



Comparison between Eysenck's and Gray's models of personality in the prediction of motivational work criteria

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Abstract

Impulsivity based on Gray's [Gray, J. A. (1982), *The neuropsychology of anxiety: an enquiry into the function of the septo-hippocampal system*. New York: Oxford University Press; (1991). *The neurophysiology of temperament*. In J. Strelau & A. Angleitner. *Explorations in temperament: international perspectives on theory and measurement*. London: Plenum Press]. physiological model of personality was hypothesised to be more predictive of goal oriented criteria within the workplace than scales derived from Eysenck's [Eysenck, H.J. (1967). *The biological basis of personality*. Springfield, IL: Charles C. Thompson.] physiological model of personality. Results confirmed the hypothesis and also showed that Gray's scale of Impulsivity was generally a better predictor than attributional style and interest in money. Results were interpreted as providing support for Gray's Behavioural Activation System which moderates response to reward. © 2001 Elsevier Science Ltd. All rights reserved.

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1. Introduction

Typically, research investigating the validity of personality traits (Barrick & Mount, 1991; Tett, Jackson, & Rothstein, 1991) and attributional style (Corr & Gray, 1995a,b, 1996; Seligman & Schulman, 1986) in the work place centres on comparing them with predictors of performance. By means of meta-analysis, Tett et al. concluded that personality scales are reasonable predictors of performance at work (average validities ranged from 0.16 for Extraversion to 0.33 for Agreeableness). Specifically with regard to sales, Barrick and Mount concluded that extraversion generally predicts sales success, and Milford and Perry (1977) determined that self-esteem was predictive of

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success for automobile sales staff. Other researchers have also concluded that personality predicts sales success (Frei & McDaniel, 1998; Hogan, Hogan, & Gregory, 1992; Verbeke, 1994), although Jackson & Corr (1998) failed to find any personality main effects in predicting ratings of sales performance.

In the above studies, it seems implicit that personality traits are seen to be related to job performance as a result of the *stable* and *consistent* behaviours that personality traits are thought to represent. Traits are about the qualities that people have. Thus the extravert is seen as possessing social skills and energy which seem relevant to the job of a sales person. Costa and McCrae (1992, p.36) remark that, “while it is possible to enjoy sales and to be a good salesperson without being extraverted, it is probably unusual”. In general, trait scores are therefore unrelated to *motivation* within the workplace since motives are about what people do (Fiske, 1994; Funder, 1994; Harlow & Cantor, 1994; John & Robins, 1994; McAdams, 1994; Pervin, 1994a,b; Snyder, 1994).

Eysenck’s (1967, 1997) giant three model is a widely respected trait theory based on factor analysis and a psychobiological perspective. It consists of Extraversion (e.g. sociable, outgoing), Neuroticism (e.g. anxious, guilt ridden, under-confident) and Psychoticism (e.g. solitary, aggressive, tough-minded, impulsive, uncaring, detached, risk-taking, brutal). Psychoticism is not to be confused with clinical definitions of psychotic people, since the scale reflects a continuum containing the broad majority of the population. Although Eysenck (1967) does claim that introverts are more conditionable than extraverts, there is very little distinction between reward and punishment motivators.

Eysenck identifies two broad brain systems as being the key elements of his model of personality. The reticulo-cortical circuit controls cortical arousal that is generated from incoming stimuli. Introverts are believed to be typically more aroused than extraverts. The reticulo-limbic system is thought to become aroused with emotion-inducing stimulation, and is therefore related to neuroticism. The biological basis for psychoticism is less clear and has never been fully identified.

On the other hand, Gray’s (1982, 1987, 1991) two scale theory of personality is also a biological model, but has a clearer motivational basis. This model is most often stated to be a 45° rotation of Eysenck’s, but recent clarification suggests that Impulsivity is aligned at 30° to Extraversion, and Anxiety is aligned at 30° to Neuroticism (Matthews & Gilliland, 1999; Pickering, Corr, & Gray, 1999). Impulsivity has a biological basis in the Behavioural Activation System (BAS), and Anxiety has a basis in the Behavioural Inhibition System (BIS). The BAS is associated with pleasurable emotional states which are highly sensitive to reward. Gray’s theory suggests that highly impulsive people learn best from, and are motivated by, *reward*. On the other hand, people with heightened reactivity to the BIS are sensitive to fear and punishment, and therefore high scorers on anxiety are thought to learn best from, and be motivated by, *punishment*.

