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Can emotional intelligence be measured and developed?

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Abstract
Emotional intelligence (EI) is a topic of growing interest. This article describes the design of a new tailored instrument to measure emotional intelligence, which was piloted on 201 managers. Data are presented showing its high reliability and validity. In particular, construct validity is demonstrated using the 16PF, Belbin team roles, Myers-Briggs type inventory and Type A behaviour. Seven elements (subscales) make up the total questionnaire – self-awareness; influence; decisive; interpersonal sensitivity; motivation; integrity; and resilience. These are defined in detail, and guidance is given on administration, and reporting which is done through an expert system. Advice on how the results can be used for personal development is also given. Finally, suggestions are put forward for further work on appropriate organisational cultures to reinforce emotional intelligence, and the issue of emotional intelligence and leadership.

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Introduction

In previous papers on emotional intelligence (Dulewicz and Higgs, 1998a; 1998b) the growing interest in, and topicality of, the concept of emotional intelligence was highlighted. Since the publication of these papers the level of interest has, if anything, grown (if measured through references in national and practitioner press). Furthermore, the author largely responsible for popularising the concept, Daniel Goleman, has produced a further book designed to explore the work-based applications of emotional intelligence (Goleman, 1998). However, as Dulewicz and Higgs (1998a) point out, the concept of emotional intelligence, as portrayed in the popular literature, is somewhat nebulous. They go on to review literature and attempt to pin-down and define this nebulous construct, using competency-based and personality factor (16PF and OPQ) scales. In reviewing the literature Dulewicz and Higgs (1998a) point out that the evidence underpinning the core proposition of Goleman (1996) is largely derivative and anecdotal. They examined the proposition that a combination of IQ plus emotional intelligence explains more variation in "success" in chosen careers than IQ alone. In their study they extend the variables impacting on "success" to include a third, competence-based variable which is labelled managerial quotient (MQ).

Using data gathered from 100 general managers for a seven-year follow-up study, the reliability, and construct and predictive validity of three scales were investigated. An EQ scale based on 16 relevant competencies showed highly promising reliability and validity, and was shown to consist of six independent factors, each also reasonably reliable. The results also showed the relevance of two other competency-based scales – intellectual intelligence (IQ) and managerial intelligence (MQ) – which both predicted organisational advancement. Taken together, however, the three scales had even higher validity, accounting for 71 per cent of the total variance on the level advancement variable.

One of the main conclusions from the earlier paper (Dulewicz and Higgs, 1998a) was that it is feasible to see a relationship between the concept of emotional intelligence and both measures of competency and broader-based measures of personality. Well-established and validated general measures of personality such as the 16PF (Cattell *et al.,* 1970) and the OPQ (Saville *et al.,* 1993) would appear to have features which relate directly to the elements of the construct of emotional intelligence. Also, they found indications that there are distinct associations between competency models and elements of emotional intelligence. One such competency model is the job competencies survey (Dulewicz, 1998) which was used to track individual advancement in a longitudinal study (Dulewicz, 1994; Dulewicz and Herbert, 1996; 1999). In reviewing the 16 PF and OPQ it is evident (on the basis of content analysis) that a sub-set of the factors from each questionnaire map onto elements of the definition of emotional intelligence derived from our previous analysis. Such relationships are also evident, on a content analysis basis, between a number of the JCS competencies and emotional intelligence. These relationships are described in the papers referred to above.

In the earlier study, data from the Henley GMC follow-up had been re-visited in order to examine the core hypotheses. The main measures employed, and their constructs, were:

- *EQ competencies:* the sub-set of the JCS questionnaire items which were identified as aligning with the content analysis of emotional intelligence (see Table I, which shows the competencies and the reliability and the factor loadings of each item);
- *16PF.EQ:* From the literature review (Dulewicz and Higgs, 1998a), it was possible to identify a sub-set of the factors in the 16PF which appear to be related to emotional

Table I
The EQ personal competencies and six factors, with alpha reliability and factor loading

Emotional intelligence (EQ) (61)	(Alphas) and loading
A sensitivity V achievement	(0.71)
Perceptive listening	0.78
Sensitivity	0.51
Flexibility	0.51
Achievement – orientation	–0.78
B Resilience	(0.71)
Stress tolerance	0.65
Resilience	0.81
C Influence and adaptability	(0.61)
Persuasiveness	0.73
Negotiating	0.72
Adaptability	0.67
D Decisiveness and assertiveness	(0.56)
Decisiveness	0.84
Ascendancy	0.65
E Energy vs integrity	(0.54)
Energy	0.81
Impact	0.62
Integrity	–0.56
F Leadership	(0.71)
Motivating others	0.84
Leadership	0.78

intelligence. Scores for these factors were used as a personality-based measure of emotional intelligence.

- *OPQ.EQ:* employing the same basis as used for the 16PF a personality-based measure of emotional intelligence using the OPQ was developed.
- *Level advancement:* based on the arguments outlined above, the key measure of success in organisational life was that of advancement in level of individuals within the organisation. This measure was directly available from the seven-year follow-up study.

