with slow recovery (Palmero, Diez & Asensio, 2001), elevated systolic and diastolic blood pressure (Omura, Saito & Sasaki, 2005, atherosclerosis (Suls & Sanders, 1989) and hypertension (Yan *et al.*, 2003).
- **Deterioration of health** (Birks & Roger, 2000; Jamal, 2005; Jamal & Baba, 2003; Sumi, 1998), for instance: burn-out (Idemudia, Jegede, Madu & Arowola, 2000; Jamal, 2005; Jamal & Baba, 2001; Law, 2004), upper respiratory-tract infections (Stout & Bloom, 1982), stress-linked diseases (Hicks, Lingen & Eastman, 1979; Hicks & Pellegrini, 1982), sleep problems (Hicks & Pellegrini, 1982), headaches (Hicks & Campbell, 1983; Martin, Nathan & Milech, 1987), migraines (Rapport, McAnulty & Brantley, 1988), duodenal-ulcer symptoms (Ayzenberg, 1983), stomach disorders (Hicks & Pellegrini, 1982), ischaemic stroke (Kim *et al.*, 1998), work-related problems such as high work involvement and workaholism (Roodt, Bester & Boshoff, 1994), workplace aggression (Baron, Neuman & Geddes, 1999), and psychiatric sick-leave (Moriana & Herruzo, 2005).
- **Negative psychological symptoms** (Nakano & Kitamura, 2002; Sumi, 1998), hostility (Sebregts, Falger, Appels, Kester & Bär, 2005), negative emotions (Fukunishi *et al.*, 1992; Martin *et al.*, 1987; Mellam & Espnes, 2003) and accident prone behaviour (Suls & Sanders, 1989).
- **Reduced social support** (Furchner, 1999; Jamal & Baba, 2001; Sumi, 1998), an increased road-traffic accident risk (Nabi *et al.*, 2005) and a significant positive relationship between Type A aggression and pessimism (Hasan, 2002), which, according to Seligman (1998), is the primal cause of learned helplessness leading to a decrease in psychological health.

Overall, it seems that Type A behaviour has a number of negative health effects.

Possible reasons for differences in Type A relationships

Gastorf and Teevan (1980) and Nowack (1987) explain differences in findings related to Type A behaviour as being due to reluctance by Type A individuals to report symptoms as a self-defensive pattern motivated by a fear of failure, by ignorance and by the suppression of somatic and psychological symptomatology. Inconsistencies could also relate to sampling methods (Strümpfer, 1993b). These differences in relationships in Type A behaviour are explained by Alkhadher (1999) as being due to the measurement of Type A as a global construct, whereas the separation of individual sub-constructs leads to some differentiation in relationships.

With the separation of the Type A sub-constructs, it seems that it is especially the Type A components of anger (Northam & Bluen, 1994), achievement in interaction with high optimism (Begley, Lee & Czajka, 2000), impatience (Nakano & Kitamura, 2002; Siu, Cooper & Leung, 2000), enthusiasm (Yoshimasu *et al.*,