If generalised expectancies of reward and punishment are extremely relevant to human behaviour (Zuckerman, 1991; Zuckerman, Joireman, Kraft, & Kuhlman, 1999), then Gray’s model of personality is likely to have more relevance to the prediction of motivational criteria in the work place than Eysenck’s.

Motivation at work is generally explained in terms of goal-setting theory which is widely believed to be one of the most scientifically valid and useful theories within the organizational literature (Locke & Latham, 1990). A multitude of research indicates that high motivation to succeed results from the setting of hard, specific and realistic goals. The result is better performance and greater likelihood of achieving those high goals (Locke & Latham).

Several studies have examined the role of individual differences in the self-setting of goals (Campbell, 1982; Hollenbeck & Brief, 1987; Philips & Gully, 1997), but there has been scant research on the relationship between personality and goals set by organizations, performance levels of staff who have been set the goals, and the achievement of goals. Measurement of these criteria is an essential aspect of staff management and selection, especially in sales (Bagozzi, 1978; Walker, Churchill, & Ford 1977), where staff tend to be set high and specific goals and the financial criteria underpinning these goals are very clear cut.

The first hypothesis is that Gray's scale of Impulsivity will be more highly correlated to goal-oriented criteria than Eysenck's scales. According to Gray's model, highly impulsive staff are thought to be motivated by rewards such as the financial commissions and greater self-worth that is associated with being set higher organizational goals, obtaining high sales performance, and achieving a greater percentage of the target. Without the underlying link between Impulsivity and reward, it is difficult to explain a link between Impulsivity and goal oriented behaviour. Certainly, from the stable trait perspective, Impulsivity seems to be unrelated to sales success since Impulsivity (i.e. the characteristic of 'leaping into things without looking first') is likely to be a poor personality characteristic of a sales person. Therefore this study is a good means of distinguishing between these two competing biological models of personality, and represents a good test of the two models. Reviewers of other lines of research have concluded that the evidence from other approaches (such as EEG, event related potentials, cardiovascular measurements, mood studies, conditioning and attention) has not produced outstanding evidence in favour of either model (Matthews & Gilliland, 1999). It is not hypothesised that Anxiety will be related to goal oriented criteria in this study, since the participants worked for a large firm that is well known for pioneering work in creating a positive rewarding environment for staff, as opposed to a punishment-oriented culture.

Any personality theory of motivation should also be compared within the context of other theories to determine whether its explained variance is in addition to these other approaches. In this study, Eysenck and Gray's models of personality are compared as well as attributional style and interest in money.

The literature on attributional styles suggests people try to explain events as internal factors resulting from their mood, ability and effort or as a result of external factors such as task difficulty, luck, and help from others. A positive explanatory style internalises success and externalises failure. Seligman and Schulman (1986) administered the attributional styles questionnaire to 94 experienced life insurance sales agents and found that those individuals who internalised failure initiated fewer sales attempts, were less persistent, produced less and quit more than those with an external attributional style for failure. These results support the work of Abramson, Seligman, and Teasdale (1978) and Peterson and Seligman (1984) and suggest that a pessimistic explanatory style predisposes people to poor performance. Sales people repeatedly encounter failure, rejection and indifference from prospective clients and therefore provide an interesting population for attributional style research. Corr and Gray (1995a,b,1996) found that a positive attributional style for success was predictive of sales criteria in the UK. Nevertheless, there are serious doubts about the cross situational consistency and usefulness of attributional style as a trait measure (Cutrona, Russell & Jones, 1984).

The attributional theory of motivation argues that people with a positive style will learn from mistakes and subsequently develop an improved technique. Thus an optimistic sales person may

be motivated to work longer hours, be more tenacious or make more sales calls (Harmon, Brown, & Hammond, 1994; Sujan, 1986). Dweck & Leggett (1988) identified two broad goal seeking strategies: performance goal orientation and learning orientation. A performance goal orientation seeks favourable judgements and avoids negative judgements relating to competence. A learning orientation is concerned with developing competence by acquiring new skills and mastering new situations. Vandewalle and Cummings (1997, 391) note: 'Individuals with a performance goal orientation tend to hold an *entity* theory about their ability; they view ability as a fixed, uncontrollable personal attribute. In contrast, individuals with a learning goal orientation tend to hold an *incremental* theory about their ability; they view ability as a malleable attribute that can be developed through effort and experience'. We therefore see a positive attributional style in both positive and negative situations as reflecting the superior learning goal orientation (since optimists will learn to strive harder and apply more effort), whereas a negative attributional style in positive and negative situations is typical of a performance goal orientation (avoiding negative judgements and withdrawal from the task even though there may still be the intention to perform well (Dweck & Leggett; Elliott & Dweck, 1988; Phillips & Gully, 1997; Vandewalle & Cummings). In short, a positive attributional style should be related to work success and goal achievement.

