

# ATTRIBUTIONAL STYLE, SOCIALIZATION AND COGNITIVE ABILITY AS PREDICTORS OF SALES SUCCESS: A PREDICTIVE VALIDITY STUDY

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**Summary**—The role of attributional style, socialization and cognitive ability factors in insurance sales performance was investigated in a 1-yr predictive validity study conducted within a large U.K. company. Psychometric tests were selected to measure specific and general aspects of the job: (1) attributional style (motivational resilience), (2) socialization (inter-personal skills), and (3) numerical and abstract reasoning abilities (specific cognitive skills). Performance was defined in terms of number of appointments/prospects obtained (*effort*) and number of policies sold (*sales*). Two sets of psychological predictors were analysed: (1) individual psychological measures and (2) pairs of interactive psychological measures. The results showed that: (1) positive attributional style was positively correlated with *effort* but negatively correlated with *sales*. The interaction variables revealed complex interactions between attributional style and cognitive abilities which led to a fourfold increase in predictive variance. The results are discussed in terms of the validity of attributional style in predicting performance and the utility of applying interaction models to personnel selection and job analysis.

## INTRODUCTION

Psychological testing in personnel selection has been the subject of much recent controversy. The criticisms of Blinkhorn and Johnson (1990; Johnson & Blinkhorn, 1994) have been particularly instrumental in fuelling debate within the academic community (e.g. Barrick & Mount, 1991; Jackson & Rothstein, 1993), and the wider business community (Fletcher, 1991), concerning the usefulness of psychological testing in occupational settings. Criticisms of psychological testing in personnel selection include: (1) poor identification and selection of measures of (a) personality/ability and (b) performance, (2) inadequate and flawed analysis of personality–performance relationships, and (3) low validity coefficients rendering psychological testing of little practical value (the last criticism has been directed particularly towards personality measures). To these three major criticisms may be added others [the effects on validity of poor test administration procedures, sex/ethnic bias, inappropriate choice of tests, etc. (see Fletcher, 1993)].

Despite these criticisms there remains a wide-spread consensus among occupational psychologists that personality and cognitive abilities testing makes a valuable contribution to human resources management (Jackson & Rothstein, 1993). Proponents of psychological testing in the work place may quote empirical studies in support of their position. For example, Barrick and Mount (1991) showed the relevance of the 'big-5' model of personality to a range of performance measures. In addition, experimental evidence in favour of the trait approach to personality psychology (Dreary & Matthews, 1993) may be cited in support of the theoretical rationale for the continued use of trait measures of personality in the work place.

This paper focuses upon the three major criticisms outlined above, concentrating specifially upon: (1) the identification of individual difference measures for predicting sales success, (2) methodological approaches to evaluating validity, and (3) the practical value of psychological testing to organizations. The issues involved are discussed in the context of a 1-yr predictive validity study conducted within a large U.K. insurance company.

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#### Identifying the psychological attributes in insurance sales

There are many different ways to identify the important psychological factors which underly work performance (e.g. critical incident, various forms of job analysis). For some occupational positions a thorough delineation of the nature of the job is required in order to identify relevant competences (especially for senior management positions). This involves essentially an exploratory, empirical approach. A second way to identify important psychological attributes is to apply a theoretically-driven approach based upon the hypothesized match between, on the one hand, performance measures and, on the other hand, psychological variables which have some degree of established construct validity. One immediate advantage of the *construct validation approach* is the reduction in the number of psychological variables sampled, and thereby reduced chance of spurious relationships emerging in the validation data. This theory-driven approach is particularly apt for organizations who do not wish, or are unable, to conduct a more conventional job analysis, and for jobs which are relatively well defined in terms of the predicted psychological factors of importance.

The selling of insurance makes a number of peculiar personality/motivational and cognitive demands. Salespeople encounter frequent criticism and rejection and this, not unexpectedly, leads to lowered self-esteem and feelings of dejection, with a consequent drop in motivation (a type of job specific depression). The principal source of this negative reinforcement (i.e. the client) is thus avoided and performance is thereby impaired (this negative response tends to generalize to other work-related aspects, such as management, colleagues, etc. producing a generalized negative effect on all aspects of work performance). The fact that such a high proportion (approx. 40%) of new recruits to insurance companies resign within the first year of employment, with this percentage sometimes rising to 80% within 2 yr, testifies to these negative effects (notwithstanding other reasons for quitting).