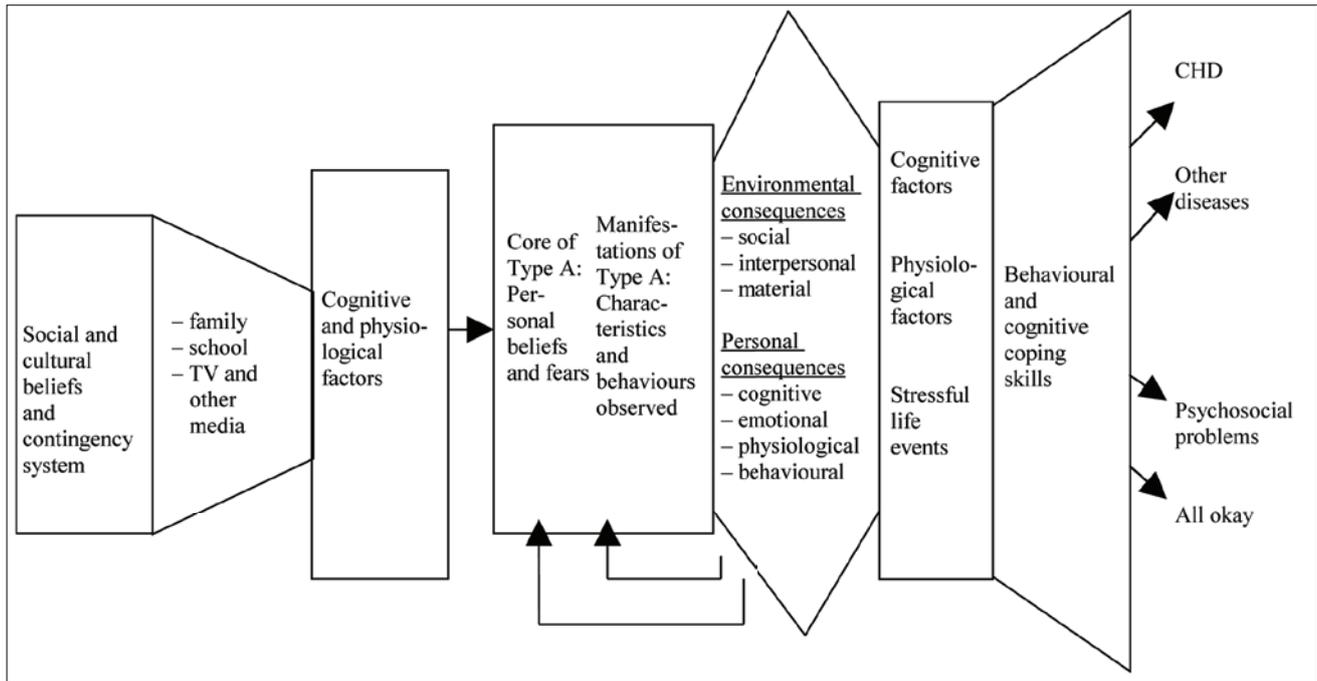


FIGURE 1
Proposed cognitive social-learning model of the Type A behaviour pattern (Price, 1982, p. 38)

2001), competitiveness (Furchner, 1999; Yoshimasu *et al.*, 2001), enthusiasm and competitiveness (Yoshimasu *et al.*, 2002) and hostility (Furchner, 1999; Williams, Barefoot & Schneiderman, 2003), as well as the social isolation caused by this behaviour (Furchner, 1999; Jamal & Baba, 2001) that relate to the severity of coronary atherosclerosis and other health risks. Although Type A achievement did not relate to burn-out in a sample of 329 Swedish information-communication technology consultants, burn-out significantly related to the irritability and impatience construct of Type A behaviour (Hallberg, Johansson & Schaufeli, 2007).

Opposing views on advanced performance due to Type A behaviour

Notwithstanding this negative view of Type A behaviour, some profitable outcomes do relate to this behaviour pattern: Type As are seen as having a heightened sense of self-efficacy, mastery and personal competence (Bryant & Yarnold, 1991). Although Strümpfer (1980) argues that Type A behaviour does not necessarily equal occupational and educational competency, there is some evidence indicating that Type As are significantly higher performers than Type Bs (Bryant & Yarnold, 1991; Roskies, 1987). There are, however, some inconsistencies concerning the performance of Type A individuals compared with that of Type Bs. Keinan and Koren (2002) argue that the contradictions in some findings indicating that Type As do not perform significantly better than Type Bs may be due to differences in the challenges presented in the research design. A study comparing the performance of Types A and B indicates that teams consisting mainly of Type A were consistently more productive than their Type B team counterparts when performing both competitive and non-competitive tasks (Keinan & Koren, 2002).