Although, the underlying driving force within the sales industry is generally money (Amabile, Hill, Hennessey, & Tighe, 1994; Richins & Rudmin, 1994; Wright, 1992) and employees are often motivated to achieve targets through the use of commission-based wages and target incentives, it is surprising how little research has touched upon the area (Furnham, 1984), particularly in that of attitude to money in the prediction of work-oriented performance. Financial reward certainly seems to have the power to influence performance (Campbell, 1982; Locke, Bryan, & Kendall, 1968; Mowen, Middlemist, & Luther, 1981; Pritchard & Curtis, 1973; Terborg, 1976; Terborg & Miller, 1978). Wernimont and Fitzpatrick (1972) carried out a study using 500 subjects from various occupations. They found that the subject's work experiences, sex and socio-economic level appeared to influence their perceptions of money. For example, employed groups viewed money much more positively and as desirable, important and useful, whereas the unemployed seemed to take a tense, worrisome, unhappy view of money.

Scales reflecting a motivation to make money could be expected to be correlated with goal-oriented criteria. Here high interest in money is seen as prioritising success within the work place such as by the achievement of sales goals in comparison to achievement of other goals (e.g. successful social or family life). Thus the limited resources of the individual are directed towards the achievement of the goal in which interest is high. Using a similar rationale about goal prioritization, Kernan and Lord (1990) argue that differential feedback can lead to attention to one goal at the expense of another. Other theorists have also suggested that people resolve goal conflicts by using situational cues within the work environment (Austin & Bobko, 1985; Lord & Hanges, 1987); in this study it is suggested that individual differences in interest in money might direct attention to financial goal achievement.

Furnham (1984) developed a multi-faceted instrument known as the Money Beliefs and Behavior Questionnaire to measure money beliefs. Results showed that age, education, and protestant work ethic were predictive of a person's attitude to money. Following on from this, further research by Furnham (1996) has also shown political beliefs and work values to be powerful predictors.

The second hypothesis was that Impulsivity would better explain goal oriented criteria than attributional style and / or attitudes toward money.

2. Method

2.1. Participants

The ‘blue chip’ company used in this study employs around 4000 people in more than 50 locations and provides one of the widest range of document processing and management solutions in the industry. The UK is managed by six customer business units located around the country and each covers a set geographical area. All the sales managers and sales executives are paid on a commission basis determined by their performance against set targets. The information collected in this study was for the purpose of this research only and results were not shared with the company or the participants.

The questionnaires were distributed by post to all sales staff presently working within the southern customer business unit in the UK and 65 replied (52% response rate). A total of 65 staff provided questionnaire scores and objective measures of performance were available for 60 of these participants. The participants consisted of 62% males/38% females and the ages ranged from 20–61 years.

2.2. Questionnaires

Each subject completed the following three questionnaires¹

2.2.1. Eysenck Personality Profiler

The Eysenck Personality Profiler (EPP; Eysenck, Barrett, Wilson, & Jackson, 1992) is a 420-item questionnaire measuring three higher order personality scales which are the summed average scores of underlying traits that are also measured in the questionnaire. The three-factor model of personality has a wide international following and has advantages over five-factor models from its stronger basis in physiological research (Eysenck, 1967, 1997), although it may not provide such a good factor description of personality (Costa & McCrae, 1995). Following the recommendations of Eysenck et al. and in line with the analysis of Jackson, Furnham and Lawty-Jones (2000), Extraversion was calculated as the average score of sociability, activity, assertiveness and ambition; Neuroticism was calculated as the average score of dependence, inferiority, unhappiness, anxiety, guilt and hypochondria; and Psychoticism was calculated as the average score of risk-taking, manipulativeness, sensation-seeking, aggression, impulsiveness, irresponsibility, dogmatism and expressiveness. In addition to the above scales, there is a Lie scale (similar to that of the Eysenck Personality Questionnaire).

The scales of impulsiveness and anxiety (sub-scales of Psychoticism and Neuroticism, respectively) from the EPP provide the dimensions that Gray (1982, 1987, 1991) advocates as the major two dimensions of personality. Although there are specific scales available for measuring the Gray dimensions (MacAndrew & Steele, 1991; Wilson, Barrett, & Gray, 1989), they are not convincing (Matthews & Gilliland, 1999). Eysenck’s sub-scales do, however, seem to be a reasonable

¹ All the questionnaires used in this study are available from the author.

representation of the different levels of description and levels of physiological mechanisms between the two models. It should however be noted that the EPP places the Impulsivity scale in Psychoticism, whereas Gray would seem to place Impulsivity close to Extraversion.