Results of this study may be summarised as follows:

- The EQ competency scale and the six component factors all showed very respectable internal consistency and reliability.
- The three EQ factors correlated significantly with an independent and widely used personality type (A) measure and add further support to the construct validity of the EQ competencies scale.
- The total EQ scale, and one component factor, influence and adaptability, showed statistically significant relationships, and hence predicted advancement up the organisational ladder.

Such long-term validity evidence is very rare and provides strong support for the validity of these scales.

Almost all components of emotional intelligence appear to be well sampled by the EQ competencies (and 16PF EQ and OPQ EQ) with one exception. This is self-awareness, covering knowing and being in touch with one's own feelings; and using one's feelings to make decisions with confidence. The concept of self-awareness was strongly emphasised by Goleman (1996). However, this concept was implied in the earlier work by Gardner (1983) and made more explicit by Lazear (1991) who explored Gardner's term "intrapersonal sensitivity" and proposed that this construct could be defined as knowing oneself both consciously and cognitively. This view of self-awareness is concerned with inwardly-directed self-examination of identity, worth and feelings; in contrast with interpersonal intelligence which is projected outward to the behaviour, motivation and feelings of others. The competencies decisiveness and sensitivity might pick up some aspects of these constructs, but do not appear to measure them directly. This is not surprising since competencies are by definition behaviourally anchored, whereas these EQ constructs are concerned very much with internal states or "meta moods", as Goleman (1996) calls them, best measured by introspection. Unfortunately, OPQ and 16PF do not measure them directly either. If an appropriate measure had been available for this study, then the results might have shown even higher reliability and validity. Further work on developing a measure of self-awareness seemed to be called for.

Measurement of emotional intelligence

Throughout the literature on emotional intelligence there is considerable debate around the feasibility of measuring the construct (e.g. Goleman, 1996; Steiner, 1997; Stuller, 1998; Mathews, 1996). In broad terms Goleman (1996) suggests that a competence-based measure is more likely to yield an effective measure of emotional intelligence than a "pencil-and-paper" test. This point is reinforced in his more recent work which focuses on the relationship between emotional intelligence and the McBer competence model (Goleman, 1998). The problems of measuring emotional intelligence are highlighted by other authors (e.g. Steiner, 1997; Martinez, 1997; Fisher, 1998). In particular Fisher (1998) points to the difficulty of measuring self-awareness:

> It's very tough to measure your own emotional intelligence, because most of us don't have a very clear sense of how we come across to other people ... (p. 297).

The original study by the authors also identified the limitations of their competence-based measure in this respect. Having established the validity of a competence-based measure (Dulewicz and Higgs, 1998) it appeared feasible to develop a questionnaire-based measure to capture the competences on a self-report basis and, furthermore, to capture the missing elements which related to self-awareness.

The current study

In spite of the acknowledged difficulties in measuring emotional intelligence validly, the appetite for such tests and abundance of unvalidated attempts to provide a single measure are evidenced by the number of self-score questionnaires available in popular journals and the Internet (Fisher, 1998).

Building from the earlier study (Dulewicz and Higgs, 1998a; 1998b), the authors developed a questionnaire designed to assess, on a self-report basis, an individual's level of emotional intelligence. The details of this questionnaire's development and results of the study are reported below.

Emotional intelligence questionnaire design

The questionnaire was designed from the literature survey of emotional intelligence and relevant personal competences (see Dulewicz and Higgs, 1998a). Items were drafted to capture the meaning of the behaviours related to the personal competences, and shown to be good predictors of success, and other elements of emotional intelligence identified as being of potential relevance to the new scale (derived from the literature review in Dulewicz and Higgs, 1998a), together with items designed to sample the under-represented sub-construct of self-awareness. In the original prototype version of the questionnaire, 72 items appeared.

Pilot study and the sample

The new draft questionnaire was piloted on 201 managers who attended the senior management programme, various MBA programmes, and the DBA programme at Henley Management College during September 1998. Details of the biographical data of the sample appear in Table II. The average age of the subjects was 35.5 years; their salary was £51,400 p.a., and budget £32.2 million p.a., and they worked just over two levels below their respective CEO on average. Looking at the total sample, 76 per cent were male, and 80 per cent worked in the private sector. Turning to their nationality, 65 per cent were from the UK or Eire, 11 per cent were from the rest of Europe and the remaining 25 per cent were from all other parts of the world.

Participants were asked for their views immediately after the testing sessions, which were held under strict psychometric assessment conditions. No adverse reactions about the overall questionnaire were received, and critical comments were made about six individual items. Time taken to complete the questionnaire varied from 15 to 25 minutes.

Item analysis

The authors adopted a conceptual, deductive approach to design, based upon the framework and model derived from the review of the literature. This method of test construction produces what Saville *et al.* (1993) refer to as homogeneous item clusters (HICs). Item analysis was conducted using part-whole correlations, and involved five iterations. A principal components (factor) analysis was also conducted, and 24 independent factors emerged. Reference to these was made throughout the iteration process. Split-half and Cronbach Alpha reliability techniques were also used (see results section below for details). On the basis of these analyses, seven separate elements of emotional intelligence were identified. These are defined in the section below. Three items were dropped because of low part-whole correlations, so the original 72 items were reduced to 69. To have retained these would have reduced the reliability co-efficients of the elements and total scale.