Therapeutic intervention in the Type A behaviour pattern

Although Type A achievement and global behaviour seem to be rewarding for some professionals as things seem to get done through achievement and through hard driving and competitiveness, the negative health indications related to this behaviour pattern should not be ignored, since treatment seems

to achieve a definite decline in the occurrence of coronary blockage (MacLennan, 1994) and notable statistical and clinical reductions in the recurrence of myocardial infarction (Friedman & Thoresen, 2001; Thoresen, Friedman, Powell, Gill & Ulmer, 1987). Type As should be made aware that typical Type A behaviour is not a prerequisite for occupational and educational achievement and that similar successful accomplishments are achieved by Type Bs (Strümpfer, 1980). Type As should be further sensitised to the fact that the negative health consequences associated with Type A behaviour outweigh the superficial attractiveness of this kind of behaviour (Kirkcaldy, Shephard & Furnham, 2002), which is especially prevalent in managerial positions in South Africa (Strümpfer, 1993a). It is therefore argued that therapeutic intervention for even healthy Type A behaviour is ethically justified.

Roskies (1987) declares that the provision of new and better ways of coping with daily irritations – the everyday hassles of life should be the purpose of stress-management training for healthy Type A behaviour. She proposes that the aim of treatment for healthy Type A behaviour should be to reduce stress-related factors by increasing the individual's awareness and control of her or his perceptions of and reactions to stress. The individual can therefore become more skilled in pursuing personal goals with a minimum cost in terms of personal upset and disruption in interpersonal relations.

According to MacLennan (1994), a prerequisite for successful intervention in Type A behaviour is the ability to grow in self-knowledge. She states that intervention itself leads to an increase in congruency and thus psychological-mindedness. Type A individuals should be taught to adopt healthier behaviour patterns with similarly successful outcomes (Price, 1982). Meaningful intervention should be aimed at helping individuals live active, productive lives without paying a price in terms of physical tension, mental turmoil and disturbed relations with others (Roskies, 1990). The high stress levels caused by Type A behaviour can be moderated through exercise, as indicated in a study by Siu *et al.* (2000) among Hong Kong managers, provided that individuals do not see exercise situations as competitive, which could lead to further negative effects of anger, depression and anxiety (Masters, Lacaille & Shearer, 2003).

Taking into account the high prevalence of Jenkins Activity Survey (JAS) Type A behaviour measured in South Africa (Strümpfer, 1993a), it is important that management make employees aware that Type A behaviour can be detrimental to their health and that preventive actions can be taken. Psychological distress, measured by the Hopkins Symptoms Checklist: HSCL-10, for example, is significantly higher among men with Type A behaviour than among men without Type A behaviour at the 95% confidence interval (Søgaard, Dalgard, Holme, Røysamb & Håheim, 2008). Employers can enhance the overall well-being of employees who have been identified as displaying Type A behaviour through stress management (Idemudia *et al.*, 2000). The presence of reactive systolic and diastolic blood pressure in Type A individuals, for example, can be effectively decreased through training and intervention, moderating their typical excessive cardiovascular responses (Dion, Gerrard, Ready & Dyck, 1992; Omura *et al.*, 2005) and the cognitive aspects of Type A, in particular the conduct of hostility (Sebregts *et al.*, 2005).

Ayzenberg (1983), however, warns that an attempt to change the Type A behaviour pattern might prove insufficient if the needs associated with the behaviour are not also addressed. Intervention focused on behaviour only is therefore only palliative, as the underlying personality structure is not addressed. She even believes that the modification of Type A behaviour without a change in core emotions could prove dangerous, as it does not allow the discharge of some emotional drives and denial thereof could have pathological effects.

Pace *et al.* (1986) propose an ecological approach to the treatment of Type A behaviour in the workplace, given that the syndrome arises from different intrapersonal, interpersonal, institutional and cultural sources. Treatment would include that of elements surrounding the system of the individual, namely the ecological system. For this reason and in the light of the argument by Byrne (2000) that it is the interaction between Type A behaviour and work circumstances that leads to health-risk factors, it is important to investigate the possible occupational variables that could lead to Type A behaviour.