The factor structure of the EPP has been investigated (Costa & McCrae, 1995; Eysenck et al., 1992); specific groups have been studied (Jackson & Wilson, 1993, 1994; Wilson & Jackson, 1993), and the EPP has been the centre of theoretical work (Furnham, Forde, & Cotter, 1998a, b; Jackson & Corr, 1998; Jackson, Furnham & Lawty-Jones, 1999).

2.3. *Occupational Attributional Style Questionnaire*

A revised version of the Occupational Attributional Style Questionnaire (OASQ) originally constructed by Furnham, Sadka and Brewin (1992) was used. The OASQ consisted of six brief descriptions of hypothetical situations commonly experienced and particularly relevant to employed individuals. The hypothetical situations describe three positive outcomes and three negative outcomes. For each hypothetical event, subjects were asked vividly to imagine themselves in the situation described and to write down the single most likely cause of the event. This cause was then rated by the subjects on five separate seven-point scales concerned with the attributional styles of internality, stability, globality, externality and personal control. The sum of these scales can be calculated as a global measure of positive attributional style for positive (Co-Pos) and negative (Co-Neg) situations. This is the first study to examine the validity of the OASQ against objective occupational measures.

2.4. *Money Beliefs and Behavior Scale (Furnham, 1984)*

This questionnaire aims to assess the value people place on money and therefore the degree of importance they attach to it. It is a 60-item inventory which requires subjects to respond to various statements regarding their behaviour in relation to their own, and other people's money. Responses are made on a seven-point scale ranging from 'never' or 'not at all' to 'very much' (Furnham, 1984). This study reports on a shorter form of the questionnaire which comprises 30 items and is the first study to investigate the validity of financial beliefs in the prediction of occupational success.

2.5. *Objective measures*

Three concurrent objective measures were collected. Each sales person is assigned a sales target, or goal, for the year which represents the amount of revenue they are *expected* to earn for the company. This figure is partly based on the geographical territory each employee is given as their particular selling area. The sales people working in recognised business areas, such as central London, are assigned higher targets than those with territories in less populated or rural areas. This measure of expected performance has been labelled Goal since it represents the goals set by the organization for the sales person. Since assigned territory and other factors such as age are likely to influence the set goal, variations in the amount set do not totally reflect goal difficulty. The second criterion used in the study is the actual financial performance of the sales staff and is labelled Performance. Again it should be noted that performance will tend to be higher when the set goals are higher because it is usually easier to make money in these areas than other areas. The third criterion used in this study represents the percent of the goal achieved by the sales staff and is labelled Goal

achievement (%). Of the three criteria, this is likely to be the best measure of achievement orientation.

2.6. Procedure

The EPP, Money Beliefs and Behavior Questionnaire and the OASQ were administered to all employees working within the southern region of the UK for the purposes of this study.

2.7. Statistical analysis

After a factor analytic examination of the Money Beliefs Questionnaire, the analysis proceeded at two levels. First, the correlations between each of the scales and the three objective measures were determined after having partialled out the effect of gender and age. A one-tailed directional test was used to show significance of the scales, since the expected direction of the relationship was predicted. Seligman and Schulman (1986) used a similar methodology. Second, a two-step multiple regression was used of the significant variables against the criteria. In Step 1, Gender and Age were entered; and in Step 2, the significant scales were entered using the stepwise method.

3. Results

Table 1 shows the number of subjects, mean scores, standard deviations and alpha reliability for the EPP, OASQ, Money Beliefs and Behavior Questionnaire and the criteria. The alpha reliabilities for all of the scales are greater than 0.7, except for Co-Neg which is 0.68 and Financial image which is 0.69.

Five factors from the 30 items of the Money Beliefs and Behavior Questionnaire were extracted by Principal Components Analysis using the scree slope method. VARIMAX rotation of the five factors is shown in Table 2. The item numbers used in Table 2 refer to the original 60-item questionnaire fully labelled and described in Furnham (1984). The factors used in this study have some, but not major, resemblance to those of Furnham.