However, the frequent rejection and criticism encountered by salespeople is compensated to some degree by the high financial rewards associated with sales success. Therefore, the combination of: (1) potential high rewards (motivation) and (2) the fear and actual occurrence of rejection (demotivation) places the salesperson in a classic 'approach-avoidance' situation: salespeople are motivated by success but also, at the same time, demotivated by failure. The balance of these motivational forces determines the strength of goal-oriented motivation and the extent to which sales potential is translated into sales performance.

The actual selling of insurance products is an intellectually challenging business. Financial products are becoming increasingly complex and regulatory bodies exist to enforce high standards of professional conduct. The public image of the typical salesperson belies the intellectual skills required to perform the job to even a satisfactory standard. In consequence, occasional lapses in professional standards may often be traced to failures in intellectual functioning rather than to failures in ethical probity.

To a greater extent than most other occupations, selling is essentially a process of inter-personal transactions. Clients must be approached and empathic relationships formed, and these relationships must withstand the pressure of rejection/criticism.

Taking these factors into account, a number of psychological attributes would seem essential to successful financial sales performance. (1) Intelligence is required to understand and explain complex financial products to clients; (2) motivational resilience is required to overcome frequent rejection; and (3) strong interpersonal skills/capability is required in order to initiate and effectively control the interpersonal selling process.

## Psychological tests of insurance selling

The above considerations guided the identification and selection of psychological measures in the 1-yr predictive study. Three main sets of measures were chosen: (1) attributional style (to measure reactions to potential reward and failure); (2) abstract and numerical reasoning (measuring two important aspects of intelligence required in the financial services sector); and (3) socialization (to measure capacity/willingness to engage in interpersonal transactions). The selection of attributional style and socialization measures in this study calls for special consideration.

Attributional style is a measure of individual differences in the explanation of favourable and unfavourable events (Abramson, Seligman & Teasdale, 1978; Seligman, Abramson, Semmel & von Baeyer, 1979). Individual differences in attributions have been related to many forms of pathological

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[e.g. clinical depression (Sweeney, Anderson & Bailey, 1986)] and normal [e.g. sports achievement and commercial success (Seligman, 1991)] behaviour. The theoretical background to the importance of attributional style in insurance sales is discussed by Corr and Gray (submitted).

People who are prone to attribute favourable events to internal, stable and global factors (high positive attributional style; CoPos), and who attribute unfavourable events to external, unstable and specific factors (low negative attributional style; CoNeg), are most likely to be motivated by success and most resilient in the face of criticism/rejection. Thus, those high in positive attributional style and/or those low in negative attributional style should perform best in psychologically challenging situations. The selling of insurance is one such situation.

Seligman and Schulman (1986) tested the hypothesis that attributional style is important in insurance selling. Two studies were conducted, one concurrent and one predictive. The concurrent study showed that high levels of negative attributional style impair sales performance. The predictive study showed that the difference between positive (CoPos) and negative (CoNeg) attributional style correlated with amount of insurance sold and the rate of quitting. These data confirmed that optimistic individuals sold more insurance and were less likely to quit as compared with their less optimistic colleagues.

Corr and Gray (1991, submitted) conducted a concurrent validation study in a large U.K. insurance company. The results showed that positive attributional style predicted: (1) amount of business sold (defined in monetary terms), (2) ratings of (a) business knowledge, and (b) relationships with clients and colleagues, and (3) national rank order (based upon a composite performance measure) of salespeople. Thus, in both the U.S.A. and U.K., attributional style has been found to be related to sales success; although it appeared that while in the U.S.A. low CoNeg is important, in the U.K. high CoPos is the more important measure.

Socialization represents the opposite pole to such traits as tough-mindedness, asociability and (at the clinical extreme) sociopathy. Socialization has been used to measure the disposition to criminal and antisocial behaviour (Rosen & Schalling, 1974), but in the normal range of scores it is assumed to measure nothing more than a preference for adhering to societal rules and conventions of behaviour. Importantly, it is related to preference for (high socialization) or aversion to (low socialization) warm human relations (Gough, 1969).