Emotional intelligence scale descriptions

The seven sub-scales (elements) which contribute to emotional intelligence are defined below:

1. *Scale a: self-awareness*. The awareness of one's own feelings and ability to recognise and manage these feelings in a way which one feels that one can control. This factor includes a degree of self-belief in one's ability to manage emotions and to control their impact in a work environment.
2. *Scale b: emotional resilience*. This scale reflects the ability to perform consistently in a range of situations under pressure and to adapt behaviour appropriately. The facility to balance the needs of the situation and task with the needs and concerns of the individuals involved and the ability to retain focus on a course of action or need for results in the face of personal challenge or criticism are also encompassed within this scale.

3 *Scale c: motivation.* This scale covers the drive and energy to achieve clear results and make an impact and to balance both short- and long-term goals with an ability to pursue demanding goals in the face of rejection or questioning.
4 *Scale d: interpersonal sensitivity*. Interpersonal sensitivity relates to the facility to be aware of, and take account of, the needs and perceptions of others in arriving at decisions and proposing solutions to problems and challenges. The ability to build from this awareness and achieve "buy in" to decisions and action ideas; the willingness to keep your own thoughts on solutions open and actively listen to, and reflect on, the reactions and inputs from others are also aspects of this scale.
5 *Scale e: influence.* The ability to persuade others to change a viewpoint, based on the understanding of their position and the recognition of the need to listen to this perspective and provide a rationale for change, are core elements of this scale.
6 *Scale f: decisiveness.* This scale is concerned with the ability to arrive at clear decisions and drive their implementation when presented with incomplete or ambiguous information, using both rational and "emotional" or insightful perceptions of key issues and implications.
7 *Scale g: conscientiousness and integrity.* The ability to display clear commitment to a course of action in the face of challenge and to match words and deeds in encouraging others to support the chosen direction is core to this scale together with the personal commitment to pursuing an ethical solution to a difficult business issue or problem.

Table II
Biographical details of the sample

Variable	*N*	Min	Max	Mean	Std. Dev
Age	196	22	54	35.5	6.53
Salary (£K)	177	5.2	294	51.4	36.86
Budget (£M)	103	0.01	900	32.2	100.65
Number of staff	167	0	3,000	77.4	294.79
Levels to CEO	183	0	8	2.2	1.68
	N	**Percent**			
Gender					
Male	153	76			
Female	47	24			
Sector					
Private	152	80			
Public	38	20			
Nationality					
UK and Eire	131	65			
Europe	23	11			
Scandinavia	11	6			
Africa/Caribbean	5	3			
Asia/Pacific	13	7			
North America	5	3			
South America	1	1			
India	5	3			
Australia/South Africa	7	4			

Note: Gender and sector numbers and percentages exclude missing data; percentages rounded up

Results

Intercorrelations between scales

The intercorrelations between the seven elements of the test, and the total score, appear in Table III. It can be seen that, with the sole exception of the correlation between interpersonal sensitivity and decisive, all the coefficients are highly statistically significantly correlated with each other, and thus measure similar, related constructs. In other words they appear to be measuring slightly different aspects of the same thing, since they all show high correlations with the total scale, even the two exceptions noted above, which are independent of each other, but not of the total.

Scale scores and biographical data

Correlation coefficients between scores on the seven elements and total score, and continuous biographical variables were examined. (These were: age; salary; budget responsibility; number of staff for whom the manager is ultimately responsible; the number of organisational levels between the manager, the CEO; and the "rate of advancement" measure derived from the ratio of age to salary). The results showed only one significant relationship. Age was the only variable to be significantly correlated with an EI element measure – sensitivity – with older people tending to be more sensitive.

Three biographical measures – gender, sector and nationality – were categorical, and therefore "*t*-tests" were used to investigate differences on scale scores. No significant differences were found between males and females on any of the scales, and on only one element were significant differences found for sector and nationality. Public sector managers obtained significantly higher scores on conscientiousness and integrity than did their private sector counterparts, and UK managers were found to be more decisive than those from overseas. (Since the numbers from many specific geographical areas were very small, the analysis compared UK and Irish managers with "overseas" managers.)

