

EMOTIONAL INTELLIGENCE MEASURED IN A HIGHLY COMPETITIVE TESTING SITUATION

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Abstract

This is a study in which emotional intelligence (EI) as well as several other personality dimensions were studied in a real, high-stakes, selection situation, N=190. Forty-one trait oriented personality scales were measured and factor analyzed. A factor pattern with four secondary factors was found: EI, emotional stability, rigidity/perfectionism and energy/dominance. These factors were related to standard FFM (Five Factor Model) dimensions, to Hogan's Development Survey ("the dark side of personality") and to a number of tasks measuring skills in identifying emotions and emotion knowledge. It was found that EI and emotional stability correlated significantly with some of the latter measures, more so than the FFM scales. Impression management was measured with several scales. In the end of the testing session, participants were instructed explicitly to fake their answers. These active faking responses showed consistency across personality dimensions and also correlated strongly with impression management scores. Correcting the final pooled score (the four secondary factors combined) for impression management and faking produced fairly strong changes in the "short list" of participants ranking among the top 30, or 60. It is concluded that personality trait EI shows some promise while emotion identification tasks must probably be geared towards human emotion rather than abstract judgment of emotion as expressed in art or music.

Key words: emotional intelligence, selection, impression management

Emotional intelligence (EI)² is a concept currently in focus among the general public, practitioners and researchers. It is widely believed by the public that emotional and social competence are as important, or even more important, than traditional dimensions of intellectual ability and personality, and Goleman (Goleman, 1995, 1998) and others, e.g. Bar-On (Bar-On, 1997), have made some very strong claims to that effect. It is often pointed out that traditional IQ involves many prediction errors with regard to real-life important criteria. Yet, the fact that much remains to be accounted for in various criterion dimensions beyond what is typically achieved with traditional IQ type predictors does not necessarily imply that EI is the missing factor. Sternberg has made a good case for his concept of practical intelligence which is cognitively oriented (Sternberg et al., 2000). Besides, actual measurement of EI has so far been rather elusive; see Davis et al. (Davies, Stankov, & Roberts, 1998) and Sjöberg (Sjöberg, 2001b) for reviews.

There are basically two approaches to the measurement of EI: as a mental ability or as a personality trait. Mayer, Salovey and Caruso were instrumental in initiating current interest in the concept by their work in the beginning of the 1990's (Mayer, DiPaolo, & Salovey, 1990; Salovey & Mayer, 1990). They devised tasks in which people were instructed to judge, among other things, the emotional content expressed in art or music. The most common way of scoring such responses is consensual scoring in which people are awarded points for making the modal response given by a norm group. There is currently an extensive testing procedure available for assessing EI according to this approach but little is known about its convergent and discriminative validity (Mayer, Caruso, & Salovey, 2000; Mayer, Salovey, & Caruso, 2000).

EI as a personality trait is measured by personality test items of a fairly traditional kind, and is close to many other questionnaire methods for measuring various traits. The best-known example has been devised by Bar-On (Bar-On, 2000; Bar-On, Brown, Kirkcaldy, & Thomé, 2000), but little research has been published on that test. Its validity is likewise not extensively documented in published articles, although the test distributors do list a number of internal technical reports. It is noteworthy that the personality trait approach has so far rarely been related to the main-stream Five Factor Model (FFM) of personality (McCrae & Costa, 1987; Wiggins & Trapnell, 1997). It is important, of course, to establish empirically whether EI really contributes any information not readily available in standard FFM tests. Sjöberg (Sjöberg, 2001b) found some support for the notion that trait EI does make such a contribution.

The two approaches have, thus, only been little investigated so far and they have rarely been related to each other on data from the same respondents. In addition, response styles such as social desirability and acquiescence (Paulhus, 1991) have been little investigated in relation to EI tests. The sensitivity of EI measures to response bias is a pressing issue whenever EI is used as a basis for important decisions such as those of selection situations.

The purpose of the present paper was to investigate whether

- an EI dimension can be isolated from other, standard, personality dimensions and whether it is related to gender (women expected to be superior) but not to age
- if trait EI is related to emotion identification skills and contributes to explaining such skills beyond the standard FFM dimensions
- if EI can be measured in a highly competitive selection situation without being unduly influenced by impression management tendencies; alternatively if such tendencies can be controlled for.

The present study is partly a replication and partly an extension of a previous investigation using similar conceptualizations (Sjöberg, 2001b). The set of personality scales was considerably extended and so was the measurement of impression management and faking. The criterion tasks of identifying emotions were also improved, as described in the following section.

Method

Participants and test situation. The Board of the SSE (Stockholm School of Economics) had decided to create 30 extra openings for students starting in the fall of 2000 and to base selection to those slots on non-intellectual dimensions such as EI. A similar procedure had been used in 1999. It should be noted that the SSE is a very prestigious elite school. It is very difficult to gain admission as a student and such admission is extremely desirable for many applicants.

The author was commissioned to further develop the tests to be used for selection. From applicants not admitted in the regular procedure, the School invited 400 applicants (out of a total of appr. 4,000) closest to the cut-off in terms of the qualifications they had documented in their applications (high school grades or intellectual ability test scores). Hence, the invitees were quite a select group intellectually, just slightly below those who had been admitted. Twenty-one of those who turned up for testing had taken similar tests one year before.