Variables in an occupational situation that seem to cause Type A behaviour

It is important to notice that the classifications of Type A and B entities are not mutually exclusive – the one is not the counterpart of the other (Thoresen *et al.*, 1987); it is possible for individuals to display both Type A and Type B behaviours to different degrees (Webster, 1994).

What, in fact, causes Type A behaviour? Price (1982) explains Type A behaviour on the basis of a cognitive social-learning model. She argues that Type A behaviour cannot be seen as a personality type but rather as a set of socially learned behavioural responses. Her argument is based on work by Friedman and Rosenman (1959; 1974), which indicates that Type A behaviour is produced and maintained in interaction with behavioural, environmental, cognitive and physiological factors, with certain antecedents and consequences enhancing or discouraging the maintenance of the behaviour pattern. The proposed cognitive social-learning theory model developed by Price (1982) is shown in Figure 1.

Williams *et al.* (2003) point out that there does not seem to be one single behavioural pathway that causes cardiovascular disease. Byrne (2000) expresses a concern that it could also be the interaction between Type A behaviour and occupational situations that leads to health-risk factors.

Evidence of the prevalence of Type A behaviour in South Africa

It seems important to explore predictive factors further,

especially as there is some evidence to indicate a high tendency of Type A behaviour in South African organisations (Cox, 1983; Kahn, 1968; Strümpfer, 1980, 1990, 1993a, 1993b). This high prevalence of Type A in South African businesses suggests that cardiac disturbances can be predicted in both white and black South Africans (Els, 1987). The Type A tendency was also predominant in a sample of white South African students (Spangenberg, Shuda & Robbertze, 1997).

This phenomenon can possibly be explained by the high demands that Western society makes in terms of individual achievement (Spangenberg *et al.*, 1997) and personal performance in the work situation, which could lead to a high level of strain in professional activities (Byrne, 1987). The high occurrence of Type A could also be due to the shortage of high-level human resources in South African business and industry (Strümpfer, 1990).

Relationship between Type A behaviour and occupational variables

Although research concerning the Type A concept has decreased in the last decade, this does not mean that all relationships have already been answered. It is for this reason that this study investigated the possible cognitive organisational factors that could cause Type A behaviour (as depicted in Price's model given in Figure 1). The cognitive organisational factors under investigation were the locus of control, career orientation, self-concept and entrepreneurial attitude of individuals.

The element of control seems to be an important characteristic of the Type A behaviour pattern (Benight & Kinicki, 1988; Clark & Miller, 1991; Glass, Snyder & Hollis, 1974). It does, in fact, play an important role in emotional reactions that lead to tension or anxiety (Glass *et al.*, 1974). Glass (1977) is of the opinion that a Type A behavioural style is activated when an individual's sense of control is threatened. Clark and Miller (1991) report that a desire for control potentially gives rise to anger, which is a component of the more 'toxic' Type A behaviour in terms of the development of coronary-artery disease. Many studies indicate generally weak associations between Type A behaviour and locus of control (Begley, 1995; Feather & Volkmer, 1988; Furnham, 1983; Glass, 1977; Gomez, 1997; Morrison, 1997; Norden, 1995; Spector & O'Connell, 1994; Wolf, Hunter, Webber & Berenson, 1981). Kirkcaldy *et al.* (2002) demonstrate that an external locus of control in combination with Type A personality characteristics point towards significantly lower work satisfaction in a sample of 332 German managers.

Certain career orientations, as identified by the career anchors of Schein (1978), seem to be a further potential construct related to Type A behaviour. Studies by Burke (1983, 1985) identify a low but significant positive correlation between Type A behaviour (measured by JAS scores) and the career orientations (in terms of Schein, 1978) of self-investors and careerists and a significant negative correlation Type A behaviour and the career orientations of artisans (Jenkins, Zyzanski & Rosenman, 1979).