Taking all these results into account, scores on the overall EI measure and on the element scales appear to be highly independent of the

Table III
Inter-correlations between EI questionnaire elements and total score

	EI							
Components	**Self-aware**	**Resilience**	**Motivation**	**Sensitivity**	**Influence**	**Decisive**	**Conscientiousness**	**EI total**
Self-awareness	1.00	0.59	0.41	0.28	0.48	0.27	0.44	0.77
Emotional resilience	0.59	1.00	0.49	0.18	0.40	0.32	0.31	0.73
Motivation	0.41	0.49	1.00	0.25	0.52	0.34	0.35	0.72
Interpersonal sensitivity	0.28	0.18	0.25	1.00	0.27	*0.03*	0.37	0.55
Influence	0.48	0.40	0.52	0.27	1.00	0.40	0.29	0.71
Decisive	0.27	0.32	0.34	*0.03*	0.40	1.00	0.19	0.51
Conscientious and integrity	0.44	0.31	0.35	0.37	0.29	0.19	1.00	0.62
EI total	0.77	0.73	0.72	0.55	0.71	0.51	0.62	1.00

Notes: Statistically non-significant co-efficients in italics – all others significant at 0.01 level; *n* = 201; * = signficant at 5 per cent level

age, gender, sector, nationality and responsibilities of the respondents in the trial.

Reliability

The normal range of acceptable reliability co-efficients is between 0.60 and 0.80. Above 0.80 suggests that the all scale items are very similar in wording or measure virtually the same behaviours – there is little breadth of coverage. Co-efficients below 0.50 reflect excessive heterogeneity or ambiguity, thus implying that scale items are not all measuring the same construct. Consequently, they may well correlate more highly with other scales than with the one intended.

The results of the reliability analyses, conducted on the total EI questionnaire and for each of the elements, are shown in Table IV. The first column shows the number of items for each elements, and the second column the Alpha co-efficients. All these co-efficients are acceptable, being above 0.50, with self-awareness, interpersonal sensitivity, and emotional resilience being particularly highly reliable. The weakest elements are decisiveness and conscientiousness and integrity, and these just about reach acceptable levels, but from the third column one can see that the split-half reliabilities of these two scales are both at least 0.60. Taking the two reliability measures together, all scales appear to be reliable.

The final column presents the correlations between the test elements and the total EI score. It can be seen that four scales show very high correlations (> 0.70) and so measure the core elements of EI, whereas decisiveness and interpersonal sensitivity appear to measure something slightly different from the others, but still make a statistically significant contribution.

Turning to results at the item level, an analysis was conducted of the "part-whole" correlations between each item and (a) the total element score; and (b) the total emotional intelligence test score. With a sample of 201, all correlations were found to be statistically significant with only two item exceptions in relation to the total emotional intelligence score. All correlations between item and element totals were significant, demonstrating that they are all relevant to the sub-scales of which they form a part.

Table IV
Reliabilities of EI elements and correlations with total score

Components	***n*.items**	**Alpha**	**Split ½ r**	**Total**
A. Self-awareness	12	0.70	0.59	0.77
B. Emotional resilience	11	0.67	0.60	0.73
C. Motivation	10	0.62	0.65	0.72
D. Interpersonal sensitivity	12	0.77	0.71	0.56
E. Influence	10	0.60	0.52	0.71
F. Decisiveness	7	0.56	0.60	0.51
G. Conscientiousness and integrity	7	0.59	0.62	0.62

Validity

The validity of the test, indicated by the data, was examined and is described below.

Face validity

No adverse comments, whatsoever, were received from the subjects in the second study. Many subjects said that the questionnaire appeared to be measuring something relevant about themselves, and some said it was obviously measuring emotional intelligence. Thus it was reasonable to infer that the test had face validity.

Content validity

The literature review, above, demonstrated the rigour with which all aspects of emotional intelligence (not only Goleman's work) were reviewed. Furthermore, reference was made to the extensive literature on personal

competences, and clear links were drawn with items in the personal competences survey which appeared to be related to emotional intelligence. This work enabled the test designers to write items based on a comprehensive set of constructs considered by leading authors in the field to relate to emotional intelligence, and then in turn to link these to personal competences and provide evidence of its content validity.

Construct validity

This is usually evaluated by correlating scores on the new test with scores on other, well-validated tests, which measure the same, or part of the, construct or trait. The results for this test are described below.

Initial study. The initial research (Dulewicz and Higgs, 1998a), employing a measure of EQ derived from the job competences survey, examined the construct validity of the measure in relation to:

- the 16 PF personality questionnaire;
- the OPQ personality questionnaire;
- Type A Behaviour, derived from the OPQ.

The EQ competences scale was correlated with other EQ scales derived from two personality questionnaires, the 16 PF and the OPQ. Results in Table V show that the EQ competences scale score was highly significantly related to the EQ scale derived from the OPQ. Furthermore, the EQ competences scale was correlated with a measure of Type A behaviour derived from the OPQ, aspects of which were hypothesised to be related to emotional intelligence. As the results presented in Table VI show, although the overall EQ competences scale did not show a significant relationship with Type A behaviour, the EQ competences factors sensitivity versus achievement; resilience; and decisiveness and assertiveness were highly significantly related to the Type A behaviour in the hypothesised directions.

Second study: 16PF questionnaire. The study of emotional intelligence was examined for construct validity in relation to:

- the 16PF questionnaire;
- the Belbin Team Roles derived from the 16PF (see Dulewicz, 1995); and
- the Myers-Briggs Type Inventory.