One hundred and ninety of the 400 invited applicants took the tests. They were informed in the invitation letter that the tests were not about intelligence or knowledge, but about personality and emotional and social skills important for vocational success. They had also been informed that the tests were to be taken in a group, that the SSE would only be informed about their final score and rank order, and that all individual information beyond that was confidential. They were encouraged to answer all questions truthfully and fully, and those who wished also got written notification of their results about 10 days after the test was completed. Any other questions about details of testing and scoring (many called before testing to find out about the test) were not answered. The testees were also informed that 60 of them would be invited to come to an interview the following week (on the basis of test results) and that the final recommendation would be based on both

interview and test results. They were instructed to bring with them a short essay on the topic "Why I want to become an economist".

On the whole, the participants appeared to be highly motivated for the test. Their mean age was 20.5 years (range 18-34), 88 (46%) were female and 102 male.

Test development. The total test battery took about 6 hours of testing time, i.e. a full day of testing. The description of it will be divided, for the purposes of the present paper, in two sections: tests proper and criteria. The present section deals with the tests, the subsequent one with the criteria.

The tests described here were designed and selected so as to measure EI and some related dimensions. Not all can be counted as EI dimensions proper, but they were of both practical and theoretical interest in the present context and they provided a context for the attempt to isolate the EI dimension.

Measurement of emotional intelligence. Some items were translated from the literature, among them the EI scale proposed by Schutte et al. (Schutte et al., 1998). Reliabilities were estimated by means of Cronbach's alfa (Cronbach, 1951). The Schutte et al. scale (present alfa=0.86³) measures alexithymia (ability to identify and describe feelings, as well as a tendency to shun away from emotional dimensions in thought and social relations), attention to feelings, clarity of feelings, mood repair, optimism and impulse control. The alexithymia scale of Bagby, Parker & Taylor (Bagby, Parker, & Taylor, 1994) was also employed (present alfa=0.81). The empathy (Hogan, 1969) scale of Mehrabian and Epstein (Mehrabian & Epstein, 1970) was also used (present alfa=0.80), as well as the Jones and Crandall scale of self actualization (Jones & Crandall, 1986) (present alfa=0.67). Roger and Najarian (Roger & Najarian, 1989) described a set of items measuring four aspects of emotion control: rehearsal (14 items, alfa=0.75), emotional inhibition (14 items, alfa=0.79), benign control (13 items, alfa=0.51) and aggression control⁴ (13 items, alfa=0.70), all included here although one of the scales had a low present alfa value. Nineteen of the items of the Christie scale of Machiavellianism (Christie & Geis, 1970), and 11 additional items written for the present study, were used (present alfa including the new items=0.81). This scale measures a cynical and manipulative attitude and should be negatively related to EI (Bar-On & Parker, 2000).

Other personality dimensions. Several scales developed in our unit were used: mental energy and work motivation (Sjöberg & Lind, 1994), 19 items with an alfa=0.67, creativity (25 items and alfa=0.74), compulsive tendency (sub-clinical), 27 items and alfa=0.77, perfectionism, 8 items and alfa=0.71, and procrastination, 28 items and alfa=0.86. A scale called Enigma measures lack of understanding of oneself or other people, 7 items and alfa=0.69. From an extensive item pool included in the questionnaire four more scales were constructed: dominance (11 items, alfa=0.82), emotional instability (16 items, alfa=0.82), introversion and social indifference (18 items, alfa=0.81) and inhibition and lack of spontaneousness (13 items, alfa=0.74).

Using items of the type used in locus of control scales (Rotter, 1966), three indices were constructed: external control and fatalism (11 items, $\alpha=0.50$), competence or internal control (10 items, $\alpha=0.62$) and control by luck/unluck (8 items, $\alpha=0.55$). Other ways of conceptualizing such items are available (Collins, 1974), but there is a consensus on a need for a multidimensional description (West & Finch, 1997). The regular Rotter scale items (Rotter, 1966) yielded two factors: one measuring control (10 items, $\alpha=0.75$) and one lack of control (8 items, $\alpha=0.69$). The two factor scores were moderately strongly correlated, -0.51 , $p<0.01$.

Cognitive functioning. Several scales which measured various aspects of cognitive functioning were also included. Emotion and cognition interact, and skills in handling emotions may correlate with cognitive skills and strategies at various levels. Besides, it was considered to be potentially useful to include scales that could provide a context from which "pure" EI and emotion skills may be isolated. Broadbent's CFQ (cognitive failures questionnaire) scale (Broadbent, Cooper, Fitzgerald, & Parkes, 1982) was therefore used; this is a scale that purports to measure susceptibility to stress and mental health (present $\alpha=0.90$). Koopman et al. (Koopman, Sanderman, Timmerman, & Emmelkamp, 1994) have devised a scale for measuring irrational beliefs. It has 50 items, 48 of which were used here and were scored in five subscales: worrying (11 items, $\alpha=0.66$), rigidity (11 items, $\alpha=0.58$), problem avoidance (9 items, $\alpha=0.65$), demand for approval (7 items, $\alpha=0.66$), and emotional irresponsibility (7 items, $\alpha=0.65$). Decision making styles and attitudes were studied with the use of items reported by Mann et al. (Mann, Burnett, Radford, & Ford, 1997). Factor analysis of this set of items gave three factors: decision stress ($\alpha=0.78$, 7 items), decision perfectionism ($\alpha=0.71$, 5 items) and decision avoidance ($\alpha=0.73$, 6 items). Epstein et al. (Epstein, Pacini, Denes-Raj, & Heier, 1996) devised scales for measuring intuitive-experiential and analytical-rational thinking styles (need for cognition, 19 items, $\alpha=0.80$; and faith in intuition, 10 items, $\alpha=0.74$) and they were also used here.