According to Anastasi (1990), an individual's self-concept can be seen as the collective effect of self-evaluation on cognitive and emotional traits and as either directly or indirectly influencing the functioning of an individual. In studies by Wolf *et al.* (1981) and by Lobel (1988), the relationship between a positive self-concept and Type A behaviour was found to be significantly negative.

Entrepreneurs are generally seen as achievers in society. At present, the study of entrepreneurship is attracting considerable attention. The relationship between Type A behaviour and entrepreneurial attitudes has not, as far as could be established, previously been studied and seems to be an important area for investigation (Van Wyk, 1998).

It is not clear how the constructs of locus of control, career orientation, self-concept and entrepreneurial attitude as independent variables would predict the prevalence of Type A behaviour as the dependent variable in a structural-equation model. This study therefore conducted a comprehensive investigation into the predictability of different personality variables in combination with Type A behaviour in a sample of professionals.

The sample was selected from two occupational groups, namely accountants and pharmacists (Van Wyk & Boshoff, 2004), as these professionals have an important role to play in symbolising service to society (Gamble & Matteson, 1992; Schein & Kommers, 1972). The public accounting and pharmaceutical professions are also seen as highly stressful occupations in terms of workload and role stressors, leading to job exhaustion in the case of accountants (Law, 2004).

The goal of this paper was to investigate the predictability of Type A behaviour through the personality constructs of locus of control, career orientation, self-concept and entrepreneurial attitude by means of structural-equation modelling.

RESEARCH DESIGN

Research approach

A non-experimental, cross-sectional survey was done on two professional groups with mutually exclusive profiles on the Holland Hexagon (Holland, 1985), namely pharmacists and accountants (Van Wyk & Boshoff, 2004). Two probability sampling methods were used, namely stratified sampling (where members of a specific professional society were used) and systematic sampling (where the total professionals registered were divided by 60 and individuals were selected at given intervals) (Kerlinger & Lee, 2000). Questionnaires were mailed to individuals, together with pre-addressed and pre-stamped return envelopes. Follow-up letters were sent one week later. The participants took part voluntarily and anonymously. The completed questionnaires were personally coded.

Research method

Participants

The sample consisted of 375 professionally registered pharmacists (N = 200) and accountants (N = 175). The mean age of the sample was 41.6 years (SD = 12.46). The respondents spoke mainly Afrikaans (N = 158) or English (N = 211) as their home language, with a few speaking Tshivenda (N = 1), isiZulu (N = 2) and North Sotho (N = 2).

The number of participants employed in organisations was N = 201 (53.6%) and the number working as private practitioners was N = 169 (45.1%). Five participants did not indicate whether they were employees in someone else's company or working as private practitioners. The number of jobs held by the participants prior to this study varied between one and eight; 93% had held five or fewer jobs during their careers prior to this study. The number of years' work experience held by the respondents up to the time of this study varied between one and sixty; the mean number of years worked was 18.7 (SD = 12.56). The mean number of organisations worked at was 2.83 (SD = 1.56) before participation in this study.

The majority of the participants (N = 295 or 78.7%) were married, 62 (16.5%) were divorced, ten were widowed, six were cohabiting and two did not indicate their marital status. Most of the participants (77.6%) grew up in an urban environment. The majority (56.8%) of the participants grew up in the Gauteng province of South Africa, with a more or less even spread over the other eight provinces for the rest of the participants.

Measuring instruments

The demographic information that was gathered on the participants concerned their gender, occupation, home language, employment, marital status, area of birth, province of birth, age, number of jobs held, number of years worked and number of organisations to which they had been attached.