Table V
Inter-correlations – EQ 16PF, EQ 0PQ, EQ competencies and level advancement

	EQ PQ (*n* = 100)	EQ competencies (*n* = 100)	Advancement (*n* = 65)
EQ 16PF	0.65*	0.15	0.04
EQ 0PQ	–	0.35**	–0.22

Note: * = significant at 1 per cent level; ** = significant at 0.1 per cent level

In the second study using the EI questionnaire, construct validity was established by correlating the scores on the EI components and total scale with the 16PF first and second order factors. Scores were available from 186 subjects in the trial. The results appear in Table VII. Taking the second-order factors, hypothesised relationships were found between: extroversion and influence; and anxiety and resilience (negative); toughness and resilience; and independence and decisiveness.

At the first-order level, a number of hypothesised relationships were found between: assertive and decisiveness; happy-go-lucky and influence; venturesome and influence; emotional stability and resilience; apprehensive and resilience (negative); controlled and self-awareness; controlled and resilience; tense and resilience (negative); conscientious and conscientiousness and integrity. The only hypothesised relationship not found among the first-order factors was between tender-minded and sensitivity.

Turning to the results on the total scale, those with high EI were more likely to be extroverted, happy-go-lucky, venturesome, emotionally stable, self-confident (low apprehensive), controlled and relaxed. They were also highly conscientious and moralistic.

Overall, these results taken together produce strong evidence that the construct measured by the emotional intelligence questionnaire equates to well-established measures of personality characteristics.

Belbin team roles. The second set of constructs of interest are the Belbin team roles (see Belbin *et al.,* 1976; Dulewicz, 1995). The correlations between the BTRs and the EI overall score and elements appear in Table VIII. Looking first at the overall EI scores, those with high EI are likely to have significantly higher scores on co-ordinator and resource investigator roles, and lower scores on shaper and completer finisher roles. Focusing on the hypothesised relationships with EQ components, the co-ordinator and resource investigator roles are specifically correlated with:

- self-awareness;
- resilience;
- motivation; and
- influence.

Resource investigators also tend to be more decisive.

In contrast, the shaper role is significantly correlated with:

- low self-awareness;
- low resilience;
- low conscientiousness and integrity;
- low sensitivity.

It was surprising that the hypothesised relationships with motivation, influence and decisiveness were not supported. The

completed finisher role was found, as hypothesised, to be correlated with:

- low self-awareness;
- low resilience;
- low influence;
- low decisiveness;
- but not with conscientiousness and integrity, as predicted.

Table VI
Correlations between total EQ, factor measures and level advancement and type A personality

	Type A (n = 100)	Advancement (n = 65)
EQ Competencies scores		
EQ Competencies (aggregate of 16)	–0.10	0.29*
Factors		
EQ Sensitivity versus achievement	–0.33***	0.13
EQ Resilience	–0.25**	0.09
EQ Influence and adaptability	0.03	0.28*
EQ Decisiveness and assertiveness	0.32**	0.20
EQ Energy versus integrity	0.18	–0.08
EQ Leadership	–0.00	0.10
Multiple regression		
EQ Competencies: multiple regression	0.59***	0.60***
EQ Competencies: multiple regression (R^2)	0.35	0.36

Notes: * = significant at 5 per cent level; ** = significant at 1 per cent level; *** = significant at 0.1 per cent level

Turning to the other four roles, scores on which are not related to overall emotional intelligence, the following hypothesised relationships were found: plant is significantly related to low resilience and low motivation; team worker to sensitivity and low decisiveness; implementer to resilient (but not to conscientiousness and integrity); monitor evaluator to low influence and conscientiousness and integrity.

Taking these results together, they tend to support the construct validity of the total EI scale and all of the components, with the possible exception of conscientiousness and integrity, which was only supported by significant correlations with shaper (negatively), and monitor evaluator.

Myers-Briggs type inventory. The Myers-Briggs type inventory (MBTI) is a means of operationalising a type theory (Jung's) as opposed to a trait theory (e.g. 16PF, OPQ). Central to type theory is the concept that individuals can develop and adapt. Therefore, as the EQ construct is claimed to be developable, it was decided to explore construct validity in comparison to a "type" questionnaire.

In the second study MBTI data were available for a sub-sample of 59 of the participants. These data were used to

Table VII
Correlations between EI elements and total, and 16PF first and second-order factors