Four additional scales were split randomly in two halves in order to study active faking. The first half of the items was inserted in the regular questionnaire (at random places), and the second half was presented at the very end of the questionnaire, following the instruction to fake the answers so as to maximize the chance to be admitted. Purely tactical answers were thus called for in the faking section.

The first halves of these scales were psychometrically well behaved and gave acceptable α values: general self esteem (Schwarzer, 1993) (5 items, $\alpha=0.68$), sensation seeking (Zuckerman, 1994) (16 items, $\alpha=0.72$), manifest anxiety (Taylor, 1953) (13 items, $\alpha=0.83$) and impulsive decision making (Claes, Vertommen, & Braspenning, 2000) (12 items, $\alpha=0.70$). The properties of the faked responses will be reported in a later section. It should be noted here that the non-faked responses will be used in the initial factor analysis of all the indices.

In addition, several experimental items were included in the questionnaire, to be used in further test construction work. They are not described here but were of the same general

nature as the items described. The total number of questionnaire items was 1109. They were presented in random order. They were judged on a four-point response scale with the categories "agree absolutely", "agree to some extent", "disagree to some extent" and "disagree absolutely".

The indices used for isolating an EI dimension numbered 41 in the present study which was thus much broader than the previous one which used 21 indices.

Criteria. In order to assess the construct validity of EI and other second-order factors expected from the analysis of personality scales, a number of criterion variables were included in the design. Some of them were measures of emotional skills, broadly speaking, others were standard and well-known personality tests.

The first criterion dimension used was that of knowledge about other people's current and habitual mood, here termed emotion knowledge. This is a measure not included in the MEIS (Multifactor Emotional Intelligence Scale) scale devised by Mayer, Salovey and Caruso (Mayer, Salovey et al., 2000) who studied other aspects of knowledge about emotions. To measure it, we used a mood scale consisting of 71 items, measuring six factors (Sjöberg, Svensson, & Persson, 1979). The six factors were happiness, tension, fatigue, confidence, extraversion and social orientation. The participants were instructed to rate their own current mood at the start of the test session, and then their habitual mood. After that, they were asked to rate the current and habitual mood of the other testees. The mean ratings of current and habitual mood were used as criteria. Factor scores were computed and the absolute differences between actual means of current and habitual mood on the one hand, beliefs about these dimensions on the other, were computed for each participant and each factor. The alphas (computed across the six factors) were 0.78 and 0.84 for current and habitual mood, respectively. They were strongly correlated, $r=0.52$.

The intercorrelations among the scores in the six factors are given in Table 1 for current and habitual mood⁵.

Table 1. Intercorrelations among mood skill scores. Above diagonal current mood, below diagonal habitual mood.

	Happiness	Extra- version	Social orientation	Activation	Relaxation	Confidence
Happiness	1.00	0.45**	0.38**	0.31**	0.54**	0.63**
Extraversion	0.60**	1.00	0.45**	0.13	0.28**	0.30**
Social orientation	0.51**	0.52**	1.00	0.22**	0.32**	0.31**
Activation	0.55**	0.39**	0.51**	1.00	0.11	0.42**
Relaxation	0.48**	0.39**	0.34**	0.17*	1.00	0.56**
Confidence	0.60**	0.55**	0.48**	0.60**	0.43**	1.00

* $p < 0.05$, ** $p < 0.01$,

These data support the existence of an ability to correctly estimate how other people feel, and it will be used as a criterion to assess our tests of emotional intelligence. The results are very similar to those reported in Sjöberg (Sjöberg, 2001b).

In a second phase of the test session, participants made ratings of music, art, social interaction episodes described in the questionnaires and facial expressions. These tasks were all designed to measure ability to identify emotions, this being the major aspect of EI according to Ciarrochi et al. (Ciarrochi, Chan, & Caputi, 2000), and also the one most easy to measure. The "correct" answer in each case was the most common one given in the present group. This approach to scoring is commonly used in EI work, see e. g. Davies, Stankov and Roberts (Davies et al., 1998). In a few cases two response alternatives were equally often chosen, and most popular, and then they were both used as definitions of correctness.

The 20 music excerpts came from many different types of music, from classical to hard rock. The art samples were 20 slides of computer generated fractal art. The music and art samples were all judged on five category bipolar scales, measuring:

- positive experience vs negative experience
- interesting vs uninteresting
- happy vs sad
- warm vs cold
- relaxed vs tense

- friendly vs aggressive
- admiring vs contemptuous
- reassuring vs frightening
- easy to understand vs hard to understand

Participants were instructed to rate the emotion expressed in the music or art samples, not how they themselves felt. Only the last seven of these scales were used in scoring emotion identification. (How they felt was reflected in the first two scales which were not scored). Each music or art sample was available for judgment for about one minute.