The scales of the EPP, OASQ and Money Beliefs and Behaviour Questionnaire were correlated with the three criteria (Table 3). Whereas Goals were highly correlated with Performance ($r=0.91$, $P<.01$, D.F. = 58), Goals was not significantly correlated with Goal achievement. However Performance was correlated with Goal achievement ($r=0.29$, $P<0.05$, d.f. = 58). Of the Eysenckian personality scales, only Psychoticism was positively correlated with Goal and Performance ($r=0.22$, $P<0.05$, $r=0.26$, $P<0.05$, d.f. = 58). The Impulsiveness scale, representing Gray's Behavioural Approach System, was positively correlated with Goal, Performance and Goal achievement ($r=0.25$, $P<0.05$, $r=0.29$, $P<0.05$, $r=0.24$, $p<0.05$, d.f. = 58). Since the Eysenckian scale of Psychoticism includes impulsiveness as a sub-scale, the correlation between Psychoticism and the criteria with Impulsiveness partialled out (in addition to Gender and Sex) was determined. All significant correlations of Psychoticism against the criteria became almost zero and non-significant ($r=0.00$ with Goal, $r=0.02$ with Performance, and $r=-0.05$ with Goal Achievement) suggesting that it was the Impulsiveness sub-scale as opposed to the higher order scale of Psychoticism that was the significant predictor. Partialling Impulsiveness from the correlations between the other predictors and the criteria had almost no effect.

Table 3 also shows that Co-Pos was significantly correlated with Performance and Goal achievement ($r=0.29$, $P<0.05$, $r=0.25$, $P<0.05$, d.f. = 58), whereas Co-Neg was significantly

Table 1

Descriptive statistics for Eysenck Personality Profiler, Occupational Attributional Style Questionnaire, Beliefs about money and the criteria^a

	Mean	S.D.	Alpha
<i>Eysenck's model of personality</i>			
Extraversion	15.92	5.51	0.89
Neuroticism	28.69	6.05	0.95
Psychotism	21.13	4.19	0.89
Lie scale	10.48	5.71	0.73
<i>Gray's model of personality</i>			
Anxiety	24.11	8.40	0.79
Impulsivity	19.62	7.52	0.75
<i>Attributional style^b</i>			
Co-Pos	51.45	8.67	0.79
Co-Neg	29.54	10.26	0.68
<i>Money beliefs</i>			
M1: Financial locus of control	10.80	8.69	0.83
M2: Financially careful	18.60	6.88	0.74
M3: Financially spend thrift	21.95	5.69	0.74
M4: Financial image	19.78	7.25	0.69
M5: Financially secure	13.97	6.36	0.71
<i>Criteria^c</i>			
Goal	£1 122 166.80	1 343 171.87	
Performance	£773 278.41	878 598.95	
Goal achievement%	68.47	37.61	

^a Sixty-five participants completed the questionnaire measures. Objective records of Revenue and Percent were kept for 60 of these participants. All scales are scored so that a high score reflects the name of the scale.

^b Co-Pos, positive attributional style across positive situations; Co-Neg, positive attributional style across negative situations.

^c Goal, target assigned to sales person; Performance, actual sales achieved; Percent, percent of target reached.

correlated with Goal and Performance ($r=0.23$, $P<0.05$, $r=0.30$, $P<0.05$, d.f. = 58). From the Money Beliefs and Behavior Questionnaire, Financial Locus of Control and Financial Image were significantly correlated with Goal achievement ($r=0.33$, $p<0.01$, $r=0.26$, $P<0.05$, d.f. = 58), and Financial Security was significantly correlated with Goal and Performance ($r=0.24$, $P<0.05$, $r=0.23$, $P<0.05$, d.f. = 58).

Correlations between all the significant predictors are shown in Table 4. Here two tailed tests are reported since no a priori directional hypotheses have been made. Psychoticism is highly correlated with Impulsivity ($r=0.72$, $P<0.01$, d.f. = 58); Co-Pos is correlated with Impulsivity, Co-Neg, and M1: Financial Locus of Control ($r=0.34$, $P<0.01$, $r=0.37$, $P<0.01$, $r=0.35$, $P<0.01$, d.f. = 58); Co-Neg is correlated with M1: Financial Locus of Control and M5: Security ($r=0.38$, $P<0.01$, $r=0.41$, $P<0.01$, d.f. = 58); and Financial Locus of Control and Security are also significantly correlated ($r=0.41$, $P<0.01$, d.f. = 58).