					EI			
16PF factors	**Self-aware**	**Resilience**	**Motivation**	**Sensitive**	**Influence**	**Decisive**	**Conscientiousness**	**EI total**
Second order								
Extrovert	0.18*	0.20**	0.29***	0.00	0.37***	0.23***	–0.09	0.25***
Anxiety	–0.55***	–0.53***	–0.26***	–0.13	–0.32***	–0.09	–0.14*	–0.46***
Toughness	0.14	0.21***	0.11	–0.10	0.11	0.11	0.01	0.13
Independent	–0.09	–0.10	–0.08	–0.18**	–0.02	0.15*	–0.11	–0.11
First order								
Outgoing	0.00	0.08	0.15*	0.06	0.09	–0.02	–0.06	0.07
Assertive	0.01	0.03	0.22***	–0.16*	0.19**	0.28**	–0.07	0.09
Happy-go-lucky	0.13	0.13	0.15*	–0.01	0.29***	0.14*	–0.11	0.15*
Venturesome	0.30***	0.27***	0.30	0.03	0.40***	0.26***	–0.05	0.32***
Self-sufficient	0.01	–0.11	–0.07	–0.07	–0.05	–0.07	–0.04	–0.09
Emotional stability	0.38***	0.39***	0.23***	0.09	0.28***	0.16*	0.07	0.36***
Suspicious	–0.17*	–0.13	0.04	–0.14	–0.03	0.11	–0.02	–0.09
Apprehensive	–0.43***	–0.45***	–0l.15*	0.02	–0.22***	–0.16*	–0.08	–0.33***
Controlled	0.29***	0.26***	0.11	0.15*	0.00	–0.28***	0.25***	0.19***
Tense	–0.49***	–0.52***	–0.24***	–0.17*	–0.27***	–0.11	–0.19**	–0.45***
Abstract thinking	–0.10	–0.18**	–0.08	–0.01	–0.03	–0.10	–0.04	–0.12
Conscientious	0.23***	0.15*	0.18**	0.14	0.07	–0.13	0.17*	0.19**
Tender minded	0.01	–0.12	–0.08	0.12	0.00	0.00	0.06	0.00
Imaginative	–0.05	–0.09	–0.04	0.01	–0.06	0.00	–0.04	–0.06
Shrewd	–0.01	0.05	0.01	0.11	–0.07	–0.21***	0.14	0.01
Experimenting	0.08	0.15*	0.10	0.02	0.15*	0.09	–0.01	0.13

Notes: n = 186; * = significant at 5 per cent level; ** = significant at 1 per cent level; *** = significant at 0.1 per cent level

Table VIII
Correlations between EI elements and total, and team roles

	EI							
Team role	**Self-aware**	**Resilience**	**Motivation**	**Sensitive**	**Influence**	**Decisive**	**Conscientiousness**	**EI total**
Plant	–0.05	–0.18**	–0.15*	–0.09	–0.08	0.07	–0.02	–0.12
Shaper	–0.44***	–0.41***	–0.07	–0.20**	–0.12	0.07	–0.19**	–0.32**
Co-ordinator	0.40***	0.35***	0.23***	0.12	0.23***	–0.03	0.13	0.33***
Resource investigator	0.33***	0.30***	0.21***	0.11	0.29***	0.15*	–0.01	0.31***
Team worker	0.10	0.15*	0.06	0.25***	0.07	–0.17*	0.05	0.13
Implementer	0.21***	0.21***	0.10	0.07	0.04	–0.16*	0.12	0.14
Completer finisher	–0.29***	–0.33***	–0.12	0.00	–0.30***	–0.29***	0.00	–0.29***
Monitor evaluator	–0.07	–0.04	–0.08	0.08	–0.25***	–0.21***	0.16*	–0.08

Notes: ***n*** = 186; * = significant at 5 per cent level ** = significant at 1 per cent level; *** = significant at 0.1 per cent level

correlate MBTI type scores with the EI questionnaire. Although there has been a degree of controversy over the use of parametric tests for ipsative data (such as the MBTI) an argument has developed which potentially substantiates such analyses for correlational purposes (Myers and McCaulley, 1989; Higgs, 1996). The results of these analyses are shown in Table IX. While a number of significant correlations were not found, those encountered were hypothesised, e.g. negative correlations between introversion and motivation and influence, and negative correlations between feeling and decisiveness.

It was somewhat surprising that both thinking and feeling types were positively and significantly correlated with the EI factor self-awareness. Given the bipolar nature of the scale, the larger correlation with the feeling pole was to be expected. It was, perhaps, surprising that no significant correlations were found between the MBTI factor of extroversion and any of the EI scales (although self-awareness, influence and the composite score did correlate at around the 6 per cent level). It was also somewhat surprising that the MBTI scale pole of feeling did not figure highly in correlations with EQ scales. However, this may be due to the relative under-representation of dominant *F* scores on the thinking : feeling scale among managerial populations (Myers and McCaulley, 1989).

Overall, the results from the 16PF, BTRs and MBTI, taken together, present wide-ranging support for the construct validity of the EI questionnaire.

Concurrent validity
This is established by taking measures from the test and relating them to performance measures taken at the same point in time. These performance measures are usually job appraisals or training course ratings. Such measures were not available to the researchers in this study.