Because the primary purpose of this study was to determine the predictability of Type A behaviour, this construct was measured by means of a shortened form of the JAS as developed by Spence, Helmreich and Pred (1987). Exploratory factor analysis yielded three factors with rather low alpha coefficients for the three scales (0.65, 0.52 and 0.49 respectively), possibly due to the low number of items. However, confirmatory factor analysis showed a satisfactory fit between the measurement model and the data, with a goodness-of-fit index (GFI) of 0.93, an adjusted GFI of 0.90 and a root mean-square error of approximation (RMSEA) estimate of 0.07, which rendered the instrument acceptable. The three factors were 'achievement' (five items), 'hard driving/competitiveness' (four items) and 'speed/impatience' (three items).

The Locus of Control Instrument developed by Schepers (1995) was used to measure locus of control. Exploratory factor analysis led to a three-factor solution containing 38, 14 and 5 items respectively, with Cronbach alphas of 0.91, 0.78 and 0.84 respectively. These factors were 'internal locus of control', 'external locus of control' and 'vicissitudes of life'.

Career orientation was measured with the Career Orientations Inventory (Schein, 1995). The exploratory factor analysis on the responses of the sample indicated four identifiable factors, with Cronbach alpha coefficients of 0.86, 0.81, 0.80 and 0.72 respectively. These factors were 'service dedication' (eleven items), 'job security' (five items), 'entrepreneurship' (five items) and 'lifestyle integration' (three items).

The six-factor Self-concept Scale of Stake (1994) was used to measure the self-concept of the participants. Exploratory factor analysis yielded a three-factor solution, with Cronbach alpha coefficients of 0.85, 0.84 and 0.84 respectively. The factors were identified as 'power' (14 items), 'task accomplishment' (12 items) and 'likeability' (6 items).

The Entrepreneurial Attitude Orientation Scale developed by Robinson, Stimpson, Huefner and Hunt (1991) was used to measure entrepreneurial attitude. A three-factor solution based on the responses was accepted for the exploratory factor analysis, which contained 29, 21 and 12 items respectively. The three factors were identified as 'attitude towards economic innovation', 'achievement/personal control' and 'self-esteem'. The Cronbach alphas were 0.90, 0.80 and 0.77 respectively.

Procedure

Random stratified sampling was done in two main economic areas of activity in South Africa (Gauteng and the Western Cape) on professionally registered pharmacists and accountants. A total of 418 completed questionnaires was received out of the 1 100 questionnaires distributed by mail in Gauteng and the 100 in the Western Cape. Questionnaires were left out of the analysis where any of the psychometric instruments had no response to one or more of the items. A total of 375 questionnaires was used in the final statistical analyses. The questionnaire consisted of biographical variables and questions measuring Type A behaviour, locus of control, career orientation, self-concept and entrepreneurial attitudes.

Statistical analysis (analysis of data)

Factor analysis was done on all the personality instruments to confirm construct validity and to limit error-variance measurements (Cavusgil & Das, 1997). Principal factor analysis

was performed with direct quartimin rotation, followed by confirmatory factor analysis that assessed the quality of fit between the measurement model and the data (Van Wyk, Boshoff & Owen, 1999). Statistical analyses concerning the relationship between Type A scores and personality variables were investigated by means of Pearson product-moment correlation and multiple-regression analysis (Van Wyk, 1998; Van Wyk & Boshoff, 2000).

RESULTS

On the grounds of the significant relationships indicated by the Pearson product-moment correlation and multiple-regression analysis of a previous study (Van Wyk & Boshoff, 2000; Van Wyk, Boshoff & Bester, 1999), two structural-equation models were investigated, with the prediction of achievement and global Type A as outcome variables. Structural-equation models were not built to predict hard driving and competitiveness, and speed and impatience, as these variables are not predicted well by means of multiple regression (Van Wyk & Boshoff, 2000). The predictions of achievement and global Type A are illustrated in Figures 2 and 3. Confirmatory factor analysis was performed to evaluate the strength of the model fit, as indicated in Tables 1 and 2.

With the exception of the internal locus of control economic innovation path coefficients, as indicated in Figure 1 (a value of 0.16), the other coefficients are all satisfactory (above 0.30).