Hierarchical multiple regression was then used to regress the most important personality, attributional style and money scales on each of the criteria. In Step 1, the effects of age and gender

Table 2
Rotated factor matrix of the 30 items of the money questionnaire^a

Item	LOC	Careful	Spend thrift	Image	Secure
60	0.71	0.16	0.10	0.30	0.03
56	0.69	0.33	0.11	0.21	0.04
57	0.72	0.19	0.07	-0.02	-0.10
52	0.71	-0.15	0.11	-0.05	0.11
46	0.71	-0.22	0.11	0.03	-0.06
22	0.56	0.27	-0.03	0.39	0.25
24	0.29	0.72	0.04	-0.19	-0.04
08	-0.16	0.77	0.10	0.11	0.04
55	0.42	0.62	0.18	0.27	0.11
14	-0.01	0.84	-0.08	0.22	0.18
31	-0.24	0.33	-0.23	-0.00	-0.36
35	0.07	0.36	-0.17	-0.19	-0.08
15	0.07	-0.19	0.63	0.17	-0.19
03	0.04	-0.00	0.76	-0.09	-0.11
50	-0.08	0.14	0.68	-0.17	-0.19
37	0.21	-0.06	0.59	-0.18	0.09
01	0.18	0.03	0.64	0.18	0.16
18	0.15	0.03	0.44	-0.05	-0.51
21	0.32	-0.14	0.15	-0.05	0.64
23	-0.08	-0.16	-0.09	-0.08	0.64
09	-0.04	0.24	0.37	0.32	0.56
26	-0.08	0.29	-0.12	0.22	0.70
48	0.15	0.10	-0.20	-0.25	0.60
59	-0.30	0.44	-0.17	0.08	0.58
11	0.06	-0.06	0.03	0.74	-0.19
07	0.07	0.12	-0.03	0.61	0.25
05	0.17	0.30	-0.06	0.40	-0.28
10	0.34	0.34	-0.08	0.57	-0.21
06	0.03	-0.07	-0.04	0.74	0.13
58	-0.33	0.25	0.09	-0.35	0.13
Factor	M1	M2	M3	M4	M5
% Var	16.6	11.4	80.8	70.2	50.7

^a The item numbers of the original Furnham (1984) questionnaire are presented here. See that study for a full description of the items. LOC, financial locus of control; Spend thrift, financially spend thrift; Secure, financially secure; Careful, financially careful; Image, financial image.

were partialled out. In Step 2, the significant main effects for each scale were entered in stepwise fashion. Two-tailed tests of significance are reported for the Step 1 variables, and one-tailed directional tests are reported for the Step 2 variables. Final model results are shown in Table 5. In the prediction of the Goal, Impulsivity was a significant predictor and improved the adjusted R^2 from 0.16 to 0.20; in the prediction of sales performance, Impulsivity and Co-Neg were significant. The adjusted R^2 of the Step 2 model was 0.25 compared with 0.15 after Step 1. With regard to goal achievement, Financial locus of control; Financial Image and Impulsivity were significant Step 2 predictors. After Step 2, the adjusted R^2 was 0.28 compared with 0.09 after Step

Table 3
Intercorrelations between the predictor scales and sales performance criteria^a

	Goal	Performance	Goal achievement %
Performance	0.91 ^d		
Goal achievement%	−0.05	0.29 ^a	
<i>Eysenck's model of personality</i>			
Extraversion	0.07	0.13	0.07
Neuroticism	0.09	0.08	0.06
Psychotism	0.22*	0.26*	0.12
Lie scale	0.15	0.08	−0.16
<i>Gray's model of personality</i>			
Impulsivity	0.25*	0.29*	0.24 ^c
Anxiety	0.04–0.01	0.01	
<i>Attributional style^b</i>			
Co-Pos	0.16	0.29*	0.25*
Co-Neg	0.23*	0.30*	0.19
<i>Money beliefs and behavior</i>			
M1: Financial locus of control	0.03	0.14	0.33**
M2: Financially careful	0.01	0.03	0.16
M3: Financially spend thrift	−0.16	−0.04	0.18
M4: Financial image	−0.08	0.03	0.26 ^c
M5: Financially secure	0.24*	0.23*	0.08

^a One-tailed directional tests were used. Effect of gender and age are partialled out ($n = 60$).

^b Co-Pos, positive attributional style across positive situations. Co-Neg, positive attributional style across negative situations.

* $P < 0.05$.

** $P < 0.01$.

Table 4
Correlations between the most important predictor variables^a

	<i>P</i>	Impulsivity	Co-Pos	Co-Neg	M1	M4
Impulsivity	0.72**					
Co-Pos	0.26	0.34**				
Co-Neg	0.03	0.17	0.37**			
M1: Financial locus of control	−0.06	−0.10	−0.35**	0.38**		
M4: Financial image	0.19	−0.05	0.14	0.09	0.01	
M5: Financial security	−0.14	0.15	0.17	0.41**	0.41**	−0.13

^a Effects of gender, age, seniority and years with company are partialled out. Two-tailed test levels of significance reported. Co-Pos, positive attributional style across positive situations; Co-Neg, positive attributional style across negative situations.