## Estimating validity

Having identified putative psychological predictors of performance, the next problem for the applied psychologist is to assess their actual empirical value. Although 'template matching' (comparing candidates with the 'ideal candidate' profile) is often preferred to conducting empirical studies, this is an approach of limited scientific value (see Kline, 1993). Therefore, some form of statistical approach is required in order to evaluate the usefulness of psychological testing in any given organizational context.

The usual approach is to compute correlations between psychological variables and performance. However, Blinkhorn and Johnson (1990) criticized this practice, pointing to the common procedure of computing numerous correlations between a large number of personality and performance measures with the result that many apparently significant relationships are due to nothing more than chance association. A second approach is to apply multiple regression to estimate the best linear combination of psychological variables to predict performance. It is a common practice to compute separate regression models for each performance measure. But this too can be problematic, if adequate safeguards are not taken against capitalization upon chance (Dillon & Goldstein, 1984).

Multivariate techniques are suitable for reducing the chances of spurious correlations by reducing performance measures to a small number of components (by using Principal Components Analysis). An alternative strategy is to form a composite measure of performance based upon weights which reflect the importance of individual performance measures in the client organization. Still another multivariate technique is Canonical Correlational Analysis, which provides the best fit between linear combinations of psychological variables (the predictor factors) and linear combinations of psychological variables (the outcome factors). This technique combines aspects of both factor analysis and multiple regression.

No one technique can be said to be best for all possible situations. Perhaps the simplest and most

robust approach is to form a linear performance factor based upon an importance weight attached to each individual measure and then perform one multiple regression using a sequential method to enter variables into the model (thus further reducing the possibility of spurious artefacts; see Results).

Another consideration in assessing validity is the function that is assumed for the relationship between personality/ability and performance measures. Handyside (1992) has pointed to the possibility that some relationships may not be linear. For example, performance may increase with intelligence up to a critical point beyond which increasing levels of intelligence may result in lowered levels of performance.

Now, although the above concerns are essentially methodological, they conceal a fundamental theoretical issue concerning validity estimation. Commonly, if not universally, validity studies employ a set of measures of personality/ability and use these singly to predict performance. Indeed, by various statistical techniques (e.g. partial correlation), the influence of these measures is deliberately rendered independent. However, this statistical methodology assumes a tacit theoretical model: that performance is influenced by separate psychological factors and that the influence of these factors is independent of the influence of other factors. This is a rather strong assumption and one that is open to challenge.

A persuasive argument could be made for the alternative assumption, namely that performance is affected by the *joint* action of many different aspects of personality, abilities, motivation, etc. As in other areas of psychological investigation, performance variance may be explained by the interaction of personality/ability measures. Testing for main effects of personality/cognition on job-specific performance may fail to uncover the complex interaction of psychological variables in influencing performance. It is a distinct possibility that the conventional focus upon main effects, to the relative neglect of interaction effects, may account for the low validity coefficients which are found in even the best validation studies [hovering around the 0.20–0.30 level (e.g., Sinclair & Barrow, 1992)].

This paper has two complementary aims: (1) to examine the predictive power of measures of attributional style, socialization and cognitive abilities factors in sales performance, and (2) to assess the value of considering the interactions between these variables. These two aims serve the major objective of showing how validity coefficients may be improved and how this can make a significant contribution to personnel selection procedures.

#### METHOD

## **Subjects**

One-hundred and ninety-six recruits to a large insurance company were tested during their initial induction period. They had been selected on the basis of interview and a sales aptitude test (Poppleton and Allen Sales Aptitude Test; PASAT). The PASAT measures 15 primary factors, including *social sophistication, emotional resilience, empathy*, and *self-confidence*. The sample was therefore highly selected and represented a restricted sample of the general population. Ss were tested over a 6-week period. Compliance was 100%. Mean age was 32 yr (SD = 6.17; range: 21–46). Five employees were female.

#### Psychometric materials

The Seligman Attributional Style Questionnaire [SASQ (Peterson, Semmel, von Baeyer, Abramson, Metalsky & Seligman, 1982)] was used to measure attributional style. This presents Ss with 12 situations (e.g. "You do a project which is highly praised"), six favourable and six unfavourable. Ss are required to think about each situation in turn and then write a cause (attribution) for each situation. Then Ss rate the situation on three seven-point scales: (1) internal-external, (2) stable-unstable, and (3) global-specific. This instrument yields two main measures: (1) positive attributional style (CoPos) and (2) negative attributional style (CoNeg). The SASQ does not provide or restrict the causal attribution given for each of the 12 situations, but it does yield a simple and objective measure of each of the three scales. Composite measures are the sum of scores across the three scales of each of the six situations.