Twenty social episodes, each involving two key actors, were then described. The participants were asked to rate, on unipolar three category scales, to what extent each of the two actors felt, at the conclusion of the episode:

- happy
- angry
- sad
- ashamed
- proud
- relieved
- disappointed
- surprised
- guilty

All of the nine scales were used in scoring. In the final part of the section on emotion identification, 12 pictures from the Lightfoot series of facial expressions (Engen, Levy, & Schlosberg, 1957) were displayed, and the participants rated them on eight scales:

- happiness
- anger
- sadness
- shame
- guilt
- contempt
- surprise
- fear

The alfa values were low for music, 0.43, but satisfactory for art, episodes and facial expressions: 0.69, 0.80 and 0.69, respectively. As compared to the previous testing (Sjöberg, 2001b), the art section was now much more homogenous, all pictures being computer generated fractal art. Reliability was increased. In addition, the number of social problem episodes was increased from 10 to 20, and reliability was strongly increased. The still low reliability for music may be due to the heterogenous content of that section.

Intercorrelations among the EI criteria scores are given in Table 2.

Table 2. Correlations among the 4 emotion identification and knowledge scores.

	Facial expressions	Art	Episodes	Music	Current mood	Habitual mood
Facial expressions	1.00					
Art	0.05	1.00				
Episodes	0.38**	0.10	1.00			
Music	0.15*	0.33**	0.07	1.00		
Current mood	-0.23**	-0.02	-0.16*	-0.04	1.00	
Habitual mood	-0.19**	0.06	-0.09	-0.05	0.52**	1.00

* $p < 0.05$, ** $p < 0.01$

It is seen that there is no evidence of a strong general dimension of emotion identification ability, but some coherence can be detected.

Several standard personality dimensions were also measured, to be used as criteria. Eysenck's MPI scales (Eysenck & Eysenck, 1985) were used, but the psychoticism scale had a too low alfa value to be useful⁶. The alfas for neuroticism, extraversion and the lie scale were 0.83, 0.86 and 0.77, respectively. A Big Five questionnaire (Wiggins & Trapnell, 1997) was also used, having 15-20 balanced items in each factor⁷. The alfa values were 0.7 or better.

Hogan's Development Survey (HDS) was used as another benchmark measure (Hogan & Hogan, 1997). This fairly new scale is an attempt to measure "the dark side" of personality, i.e. a number of negative tendencies such as being skeptical, eccentric or arrogant. It consists of 168 items, 14 for each of 11 scales and a 12th scale, also with 14 items, measuring social desirability. In the present sample, the alfa values for these scales varied between 0.33 (dependent) and 0.69, and most had at least borderline acceptable alfa's.

Response styles. To measure response style and self presentation bias, the Crowne-Marlowe measure of social desirability (Crowne & Marlowe, 1960) was employed (present alfa=0.84), as well as the MPI lie scale (see above). More recently developed scales by Paulhus (Paulhus, Bruce, & Trapnell, 1995; Paulhus & Reid, 1991) were also included, intended to measure impression management (18 items, alfa=0.83) and self deception (19 items, alfa=0.76)⁸. Both impression management and self deception were treated here as response style variables. There was also a social desirability scale included in the HDS questionnaire (14 items, alfa=0.67).

These scales were included in order to check for impression management, which was expected to be present. They were strongly intercorrelated, see Table 3.

	1	2	3	4	5
1. MPI Lie scale	1.00	0.80**	0.55**	0.75**	0.55**
2. Impression man.	0.80**	1.00	0.45**	0.77**	0.50**
3. Self deception	0.55**	0.45**	1.00	0.62**	0.46**
4. Social des.	0.75**	0.77**	0.62**	1.00	0.64**
5. HDS soc.des.	0.55**	0.50**	0.46**	0.64**	1.00

** p<0.01

Critics of the social desirability and impression management scales argue that these may well measure some real factor such as adjustment (McCrae & Costa, 1983; Robinson, 1973). However, the items do measure a not very sophisticated tendency in impression management; it is unlikely that those who endorse such items tell the truth because people simply are not *that* well adjusted. Or they may in fact see themselves in such a light and that would not seem to be a sign of good adjustment but the opposite. Yet, the present study included a section of active faking in order to validate the impression management scales.

Procedure. The participants went through the various tasks in the following order:

- Mood ratings
- Identifying emotions in music, art, social episodes and facial expressions
- Hogan's Development Survey
- Main personality questionnaire, concluded with an active faking section

Results

Main personality questionnaire structure. The 41 indices described above were subjected to factor analysis, which could be regarded as a second-order factor analysis. Direct oblimin rotation was used, and rotated factors were quite independent. Four broad factors were obtained, see Table 4. They explained 58.1 % of the total variance, and there was no indication of a meaningful fifth factor. The pattern ("loading") matrix of Table 4 shows quite clearly that the factors were distinctly defined. They were interpreted as follows:

- Factor 1: Mental instability
- Factor 2: Inhibition, rigidity, perfectionism
- Factor 3: Emotional intelligence (EI)

Factor 4: Dominance and energy, including creativity

Table. 4. Factor pattern, four secondary factors. Coefficients smaller than an absolute value of 0.3 have been deleted.