** $P < 0.01$

Table 5
Multiple regression analyses^a

	Step 1	Step 2	Variable	Beta	<i>t</i>	P
<i>(1) Goals</i>						
Multiple <i>R</i>	0.43	0.49	Gender	0.22	1.80	0.08
<i>R</i> ²	0.19	0.24	Age	0.43	3.46	0.00
Adjusted <i>R</i> ²	0.16	0.20	IMP	0.23	1.92	1.03
<i>(2) Performance</i>						
Multiple <i>R</i>	0.42	0.55	Gender	0.15	1.26	0.21
<i>R</i> ²	0.18	0.30	Age	0.42	3.47	0.00
Adjusted <i>R</i> ²	0.15	0.25	Co-Neg	0.24	2.04	0.03
			IMP	0.23	1.96	0.03
<i>(3) Goal achievement %</i>						
Multiple <i>R</i>	0.34	0.59	Gender	−0.35	−2.98	0.00
<i>R</i> ²	0.12	0.34	Age	0.09	0.78	0.44
Adjusted <i>R</i> ²	0.09	0.28	M1	0.34	2.96	0.00
			IMP	0.27	2.44	0.01
			M4	0.25	2.26	0.02

^a This table shows the final model statistics and Beta regression weights of the three step stepwise multiple regression model used against each of the criteria. In Step 1, Age and Gender were entered to partial out these effects from the rest of the model. In Step 2, the significant personality, attributional style and money scales as shown in Table 3 were entered. Note that two tailed levels of significance are reported for the Step 1 variables, but one tailed levels are reported for the Step 2 variables. IMP, Impulsivity; Co-Neg, positive attributional style in negative situations; M1, financial locus of control; M4, Financial image.

1. Results of multiple regression using the entry method provided similar results to those provided by the stepwise entry method.

4. Discussion

It is not surprising to note the very high correlation between Goals and Performance, since it will usually be easier to obtain higher income generation in geographical areas associated with higher goals.

The aim of this study was to test Gray's scales of personality within an occupational context. The first hypothesis was that Gray's scale of Impulsivity would better predict goal-oriented criteria than scales derived from Eysenck's model of personality. Results supported the hypothesis. Impulsivity was the only scale to be significantly correlated with all three of the criteria. Although Psychoticism was significantly correlated with sales goals and sales performance, the effect disappears when the sub-scale of Impulsivity is partialled. Therefore it seems that sales people with a high need for reward tend to have higher goals set for them by the organization, tend to have higher performance and tend to achieve a greater percent of their goal than sales people with a

low need for reward. Such an interpretation, provides the first occupational validity evidence in favour of Gray's (1982, 1987, 1991) predictions about the nature of the BAS and how the system motivates the individual, because it seems that the only reasonable connection between Impulsivity and goal oriented criteria is in terms of the reward characteristics of the BAS.

An alternative explanation of the link between Impulsivity and the criteria is that personality characteristics of Impulsivity (such as rash thinking) somehow leads to better performance. This is unlikely because Impulsivity would not seem to be a positive characteristic within a sales environment.

Anxiety, which represented Gray's BIS, did not predict any of the criteria. With this scale, highly anxious people could be expected to be motivated by punishment or threat of punishment. Although this may not be true for all organizations, the company used in this study is well known for its positive human resource policies and thus the threat of punishment is unlikely to be a relevant motivator. Certainly, future research might include a measure of organizational culture and draw hypotheses in which impulsivity is related to achievement in a reward-oriented culture whereas anxiety is related to achievement in a punishment-oriented culture.

As was expected from previous research (Corr & Gray, 1995a,b; 1996; Seligman & Schulman, 1986), Co-Pos and Co-Neg were generally significantly predictors of the motivational criteria. These results are best explained in terms of the link between a positive attributional style and a learning goal orientation that generally leads to higher sales goals, performance, and achievement. Thus positive sales people learn to strive harder and apply more effort whereas less positive sales people tend to avoid negative judgements and withdraw from the task as might be expected from a performance goal orientation (Dweck & Leggett, 1988; Elliott & Dweck, 1988; Harmon et al., 1994; Phillips & Gully, 1997; Sujan, 1986; Vandewalle & Cummings, 1997). The motivational basis of Impulsivity is further supported by its significant correlation with Co-Pos, although it is not significantly correlated with Co-Neg.