The abstract ("Non-Verbal Test") and numerical reasoning ("Numerical Test") measures were

taken from the General Ability Tests [GAT (Smith & Whetton, 1988)]. These are timed tests taking less than 30 min each to complete.

The socialization scale of the Californian Psychological Inventory [CPI (Gough, 1969)] was used to measure interpersonal relations. This socialization scale is conceptualized by Gough (1960) as a dimension representing the capability of taking the role of the generalized other [i.e. role taking (Gough, 1960)]; and it reflects the strength of symbolic representation of social interactions (Rosen & Schalling, 1974).

This questionnaire is a 54-item true/false pencil and paper test which takes approx. 15 min to complete. At the high end of the socialization scale are traits of conformity, sociability, empathy, and emotional warmth; at the low end of the pole are traits of tough-mindedness, aloofness, asociability, emotional coldness, as well as an inability to respond to social cues with appropriate behaviour and emotion.

## Performance data

After 12 months, performance data were collected on Ss remaining in the company (N = 127, i.e. 35% had left). Complete data sets were obtained for 81 employees (data for the other 46 employees were either incomplete or unobtainable for administrative reasons). No other exclusion criteria were applied to the data.

Performance data comprised number of: (1) appointments and prospects, and (2) different types of policies sold. The data were sampled over a 9-week period. A weekly mean was calculated from these data taking into account missing data, holidays, etc. For the purpose of this analysis, two performance criteria were adopted: (1) *effort* = number of appointments + number of prospects, and (2) *sales* = total number of policies sold. Equal weight was applied to each type of policy.

### Procedure

Ss were tested in groups (20–40) under timed instruction for the numerical and abstract reasoning tests (administered before the personality measures). They were presented with an information sheet and examples of items in accordance with the test publisher's recommendations. Verbal instructions were read from the test publisher's administration card by the test administrator. Testing sessions were run by psychologist-trained managers. Ss were told that their scores would remain confidential and would in no way affect their success at the induction centre.

#### RESULTS

Table 1 shows the means, standard deviations, medians and Min–Max values for: (1) *effort* and *sales* performance, and (2) the psychological variables. The correlations between the psychological variables are given in Table 2. Cronbach  $\alpha$ s for CoPos and CoNeg were 0.84 and 0.85, respectively.

For the *effort* and *sales* measures, two analyses were conducted: multiple regressions of (1) individual psychological predictors (a 'main effects' model) and (2) all main and two-way interaction effects, i.e. interactions between pairs of psychological measures (an 'interaction effects' model). Age was also included as a variable of potential interest. The correlation between *effort* and *sales* was 0.162

Table 1. Means, standard deviations, medians and minimum and maximum (Min-Max) values for (1) *effort* and *sales* performance measures, and (2) psychological variables: (a) positive and negative attributional style (CoPos and CoNeg), (b) socialization, and (c) numerical and abstract reasoning

Measure	Mean	SD	Median	Min-Max
Effort	16.93	10.05	13.69	2.45-54.87
Sales	3.63	1.56	3.32	0.80- 9.50
CoPos	5.86	0.60	5.86	4.17~ 6.69
CoNeg	3.75	0.71	3.67	2.61- 5.61
Socialization	39.50	4.56	40.00	23-47
Numerical reasoning	21.25	5.86	22.00	9-34
Abstract reasoning	17.34	5.51	17.50	5-29

Table 2. Pearson product-moment correlations between positive and negative attributional style (CoPos and CoNeg), socialization, numerical and abstract reasoning, and age							
	CoNeg	Socialization	Numerical reasoning	Abstract reasoning	Age		

	CoNeg	Socialization	Numerical reasoning	Abstract reasoning	Age
CoPos	0.123	0.020	- 0.08	0.066	0.070
CoNeg	1.000	- 0.091	- 0.009	- 0.072	0.061
Socialization	1.000	1.000	0.073	0.026	0.084
Numerical reasoning	1.000	1.000	1.000	0.510*	- 0.056
Abstract reasoning	1.000	1.000	1.000	1.000	- 0.383*

\* P < 0.05; two-tailed. N = 196.