	Factor 1	Factor 2	Factor 3	Factor 4
Neuroticism	0.83			
Lability	0.81			
Manifest anxiety	0.80			
Worry	0.75			
Rehearsal	0.74			
Enigma	0.65			
Cognitive interf.	0.61	-0.57		
Control	-0.61			0.31
Perfectionism	0.53	0.36	-0.33	
Self actualization	-0.53		0.35	
Problem avoidance	0.53			
Decision stress	0.51			
External attribution	0.50			
Decision avoidance	0.46			-0.31
Impulsiveness	-0.45	0.30		0.34
Lack of control	0.39			-0.37
Demand for approval	0.33			
Luck attribution	0.31			
Inhibition		0.75		
Compulsiveness	0.40	0.71		
Benign control		0.65		-0.38
Decision perfectionism		0.54		
Rigidity		0.48		
Procrastination	0.45	-0.46		
Empathy			0.84	
Introversion			-0.76	
Emotional inhibition			-0.70	
Machiavellianism			-0.61	
Alexithymia	0.42	-0.31	-0.46	
Creativity			0.32	0.67
Self esteem				0.62
Dominance	-0.32			0.62
Schutte et al. EQ			0.42	0.57
Sensation seeking				0.57
Extraversion			0.30	0.55
Competence attribution		0.34		0.50
Need for cognition				-0.49
Energy				0.47
Faith in intuition				0.42
Emotional irresponsibility			0.40	-0.41

It is notable that compulsiveness, procrastination and perfectionism were included both in mental instability and rigidity/perfectionism factors. It is also interesting to note that creativity was included in the factor of dominance/energy, which was independent of the other secondary factors. EI seemed to be measured best by a high value in empathy, and low values in emotional inhibition, being socially withdrawn and cynicism. The Schutte et al. measure of EI was loaded in the present EI factor and on energy/dominance, a finding similar to the previous study (Sjöberg, 2001b), and discussed there. Briefly, a closer scrutiny of the items used in the Schutte scale shows most of them to reflect self-efficacy in social and emotional dimensions; this is probably the reason why it correlated with scales measuring confidence, energy and dominance, in addition to EI. Petrides and Furnham (Petrides & Furnham, 2000) furthermore found the Schutte scale not to be unifactorial, and so did Sjöberg (Sjöberg, 2001b)

It may seem strange that "emotional irresponsibility" had a positive loading in EI, but scrutiny of these items from the original "Irrational beliefs" inventory (Koopman et al., 1994) showed that they sample beliefs that say that emotions are not fully under one's control. It can be debated if this is really an "irrational" type of belief.

The defining indices were standardized and combined, and over-all scores in the four factors were calculated for each participant. The distributions of these scores were reasonably normal-looking.

Relations between secondary factors and standard benchmark tests

It is important to investigate if any personality scales really only are variations on the FFM theme. The factors were therefore correlated with the three sets of personality variables included in our design, i.e. the Big Five, the MPI dimensions (except psychoticism, see methods section), and the HDS scales. The results are given in Tables 5 and 6.

Table 5. Correlations between secondary factors and FFM and MPI scales.				
	F1	F2	F3	F4
Agreeableness (FFM)	-0.30**	0.13	0.48**	-0.03
Conscientiousness (FFM)	-0.25**	0.48**	0.06	0.11
Emotional stability (FFM)	-0.73**	0.30**	0.25**	0.60**
Extraversion (FFM)	-0.60**	0.21**	0.57**	0.54**
Intellect/autonomy (FFM)	-0.67**	0.28**	0.38**	0.65**
MPI Extraversion	-0.51**	0.17*	0.48**	0.58**
MPI Neuroticism	0.86**	-0.21**	-0.37**	-0.42**

* p<0.05, ** p<0.01

	F1	F2	F3	F4
Arrogant	-0.02	0.39**	-0.18*	0.45**
Passively				
Aggressive	0.38**	0.04	-0.41**	-0.00
Dramatic	-0.28**	0.22**	0.22**	0.39**
Cautious	0.65**	-0.07	-0.31**	-0.36**
Volatile	0.45**	-0.17*	-0.13	-0.21**
Dependent	0.28**	-0.03	-0.05	-0.29**
Detached	0.33**	0.02	-0.42**	-0.28**
Perfectionistic	0.10	0.52**	-0.02	0.16*
Mistrustful	0.18*	0.27**	-0.27**	0.15*
Manipulative	-0.17*	0.08	-0.10	0.43**
Eccentric	-0.10	0.04	0.08	0.32**
Social desirability	-0.35**	0.27**	0.07	0.33**
Total score	0.27**	0.36**	-0.31**	0.27**

* $p < 0.05$, ** $p < 0.01$

It is seen in Table 5 that EI correlated substantially with the Big Five dimensions, and that the other secondary factors also correlated with most of them. The MPI scales were also, in some cases, highly correlated with the secondary factors. The relationships were weaker with the HDS scales, but in the expected directions for the most parts. It is interesting to see that EI correlated negatively with the total HDS score, as it should, and that energy/dominance correlated positively, in spite of the latter being on the whole a positive aspect of personality (at least in the present context).

It is noteworthy that all of the Big Five dimensions except conscientiousness were related to EI, not only intellectual openness. Extraversion was most strongly related to EI, as expected (Ciarrochi et al., 2000), but almost as strongly also to other secondary factors.

The results of multiple regression analyses are presented in Table 7, where the secondary factor scores are related to the FFM scales.

Table 7. Regression analyses with secondary factors as dependent variables, FFM scales as independent. β weights and R^2_{adj} for each of four analyses.

Factor	β , agreeableness	β , conscientiousness	β , emotional stability	β , extraversion	β , intellect/autonomy	R^2_{adj}
F1	-0.134**	-0.047	-0.447***	-0.117	-0.327***	0.659
F2	-0.040	0.450***	0.128	0.090	0.060	0.268
F3	0.425***	-0.060	0.507***	0.154*	0.507***	0.485
F4	-0.159**	-0.014	0.346***	0.146*	0.380***	0.523

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results show that relatively little variance (except error) beyond the FFM is contained in 3 of the 4 factor scores, the exception being perfectionism/rigidity. EI as defined here is thus largely explained by FFM factors. As will be seen later, however, there were some indications that EI still measures some important aspects of emotional skills beyond the information contained by FFM factors.