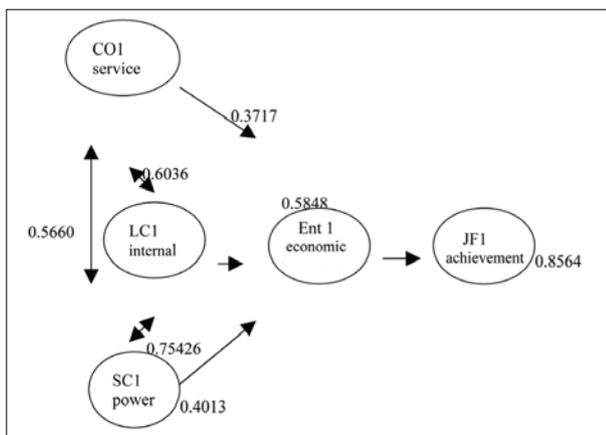


FIGURE 2

Structural equation Model 1 with Type A achievement as the outcome variable

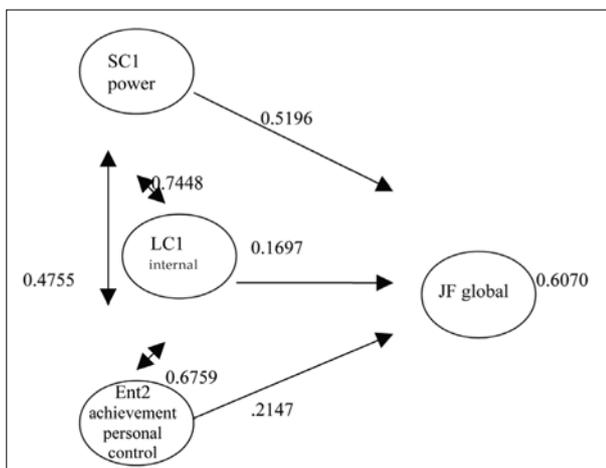


FIGURE 3

Structural equation Model 2 with global Type A behaviour as the outcome variable

Taking into account the values of the indices as indicated in Table 1, the causal model as shown in Figure 2 indicates a promising fit with the data according to the criteria set out by Hair, Anderson, Tatham and Black (1998). The basal metabolic rate (RMR) and RMSEA values are close to zero and the other relevant fit indices approach 1.0.

The path coefficients, given in Figure 3, are at an acceptable level, with the exception of the path coefficients between internal locus of control, Ent 2 and global Type A behaviour, which are below 0.3. Consequently, these causal relationships are low. The fit between the data and the model shown in Figure 3 is promising (Hair *et al.*, 1998), with the RMR and RMSEA values approaching zero and the other relevant fit indices being around 0.9.

DISCUSSION

The primary contribution of this study is the construction of a structural-equation model to determine the prediction of Type A achievement and global behaviour in two groups of professional people. The results indicate that Type A achievement and global behaviour can be explained by means of certain types of career orientation, locus of control, self-concept and entrepreneurial attitudinal variables, as measured in this study.

The study has broadened the view of causal relationships between different variables and Type A behaviour in the work environment. The structural-equation models indicate that different forms of self-perception – such as locus of control (internal), self-esteem (power) and individual service career orientation – were involved in the development of the entrepreneurial attitude of economic innovation and, finally, the maintenance of Type A achievement behaviour. The global prediction of Type A is indicated by means of the power self-concept variable, internal locus of control and an achievement or personal-control entrepreneurial attitude. Seen in the light of the argument by Price (1982) that Type A is not a personality type but a set of socially learned behavioural responses, it is important for professionals in the pharmacy and accountancy