Multiple regression results indicated that Impulsivity was a better predictor of Goals and Goal achievement than attributional style, and added to Co-Neg in the explanation of Performance. Impulsivity therefore appears to be a better predictor than attributional styles with two of the criteria and an additional predictor to Co-Pos with one of the criteria.

A positive attitude towards money could also be seen as a direct motivator towards success in the sales industry. Correlational results suggest that a positive financial locus of control (i.e. wanting to take control of one's financial situation) and having a positive financial image are significantly related to Goal achievement whereas need for financial security is significantly correlated with goals set and performance. These results suggest that attitude towards money could be a useful and indirect measure of sales potential. It appears that interest in money predicts performance in an industry that is dominated by money (Amabile et al., 1994; Johns, 1998; Richins & Rudmin, 1994; Wright, 1992).

Multiple regression results suggest that Impulsivity provides a better explanation of Goals and Performance than interest in money and suggest that Impulsivity adds to the variance explained by interest in money with regard to Goal achievement. Hypothesis 2 is therefore generally supported as Impulsivity is shown to be a more important predictor of goal-oriented criteria than either attributional style or interest in money.

Overall, Impulsivity appears to be the only consistent and the best overall predictor of the motivational criteria. Results from this study provide reasonably strong evidence in favour of

Impulsivity as being a measure of motivation to succeed within the work place, and of Gray's model in which Impulsivity is seen as a measure of response to reward. Scales of personality representing a biological basis therefore seem to have utility in predicting occupational criteria (as emphasised by Eysenck, 1997).

The results also suggest that motivational scales can explain a reasonable percentage of variance in goal-oriented criteria. An additional 4, 10 and 19% of variance in Goals set by organisations, Performance and Goal achievement respectively, was explained by one or more of the predictor scales used in this study. These results suggest that individual differences can explain a significant amount of variance in goal-oriented behaviour and add to the research already conducted in the contribution of individual differences to the self-setting of goals (Campbell, 1982; Hollenbeck & Brief, 1987; Phillips & Gully, 1997). The differences between the criteria in the amount of extra variance explained are explainable in terms of the nature of the criteria. Goal achievement is much more likely to be within the sphere of control of sales people than their goals set by the organization and their performance. Consequently, it is Goal achievement which is most related to the predictor variables. That motivational scales are also related to Goals set by the organisation and Performance supports the possibility that motivated sales staff are likely to be awarded the better geographical areas with consequent higher goals set and likely higher performance.

This study is the first comparison between Eysenck's and Gray's models of personality with regard to prediction of behaviour in the workplace. The results should be seen in the context of other evidence such as that collected from EEG studies, event-related potentials, electrodermal and cardiovascular activity, conditioning, attention and vigilance (Matthews & Gilliland, 1999).

Several limitations need to be noted with regard to this study. First, the significant correlations between predictor scales and criteria are not large (in fact, at a similar level to those reported by Seligman & Schulman, 1986). This suggests that the individual usefulness of the predictor scales is relatively modest. Second, scales of Impulsivity and Anxiety from the EPP were used to represent Gray's BAS and BIS. Whereas the positive results reported in this study should be seen as a validation of these scales for use in this context, further work needs to be conducted to support this view. This could be done in conjunction with other scales already developed for this purpose but which so far have been unconvincingly validated (MacAndrew & Steele, 1991; Wilson et al., 1989). A third limitation might be that Gray's model was compared to Eysenck's model, and yet both are outside the framework of the 'big-five' model (Goldberg, 1990; Norman, 1963) which presently seems to dominate trait theory. Such a comparison would be a very useful extension to this study, because Conscientiousness is the closest 'big-five' scale to Impulsiveness (Zuckerman et al., 1999) and results of meta-analyses suggest that high Conscientiousness predicts performance in the work-place (Barrick & Mount, 1991), which is the *opposite* to high Impulsivity as reported in this study. This is surprising since Impulsivity and Conscientiousness are the opposite ends of similar scales. It may be that this apparent conflict can be resolved by better understanding the differences between Impulsivity and Conscientiousness, by reference to the different cultures that exist in organizations, by reference to the different criteria used in studies or by reference to the different jobs that have been used in different studies.

Finally, it should also be noted that the causal direction of the relationships reported in this study was not tested. Result of this study could be interpreted as suggesting that good sales performance etc. may lead to higher sensitivity to reward. However such an interpretation does not lessen the importance of the demonstrated link between impulsivity and occupational success.

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