These analyses show that the factors were strongly and systematically related to the FFM factors Extraversion and Neuroticism, and also to some of the HDS scales. If this is good or bad can be debated. The fairly strong relationships mean that much of the variance in the factors can be accounted for by the standard scales. On the other hand, this also means that the secondary factors measure well established personality dimensions. The question remains if they are more valid than the standard scales in differentiating emotion skills (and other relevant skills in e.g. business) and if they are more or less affected by response styles. The latter is a particularly important issue in a competitive testing situation. Emotion skills will next be analyzed and then the matter of response style.

Emotion skills. The secondary factors were related to the measures of emotional skills: emotion knowledge and emotion identification, see Table 8.

	F1	F2	F3	F4
Facial expr.	-0.21**	-0.01	0.15*	0.02
Art	0.12	-0.20**	-0.07	-0.20**
Episodes	-0.06	-0.04	0.07	0.00
Music	-0.04	-0.07	0.12	-0.05
Habitual mood	0.33**	-0.04	-0.25**	-0.19**
Current mood	0.18*	-0.04	-0.21**	-0.02

* $p < 0.05$, ** $p < 0.01$

The results were partly encouraging. Facial expressions and mood knowledge scores were related to EI as expected while music, art and episodes were not. It is also interesting that emotional stability was related to the same emotion skills scores.

The other personality dimensions measured here were also related to the emotion skills variables. No consistent or otherwise strong relationships were found with emotion identification skills. As to emotion knowledge, these two variables correlated with FFM and MPI variables at the same level as with the secondary factors, while emotion knowledge variables were virtually unrelated to the HDS scales.

The three sets of explanatory variables were next related to mood knowledge scores using multiple regression. The amount of variance accounted for is given in Table 9.

Predictor set	Current mood	Habitual mood
Secondary factors	4.2	10.4
Big 5	1.3	8.6
Two MPI factors	3.7	10.9

It is seen that the FFM scales did worse than both the secondary factors and the MPI factors and that the secondary factors were somewhat better than the MPI factors in accounting for emotion knowledge skill.

Mayer et al. have emphasized empathy among all the possible EI dimensions and found significant correlations with their measures of emotional abilities. In the present data, empathy did not correlate significantly with any with emotion skills measures.

To determine if the secondary factors contributed anything beyond the standard scales, the following procedure was used with the two measures of emotion knowledge as dependent variables. The two MPI scales and EI were entered in the regression models for current and habitual mood knowledge. In both cases both EI and neuroticism obtained significant beta weights. It was thus established in these data that EI did yield information not contained in standard MPI scales. The five FFM scales were next entered in analogous analyses, together with the EI scale. The latter obtained the largest beta weight, statistically significant, in both cases. Hence, EI seemed to offer something beyond the FFM dimensions in understanding emotion knowledge.

Gender and age. Age correlated -0.12, -0.27 ($p < 0.01$), -0.01 and -0.09 with the four secondary factors in the order emotional stability, rigidity, EI and dominance. Hence, the older participants showed a somewhat higher level of mental adjustment, but no higher EI *per se*.

The gender differences were significant, according to *t* tests, in two cases: rigidity/perfectionism and EI (men scoring lower in both cases). The females thus did show the expected advantage in EI (Ciarrochi et al., 2000) and the difference was fairly large (0.39 in terms of standardized scores). Part of these differences may be due to different levels of impression management (pooled score) of the two genders. Women were on the average 0.32 standardized units higher than the men in this respect, $p = 0.025$. Holding impression management (pooled score) constant, the EI gender difference was still present but the difference in Factor 2 disappeared. Thus, male participants did not have any advantage and the female lead seemed to reflect a true and large difference in EI.

Validation of impression management scales

The final part of the questionnaire called for judgments intended to maximize the chance of being admitted, i.e. purely tactical. Four scales were used in that section: general self esteem, manifest anxiety, impulsive decision making and sensation seeking. The alfa's for these faking scales were 0.68, 0.44, 0.43 and 0.71, respectively. Note the low values in two cases, much lower than the corresponding values in the primary part of the questionnaire. There is an indication here of complex response sets.

The means of the faking scales were compared to the means of the corresponding initial scales, see Table 10.

Table 10. Means of four scales in the primary section of the questionnaire and of parallel scales in active faking

Scale	Primary	Faking	Correlation primary-faking	<i>p</i> value according to <i>t</i> test
Impulsivity	1.60	1.46	0.44	<0.0005
Generalized self esteem	3.56	3.86	0.28	<0.0005
Manifest anxiety	1.38	1.25	0.29	<0.0005
Sensation seeking	2.78	2.78	0.26	n. s.

In three cases there were clearly significant differences between primary and faking sections, and the correlations were moderate to low. The participants were on the average indicating that they believed that less manifest anxiety and impulsivity would be desirable, and more self esteem. They were divided with regard to sensation seeking.

Difference scores were then formed by taking the difference between the faked and the primary scores, correlations are found in Table 11.

Table 11. Correlations among the difference scores, faked response - primary response.