(n.s.). Complete personality/ability and performance data were available for only 81 Ss; regression analyses are based upon this number.

The computation of the interactive multiple regression models was based on the 'moderated regression approach' (Baron & Kenny, 1986). These models are logically comparable with interaction models in analysis of variance (ANOVA), and the results may be interpreted in a similar manner (Aiken & West, 1991; Friedrich, 1982). Interaction variables are formed from the cross-product of standardized variables.

All multiple regressions used stepwise inclusion of variables and a 'probability to enter' (PIN) of 0.15. The analyses were performed on SPSS<sup> $\chi$ </sup>, and all data were standardized prior to analysis. For the main effects model, the following variables were analysed: (1) abstract reasoning, (2) numerical reasoning, (3) positive attributional style (CoPos), (4) negative attributional style (CoNeg), (5) socialization, and (6) age. For the interaction effects model, all possible two-way interactions were computed between these variables; these were included alongside the main predictor effects. It may be noted that higher order interactions may also be computed, as in conventional ANOVAs, but this inevitably adds to complexity of analysis and interpretation of results.

Table 3 shows the regression models for *effort*; Table 4 shows the same for *sales*. In each case, separate statistics are given for the main effects models and interaction effects models. The regression statistics are shown for the final model only.

### Effort

Table 3 shows that, for the main effects model, sales *effort* was related positively to both positive attributional style (CoPos) and socialization (as predicted), and negatively to age. This shows that *effort* is highest among young salespeople who are high in positive attributional style and interpersonal skills.

The percentage of variance explained in the interaction effects model fell slightly from that explained in the main effects model. This is attributed to the different predictor variables in the model and the use of stepwise inclusion of variables. In terms of statistical significance the two models did not differ.

For the interaction effects model, CoPos and socialization were once more significant. Independent of, and in addition to, the main effects of CoPos and socialization, an interaction term was observed for CoPos × Age (Fig. 1). The direction of the interaction weight (negative  $\beta$ ) showed that the effect of CoPos on *effort* was less predictive the older the salesperson. This is an interesting finding because it modifies the conclusion which would have been drawn from the main effects model: now, it cannot be concluded that older salespeople are lower on *effort per se*. Figure 1 shows that CoPos was more predictive of performance in young Ss, and that with age this variable became less important. Nonetheless, *effort* was greatest among young optimistic Ss.

Table 3. Results of multiple regression of *effort* for: (1) main effects model and (2) interaction effects models of personality, ability and age factors

Main effects model	β	Interaction effects model	β
CoPos Age Socialization Final model F = 3.85  d.f. = 3,77, P < 0.05; $R = 0.36, adj R^2 = 0.10$	0.19 - 0.20 0.17	CoPos Socialization CoPos × Age Final model F = 3.42 d.f. = 3,77, $P < 0.05$ ; $R = 0.34$ , $_{ady}R^2 = 0.08$	0.18 0.21 - 0.17



Fig. 1. Regression of *effort* on positive attributional style (CoPos) in young (<32 yr) and old (>32 yr) salespeople (split at the median). There is a strong regression of *effort* on CoPos in young sample, such that high CoPos predicts high levels of *effort*, while low CoPos predicts low levels of *effort*. Older salespeople outperform younger salespeople only at the very low end of CoPos.

## Sales

Table 4 shows, for the main effects model, that CoPos was positively related to *sales* success, but that socialization, though positively related to *effort*, was negatively related to *sales*. So, although salespeople high in socialization made more appointments and obtained more prospects, they did not convert these into actual sales; indeed, it seemed that their *effort* impaired their *sales* performance.

The interaction effects model showed that when interactions were considered socialization no longer predicted sales performance. Significant interactions appeared between: (1) abstract reasoning and negative attributional style (CoNeg), (2) abstract reasoning and age, and (3) abstract reasoning and numerical reasoning. These effects are shown in Figs 2–4.

Abstract reasoning  $\times$  CoNeg interaction: Fig. 2 clearly shows that high negative attributional style was deleterious to sales in the low abstract reasoning group; in the high abstract reasoning group, CoNeg was positively related to *sales*.