TABLE 1
Indices obtained from a structural-equation analysis of Model 1

INDICES	VALUE
GFI	0.8941
GFI Adjusted for Degrees of Freedom (AGFI)	0.8618
Root Mean Square Residual (RMR)	0.1777
RAMSEA estimate (.0645-.0811)	0.0728
Chi-square (df = 131, p > Chi² < 0.0001)	390.4037
Bentler's Comparative Fit Index	0.9301
Bentler & Bonett's (1980) Non-normed Index	0.9184
Bentler & Bonett's (1980) NFI	0.8990
Bollen (1986) Normed Index Rho1	0.8820
Bollen (1988) Non-normed Index Delta2	0.9305

TABLE 2
Indices obtained from a structural-equation analysis of Model 2 (N = 375)

INDICES	VALUE
GFI	0.8961
GFI Adjusted for Degrees of Freedom (AGFI)	0.8630
Root Mean Square Residual (RMR)	0.1921
RAMSEA estimate (.0658-.0834)	0.0745
Chi-square (df = 116, p > Chi² < 0.0001)	356.9361
Bentler's Comparative Fit Index	0.9136
Bentler & Bonett's (1980) Non-normed Index	0.8987
Bentler & Bonett's (1980) NFI	0.8780
Bollen (1986) Normed Index Rho1	0.8569
Bollen (1988) Non-normed Index Delta2	0.9142

careers to be aware of the influence of the need for internal locus of control, power, service and economic innovation, which could lead to increased Type A achievement behaviour. Global Type A was found to be especially influenced by the need for power, internal locus of control and a career orientation of achievement and personal control.

These findings confirm the argument of Pace *et al.* (1986) that Type A behaviour in the workplace is the result of different intrapersonal, interpersonal, institutional and cultural sources and the concern of Byrne (2000) that it could be the interaction between Type A behaviour and occupational situations that leads to health-risk factors.

The results of this study can be used to help Type A individuals to grow in self-knowledge, suggested by MacLennan (1994) as a prerequisite for successful intervention in this behaviour pattern. The results shed more light on the occupational elements that lead to Type A behaviour, which can aid the treatment of this form of behaviour (Pace *et al.*, 1986). Improved self-knowledge can empower Type A individuals to prevent or moderate their cardiovascular responses (Dion, Gerard, Ready & Dyck, 1992; Omura *et al.*, 2005). It is important, however, that the needs of Type A individuals be addressed, as pure treatment without concern for personal needs can prove insufficient (Ayzenberg, 1983).

Limitations and direction for future research

The study has clear limitations. It was done on individuals in only two professional categories and the findings can therefore not be generalised to other occupational groups. The results of the low-path coefficients in the prediction of global Type A indicate a modest causality (Figure 3) supported by fair indices (Table 2).

Future studies should be aimed at professionals other than accountants and pharmacists and at non-professional groups. A broader measure of Type A behaviour (measuring more variables) would provide a better picture of the causalities of the different factors of this phenomenon. An examination of different variables from the ones measured in the current study should also be undertaken.

Future research should be aimed not only at the identification of Type A factors and the causal factors leading to this self-destructive behaviour pattern (accompanied by the health problems indicated) but also at the alleviation of this kind of behaviour and at finding more constructive and healthier ways to reach success without the self-destructive behavioural tendencies of Type A's.

Individuals such as professionals should be alerted to the detrimental effects of Type A behaviour and to the need for control and achievement at various psychological, physical and psycho-social levels. The identification of Type A behaviour should be aimed at helping people to unlearn cognitive social-learning patterns and to form new, healthier behaviour patterns of positive behaviour as advocated by post-modern psychologists, such as Seligman (1998).

Conclusion

Knowledge gained through the current study sheds more light on the occupational variables that precipitate Type A behaviour. As far as could be established, the prediction of Type A constructs by means of the complex interaction effects that structural-equation modelling allows has not been done before. The findings therefore make an important contribution to the theory of Type A behaviour, specifically in the work context, which can lead to certain damaging Type A characteristics. Identification of the variables can fine-tune intervention strategies that can give Type A individuals more insight into behaviour that precipitates health damage.

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