	Impulsivity	Self esteem	Man.anxiety	Sensation seeking
Impulsivity	1.00	-0.40**	0.46**	-0.29**
Self esteem	-0.40**	1.00	-0.40**	0.36**
Man.anxiety	0.46**	-0.40**	1.00	-0.25**
Sensation seeking	-0.29**	0.36**	-0.25**	1.00

** $p < 0.01$

The data support the notion of a general faking strategy revealed in these difference scores. The four difference scores were pooled to a composite measure of faking strategy after due reversals of two scores. The idea behind this index construction was to get another index measuring faked responses in the questionnaire, based on very different data and logic as compared to the traditional impression management scales. If the primary scores are close to the faked scores there is an indication that also the

primary scores were to some extent faked. This new index correlated 0.28 ($p < 0.05$) with impression management.

Faking strategy was related to the secondary factor scores together with the pooled impression management score, see Table 12.

Table 12. Results of multiple regression analyses of the 4 secondary factor scores and final pooled score against pooled faking strategy and impression management scores.

Factor	β , Impression management	β , Faking strategy	R^2_{adj}
F1, emotional stability	-0.401***	-0.458***	0.468
F2, perfectionism	0.512***	-0.037	0.245
F3, EI	0.144	-0.150*	0.045
F4, energy	0.331***	0.505***	0.452
Pooled score	0.510***	0.395***	0.524

* $p < 0.05$, *** $p < 0.001$

The mean proportion of variance accounted for in the four factors scores was 0.303. The faking strategy measure was on the whole a better predictor of the factor scores than the impression management measure, but somewhat worse for the pooled score. It is important to note that factors 1 and 4 were very strongly related to the strategic behavior of the participants, as measured here, while factors 2 and 3 were much less correlated with strategic behavior. Especially EI was hardly at all affected by strategic behavior of the participants.

How much were the FFM factors affected by faking? Much the same as the secondary factors, the average share of variance accounted for being 0.283. The faking strategy variable was the most powerful predictor in 2 of the 5 cases. It can be concluded that some 30% of the variance could be accounted for by impression management and faking strategies.

In practice, the impression management strategies can be counteracted to some extent by statistical control using the two variables of impression management and faking strategy. To demonstrate this strategy and its consequences, a pooled score of the four secondary factors was used as the dependent variable. The residuals, after controlling for impression management and faking strategy, correlated 0.69 with the original pooled score of the factors. In more concrete terms, of the 30 highest scores according to the residuals, only 9 also scored among the highest 30 according to the original scores. That is, two thirds of the high-scoring testees were detected as possible fakers and deleted from the "short list". Another cutoff (the one actually used) would be 60. The 60 scoring highest on the residual dimension contained 37 participants who also belonged

to the 60 highest scorers on the pooled raw score dimension. Hence, about 38% of the initial top scorers were deleted from this longer short list. Some dramatic individual changes were noted. The person ranking 13 in uncorrected final score dropped to position 160 in the residual score. The 2nd top residual score corresponded to rank 96 in raw score. These extreme cases were somewhat exceptional and the rank order correlation between the two measures was substantial, but they still illustrate the importance of making a choice between raw score and corrected score.

Discussion

To recapitulate, the purpose of the present paper was to investigate whether

- an EI dimension can be isolated from other, standard, personality dimensions and whether it is related to gender (women expected to be superior) but not to age
- if trait EI is related to emotion identification skills and contributes to explaining such skills beyond the standard FFM dimensions
- if EI can be measured in a highly competitive selection situation without being unduly influenced by impression management tendencies, or if such a tendency could be counteracted by statistical control

Summing up, it was found that EI could be isolated and measured, that it was related to gender as expected but not to age, that it was correlated with some, but not all, emotion related skills beyond what could be measured with standard benchmark tests and that there were indications that it could be measured independently of impression management in a high-stakes selection situation.

It should be noted that most published work on EI has been carried out in non-applied settings, where the scores have not had any important consequences to the participants. In the present study, the opposite was true. The situation was one of highly competitive testing where scores meant a lot to the participants. It is probably such a situation where EI measurement is contemplated by many practitioners, but it is hard to investigate because of access problems.

As to the emotion skills measures, devised partly according to the ideas of Mayer, Salovey and Caruso, it was found that the identification scores worked best for facial expressions. This may be because such scores are most clearly related to emotional functioning while the ability to give modal responses to judgments about art and music may be less relevant. Social problem episodes, described in vignettes, seemed to be a mixed case of some relevance. In a separate validation study, they have turned out to be quite promising (Sjöberg, 2001a). The MEIS instrument contains also several other, more complex, types of emotion skills measures, based on judgments of verbally presented information. Some previous research has shown, however, that the

identification dimensions work best (Ciarrochi et al., 2000) and it seemed unlikely that the more complex dimensions would be more useful in the present context. Most relevant, however, were the scores of mood and emotion knowledge described here and in a previous paper (Sjöberg, 2001b). The existence of an ability to make judgments about how other people feel currently or habitually is likely on the basis of the present and previous findings. The scores were also related to EI as measured by questionnaire items.

The four secondary factors obtained in the analysis of questionnaire items replicated well those found in the previous study, with the possible exception that Factor 2 was more of a measure of inhibition/rigidity than pure compulsory tendencies. The main properties of the factors remained. Factor 1 was clearly a factor of emotional stability and Factor 3 one of EI. Factor 4 was a factor of mental energy and creativity. It was interesting to see that sensation seeking was included in this factor.