Abstract reasoning  $\times$  age interaction: Fig. 3 shows a crossover interaction revealing that high abstract reasoning impaired sales performance in older Ss but improved performance in younger Ss;

 Table 4. Results of multiple regression of sales for: (1) main effects model and (2) interaction effects models of personality, ability and age factors

β	Interaction effects model	β
0.20	Abstract IQ × CoNeg	0.43
- 0.18	Abstract IQ × age	- 0.22
	Abstract IQ × numerical IQ	- 0.21
	Final model	
	F = 6.02  d.f. = 3,77, P < 0.01;	
	$R = 0.44, \ _{adj}R^2 = 0.16$	
	β 0.20 - 0.18	β Interaction effects model 0.20 Abstract IQ × CoNeg - 0.18 Abstract IQ × age Abstract IQ × numerical IQ Final model F = 6.02  d.f. = 3.77, P < 0.01; $R = 0.44, \text{ adj}R^2 = 0.16$



Fig. 2. Regression of *sales* on negative attributional style (CoNeg) in low and high abstract reasoning salespeople (split at the median). Regressions show high CoNeg is strongly and positively related to *sales* in high abstract reasoning salespeople, but in low abstract reasoning salespeople, CoNeg is strongly and negatively related to *sales*.

and low abstract reasoning improved performance in older Ss but impaired performance in younger Ss.

Abstract reasoning  $\times$  numerical reasoning interaction: Fig. 4 shows a crossover interaction which indicates that high levels of both abstract reasoning and numerical reasoning impair performance. Superior performance is observed only for those high in one measure and low in the other measure.

#### DISCUSSION

The results confirm the prediction that high levels of positive attributional style enhance performance as measured in terms of sales *effort* and actual number of policies sold (*sales*). This finding replicates the results obtained from a study of concurrent validity previously conducted in a different U.K. insurance company (Corr & Gray, 1991, submitted), and provides further evidence to support the claim that attributional style is a causal (trait) influence on sales success rather than a (state) consequence of being successful at selling (Seligman & Schulman, 1986).

The personality, ability, and age measures (Table 2) showed few significant correlations. Positive attributional style was not significantly correlated with negative attributional style, and neither attributional measure was correlated with any of the ability measures. The only significant correlations were between abstract and numerical scores, and abstract reasoning and age (age was negatively related to abstract reasoning scores).

Age was negatively related to *effort*, but this effect was partly explained by the interaction with CoPos in the interaction model (Table 3, Fig. 1). This revealed that only older salespeople who are low in optimism make poor salespeople, and that optimism is less predictive in older salespeople than in younger salespeople. This is an important finding because the more conventional main effects model suggested that age *per se* was negatively related to performance.



Fig. 3. Regression of *sales* on abstract reasoning in young (<32 yr) and old (>32 yr) salespeople (split at the median). Young salespeople high in abstract reasoning outperform young salespeople who are low in abstract reasoning; the reverse pattern of results holds for older salespeople.

Socialization, or the willingness/ability to engage in the interpersonal process of selling, was positively related to *effort* as predicted, but it was found to be negatively related to actual *sales* (Tables 3 and 4). So although high socialization Ss approached more clients they actually sold fewer policies. This might be interpreted as showing that emotional warmth and empathy are opposed to the tough-mindedness required to close the sale.

For *sales* performance, the percentage of variance explained rose from 4% in the main effects model to 16% in the interaction effects model: a fourfold increase in predictive utility. This substantial increase in predictive validity was found even after adjusting for the increased number of predictor terms in the model. Although the pattern of the interactions was not predicted, they nevertheless were open to interpretation. Overall the results suggest that positive attributional style and socialization were secondary to the interaction of abstract and numerical reasoning and age.

The results indicate that a negative attributional style enhances *sales* performance among salespeople high in abstract reasoning (Table 4, Fig. 2). This may be interpreted as showing that pessimism mixed with high abstract reasoning ability places the salespeople at a relative advantage perhaps by virtue of a more realistic perspective on sales prospects.