Predictive validity
The first study, reported above in the Introduction, demonstrated that the EQ competences scale predicted organisational level advancement over a seven-year period. The subsequent work on the EI questionnaire was

Table IX
Correlations between EI elements and total, and Myers-Briggs type indicator

	EI							
	Self-aware	**Resilient**	**Motivation**	**Sensitive**	**Influence**	**Decisive**	**Conscientious**	**EI total**
Introversion (*n* = 28)	–0.18	–0.06	–0.52**	–0.04	–0.44*	–0.05	–0.16	–0.26
Extroversion (*n* = 31)	0.34	0.14	0.11	0.09	0.34	0.13	0.29	0.34
Intuitive (*n* = 33)	0.05	0.18	–0.03	0.31	0.08	0.23	0.30	0.27
Sensing (*n* = 26)	–0.11	–0.18	–0.20	–0.19	–0.19	–0.13	–0.04	–0.20
Thinking (*n* = 54)	0.27*	0.22	0.17	–0.15	0.22	0.17	–0.09	0.16
Feeling (*n* = 5)	0.90*	0.28	–0.39	–0.73	0.49	–0.98***	0.35	–0.06
Perceiving (*n* = 22)	–0.10	0.15	–0.16	–0.27	–0.09	0.25	–0.21	–0.13
Judging (*n* = 37)	0.17	–0.01	0.12	–0.09	–0.06	–0.02	0.02	0.02

Notes: * = significant at 5 per cent level; ** = significant at 1 per cent level; *** - significant at 0.1 per cent level

underpinned by this major finding. Owing to the nature of this study and development of the test it was, evidently, not feasible to establish predictive validity directly.

In this study, the scores from the EI test, and its components, were correlated with the EQ competences scale and the EI factors, based on data from 59 of the 201 subjects in the second study. The results appear in Table X. The most important finding is that the overall EQ test correlated highly significantly (0.49) with the overall EQ competences score from the first study. This provides a direct link to the new questionnaire from the predictive validity of the EQ competences scale. This table also contains some supportive evidence from the hypothesised relationship between broadly equivalent EQ factors and EQ components from the questionnaire. In order to make the two EQ Competencies components broadly equivalent to the EI questionnaire Elements, two new factors were computed: sensitivity minus motivation (to mirror sensitivity versus achievement), and motivation minus conscientiousness and integrity (to mirror energy versus integrity). The following correlations were statistically significant:

- energy/integrity with motivation minus integrity;
- sensitivity/achievement with sensitivity minus motivation;
- influence with influence.

The only directly equivalent relationship not supported by the results was between the two decisiveness scales and the two resilience scales, the latter of which was significant at the 6 per cent level. Resilience, was however, highly significantly related to self-awareness. Other findings of interest were that leadership was significantly related to self-awareness, motivation, influence and the total score.

Turning to the emotional intelligence questionnaire elements, they were all significantly correlated with EQ competences, with the exception of sensitivity and conscientiousness and integrity. Of the EQ competences factors, only influence and leadership were significantly correlated with the overall EI questionnaire score.

Taking all these results on validity together, the evidence from the approach used in the design of the EI questionnaire, and from the first and second studies, provide fairly strong support for the content, construct and predictive validity of the questionnaire.

Discussion

The results presented above indicate that a measure of emotional intelligence has been developed which is both reasonably valid and reliable. Analysis of the data together with the structure of the instrument provides a means of assessing both the overall level of an individual's emotional intelligence and the contribution to this overall measure of the seven sub-scales. Furthermore, the initial study does indicate that the test is relatively free from "noise" in terms of the impact of confounding variables (e.g. sector, gender, age, etc.). The implications of interpreting the profiles produced by this instrument are discussed in the following sections.

Interpreting the emotional intelligence questionnaire

The EI questionnaire provides information on the overall test score, together with information on the seven element scales which comprise the overall test score. High scores on the emotional intelligence construct overall have been found in research studies to be associated with "success" in a work context (Goleman, 1996; 1997; 1998; Dulewicz and Higgs, 1998a; 1998b). Indeed, some claim that high emotional intelligence is associated with more wide-reaching "life success" (Goleman, 1996; Steiner, 1997). Thus, in interpreting the EI test it is important to

Table X
Correlations between EQ competencies and EI questionnaire elements and total

						EI				
EQ competencies	**Self-aware**	**Resilience**	**Motivation**	**Sensitive**	**Influence**	**Decisive**	**Conscient-iousness**	**Sensitive-motivation**	**Motivation-conscientiousness**	**EI total**
Resilience	0.41***	0.25	–0.18	0.01	0.24	0.15	0.05	0.16	–0.20	0.21
Energy/integrity	0.06	0.18	0.45***	–0.06	0.05	0.07	0.03	–0.43***	0.38***	0.17
Sensitivity/ achievement	0.23	0.00	–0.18	0.24	0.20	–0.01	0.12	0.32**	–0.27*	0.13
Influence	0.41***	0.43***	0.35**	0.11	0.43***	0.24	0.12	–0.23	0.22	0.46***
Decisive	0.08	0.15	0.25	–0.11	0.12	0.10	0.17	–0.29*	0.09	0.16
Leadership	0.37***	0.24	0.33**	0.20	0.42***	0.14	0.14	–0.15	0.18	0.39***
EQ total	0.45***	0.43***	0.39***	0.08	0.49***	0.23	0.21	–0.28*	0.18	0.49***

Notes: n = 59; * = significant at 5 per cent level; ** significant at 1 per cent level; *** = significant at 0.1 per cent level

begin with the overall test score. The total test score is examined in relation to the norms to determine the overall "EQ" level and its implications. Having reviewed the overall score, it is then useful to examine the individual scale scores in order to identify the components of emotional intelligence which need to be both reinforced and developed in order to enhance the individual's abilities in relation to this significant area of competence. The EI questionnaire also provides data on these seven scales which together comprise the overall measure of emotional intelligence.