The finding that salespeople with high abstract reasoning who are older do less well than their younger colleagues is open to a number of different interpretations (Table 4, Fig. 3). It is possible that the older applicant with high intelligence is attracted to insurance sales only because there are few alternative jobs available during times of recession (the study was conducted at the height of the early 1990's recession). Although equipped cognitively for the job, such salespeople may be inadequately motivated and suffer more than most from the motivational challenges of the work. This interpretation is perhaps supported by the final finding that high levels of abstract and numerical reasoning, regardless of age, seemed inimical to sales performance (Table 4, Fig. 4). Assuming that highly intelligent salespeople are more competent than their less gifted colleagues, then a motivational



Fig. 4. Regression of *sales* on numerical reasoning in low and high abstract reasoning (A-R) salespeople (split at the median). High levels of abstract reasoning predict superior *sales* performance only in those salespeople with a low numerical reasoning score. High levels of numerical reasoning predict superior performance only in those with a low level of abstract reasoning.

explanation would well account for these findings. Indeed, as Fig. 4 clearly shows, the worst sales performance was shown by the high intelligence group.

In lieu of theoretical predictions, it would be inappropriate yet to apply the results from the interaction models for selection of personnel. Replication and further study would be required to confirm the robustness and validity of these findings. However, the results suggest that, as a general analytical approach, interaction models may be pursued with confidence.

The major difference between the results reported in this paper and the U.S.A. data (Seligman & Schulman, 1986) is the importance in the U.K. of positive attributional style (CoPos) rather than negative attributional style (CoNeg) or the difference between CoPos and CoNeg. This difference is open to several possible explanations.

The first is suggested by the abstract reasoning  $\times$  CoNeg interaction. It is possible that the U.S.A. industry attracts applicants with relatively low abstract reasoning. If this were the case then there should be a negative correlation between CoNeg and performance (see Fig. 2).

There may be a second possible reason for this U.S.A./U.K. discrepancy. Based upon the reformulated model of depression (Abramson *et al.*, 1978; Seligman *et al.*, 1979), the relative importance of CoPos and CoNeg should be dependent upon the frequency and severity of favourable and unfavourable events. CoNeg should be influential only when unfavourable events predominate over favourable events (i.e. where a resistance to depression is important). Where favourable events predominate over unfavourable events, then CoPos should be the more important of the two attributional measures. Perhaps there are differences in the relative frequency of favourable and unfavourable events in the U.S.A. and U.K. insurance industries that may give rise to the difference in results.

A third explanation relates to the extent to which the SASQ is subject to response distortion (especially, faking). Schulman, Seligman and Amsterdam (1987) conducted two experimental studies

to test the 'fakability' of the test. In general, the data suggested that the SASQ was not transparent and could not be faked, although there was a difference between the control and incentive groups on CoPos in one of the studies (Study 2). In the U.K. the picture is slightly different. Data collected by Corr and Gray (unpublished) within a large insurance company show that, while the correlation between the Eysenck Personality Questionnaire [EPQ (Eysenck & Eysenck, 1975)] Lie scale with CoPos is nonsignificant (r = 0.041, d.f. = 131, P > 0.05), the correlation with CoNeg is significant although small in magnitude (r = -0.193, d.f. = 125, P < 0.05), suggesting that the scores on CoNeg are more easy to distort than on CoPos. Whereas Schulman and Seligman used university students, Corr and Gray tested newly recruited salespeople. The insensitivity of CoPos to faking may therefore account for its robustness in predicting performance.

The results from the main effects models show that personality measures are predictive of sales performance and therefore likely to be of substantial financial utility to organizations who engage in large-scale recruitment. The study illustrates that, in general, personality measures, and cognitive ability measures, can make a contribution to personnel selection. Therefore, the criticisms of Blinkhorn and Johnson (1990) and Johnson and Blinkhorn (1994) may need to be modified to take account of studies in which psychological attributes are carefully selected, and methodological considerations in assessing personality–performance relationships are not ignored.

One important caveat must be applied to these data: the sample was highly selected and restricted in range on a number of variables, not least of which was dispositional optimism. Ss had been selected on the basis of the PASAT test, which specifically measures sales aptitude. The observed correlations in the study may therefore be expected to be attenuated.

It is concluded that the results of the predictive study confirmed the main hypothesis that positive attributional style would predict *effort* and actual *sales*. Socialization was also found to enhance inter-personal contacts with clients, but this was inimical to acheiving actual *sales*. The contention that the interaction of psychological variables might provide a better fit between psychological and performance data was also supported. Further research should now be directed towards developing appropriate interaction models of job-related performance.

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