Using the results

It is recommended that the results of the emotional intelligence test described above should be used as a basis for discussion with an individual. The results of the test should be fed back by a facilitator, whose main aim is to ensure that the results are understood by the participant in a way which encourages a positive attitude to personal growth and a greater clarity about how to manage that growth for maximum performance. Also, some discussion should take place before any written report is handed over to the participant. This is because, while the test is designed to provide objective and clearly expressed feedback focusing on personal growth, there may be some profiles which need more sensitive handling than the written word is able to provide.

Approaching development

In the literature on emotional intelligence there is considerable debate around the extent to which such intelligence is developable (e.g. Goleman, 1996; Steiner, 1997; Dulewicz and Higgs, 1998a, 1998b). In supporting the concept of emotional intelligence the earlier arguments of Gardner (1983) in terms of his broader Multiple Intelligences construct should be borne in mind. Gardner observes that cognitive abilities (in the sense of multiple intelligences, which encompass inter and intra-personal intelligences, are not static, but can, indeed, be developed. With this viewpoint in mind, and given the theoretical underpinnings of the current test, the authors would propose that the results of an individual assessment should be used to aid personal development. The ways in which the results might be employed for this purpose are discussed below.

The nature of emotional intelligence as discussed above is such that it is possible to enhance the overall level by planned and sustained personal development. Much of this development will result from reflecting on the individual's behaviours which tend to be exhibited in differing situations, consciously practising different behaviours and actively seeking feedback on the way in which others interpret and respond to these new behaviours. In broad terms it is important to reflect on how the feedback might apply in a range of situations which the individual has faced and to capture and reflect on (in these different situations):

- What did they feel?
- How did they feel about the outcomes of their decisions?
- How did they feel about the outcomes of their actions?
- How could the outcomes have been improved in terms of the solution of the problem/situation?
- How could the outcomes have been improved in terms of their feelings?
- What have they learned from this situation which could help them in dealing with future issues?

The appropriate way in which to use the overall feedback is to examine each of the emotional intelligence scales and identify:

- those where individuals have strengths which may be developed and generalised;
- those where there are specific opportunities for improvement.

Detailed guidance on feedback and development relating to each of the scales is outlined by Dulewicz and Higgs (1999) in the *Emotional Intelligence Questionnaire Manual.*

Conclusion

This paper has highlighted the continuing, and indeed growing, levels of interest in the concept of emotional intelligence. The basic proposition highlighted by Goleman (1996) and demonstrated by Dulewicz and Higgs (1998a; 1998b) that the concept plays an important role in reinforcing individual "success" in an organisational context has been reinforced by the study reported in this paper. Furthermore, the study has demonstrated that the construct of emotional intelligence may be validly measured by means of a questionnaire derived from a competence-based measure. The underpinning value of a competence-based measure is further reinforced by the research reported in Goleman's (1998) latest work.

Given the competence-base underpinning the measurement of emotional intelligence, its potential value for personal development is reinforced. Once again, the conclusions from the current research are supported by those of Goleman (1998). However, in an organisational context practitioners will observe that, in some organisations, the general construct will be either rejected and/or neglected in the selection and promotion of the individual for important leadership roles. Indeed, in some organisations the exhibition

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of a number of elements of emotional intelligence may be "published" (Lazear, 1991). Gardner (1983), in presenting the concept of multiple intelligences, which include elements of emotional intelligence, observed that central to the cognitive "abilities" (i.e. multiple intelligences) argument is the experience of the individual and the environmental factors which allow these "abilities" to develop. Thus in an organisational context these "abilities" can be ignored or "punished". This can result in either voluntary or involuntary loss of employees, or the achievement of conformity at the cost of underperformance, under-utilised potential and/or low morale.

To date, while the construct of emotional intelligence at an individual level is beginning to become more transparent and potentially manageable, there is evidently a need for further research to understand the interaction between individuals and organisational cultures, in terms of the development and valuing of this newly promoted construct.

Within the original study (reported above) the population studied were general managers, clearly in leadership roles. Given that EI is a predictor of advancement within an organisation the authors have formulated a tentative proposition that there could be a relationship between EI and leadership ability. Indeed this proposition is given further weight when comparing the EI scales to recent research on transformational leadership (Alimo-Metcalfe, 1999). This comparison is summarised in Table XI. Further research is now planned by the authors to explore in detail the relationship between EI and leadership.

Table XI
Emotional intelligence and leadership

Emotional intelligence factors (1999)	Transformational leadership factors (Alimo-Metcalfe, 1999)
Self-awareness	Individual consideration
Emotional resilience	Decisive, achieving, determined
Motivation	Involves others in values
Interpersonal sensitivity	Networks
Influence	Change management
Decisiveness	Accessible
Conscientiousness and integrity	Intellectually versatile
	Integrity/openness

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