The secondary factors were related to FFM scales and it was found that the latter accounted for a large portion of their variance. Yet, there were some findings suggesting that the secondary factors offered at least some information in addition to the FFM scales. This was true of EI more than the more traditional dimensions of emotional stability and energy. It should also be noted that the FFM scales were quite fakeable.

The measurement of these personality dimensions in a high-stakes competitive situation is by no means easy. Faking is an ever-present possibility, even if the literature on this point is encouraging. Faking has been a current concern in research on personality measurement (Visweswaran & Ones, 1999). Research on the issue has supported an optimistic conclusion: the effects on validity are small even in a selection situation. Extensive research on the question has shown that social desirability does not appear to influence scores to the extent of jeopardizing their validity (Barrick & Mount, 1996; Borman, Hanson, & Hedge, 1997; Ones, Visweswaran, & Reiss, 1996), and that faking more generally seems to be a somewhat marginal problem (Cunningham, Wong, & Barbee, 1994), as does coaching on similar and related tests (Palmer & Busciglio, 1996). Yet, in selection situations with a small selection ratio, there may be great changes in who is selected, depending on whether there is a correction for impression management or not, as demonstrated in the present data. If validity is not affected by such rank order changes it must be the case that raw scores and corrected scores carry unique, but different, validity creating components.

The present study used 4 different scales of impression management and they agreed quite well, and also with a fifth scale of social desirability used by the Hogan Development Survey. A pooled measure of these scales was used for further analysis of the importance of impression management. In addition, a section of the questionnaire (the last one) called for active faking, and gave some information which was used, with success, to validate the impression management scales.

Much of the work on faking seems to have used non-consequential testing situations. A scale of faking strategy was constructed here on the basis of the responses to the instructions to fake actively, and it was found to give important information in addition to the regular impression management scales. This measure of faking can be seen as a measure of *specific faking*, being tied to the specified dimensions rather than being general in nature as the usual measures of impression management. Specific measures in general are usually more strongly correlated with dimensions matched in content than the more general dimensions e.g. measuring personality, and it was found also in the present case that such tended to be the case. General impression management and specific faking together provided a quite powerful source of control of the final score. Such control is highly desirable in a testing situation such as the present one where many participants can be expected to behave in a tactical manner when answering the questions. In individual cases, the control measures taken produced dramatic changes in the rank order positions of the participants.

EI was much less affected by impression management and faking than other secondary factors. It may therefore be a good idea to extend faking to include central aspects of all 4 secondary factors and to use the measure of faking strategy, together with a pooled impression management score, to correct factor scores statistically. In such a way, more valid factor scores can be devised and later used for personnel decisions. So far, EI appears to be less fakeable than the more traditional personality scales measuring emotional adjustment and energy/dominance.

Finally, it is pertinent to ask how EI should be measured. None of the two approaches described in the literature has received a full-scale predictive validation in an industrial setting, at least no such validation has been published. Neither have they been extensively compared to each other, to standard benchmark tests or analyzed with regard to impression management. Little work is available where these measures have been applied in high-stakes applied settings. The answer to the question how to measure EI in such a setting is therefore necessarily quite preliminary. However, the present paper and previous work (Sjöberg, 2001b) suggest that the personality trait approach may be promising. The skills approach seems to be hard to use because consensual scoring sometimes leads to low reliabilities (some exceptions exist to this statement) and, more important, because the contents of the objects used (music, art, episodes or facial expressions) leads to measures which do not clearly converge on a general dimension of emotional skill. It is true that some promising results have been published on the skills approach, but they have not been widely replicated.

In a recent study, with the purpose of validating EI dimension, it was found that it correlated substantially with some criteria, such as life/work balance and salary, and that the gender difference was quite substantial, in favor of the female participants (Sjöberg, 2001a).

The standard objection to personality trait measures is that they can be faked. While this is true, such faking was not strong for all dimensions studied here (consider the positive EI findings) and can possibly be largely controlled by means of measures of impression management and faking strategies as demonstrated in the present paper. Further work in the direction of personality traits and faking control may therefore be the most promising approach. One problem to investigate is what are the prevailing stereotypes about how one should present oneself in order to succeed in the test. The items conveyed a message about what the tester had in mind, but they did so in great abundance (over 1000 items in the present study) and some dimensions may have been more obvious than others. Besides, even if a dimension or concept is more or less obvious to the testees, they may not agree on what is going to be scored as positive. An example in the present test is that of sensation seeking. About half of the testees indicated that a high level in that dimension was desirable, but half had the opposite opinion. EI was probably, in the present testing session, not very much faked by the testees. One wonders why. It is unlikely that the dimension *per se* is hard to fake or does not invite faking. Possibly, the concept was not very salient in a context dominated by items measuring either emotional adjustment or dominance/energy. An anti-faking strategy would then be to conceal crucial concepts by means of a context suggesting other dimensions to be most important - something which was in fact done here.

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Foot-notes

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2. Emotional intelligence usually refers as much to social as emotional intelligence and the concept will be used that way in the present paper, unless otherwise stated. This terminology is unfortunate, since the two dimensions are logically distinct and may or may not correlate empirically.

3. Present alpha values are based on the testing reported in the present article, hence in many cases on translated scales. Small SD's may account for some of the fairly low reliability coefficients noted here. It should also be noted that a four category response scale (see text) was used throughout, which in some cases was a divergence from the procedures of the original scales.

4. These scales refer to, respectively, ruminating about troubling events, suppressing feelings, lack of negative emotional reactivity, and lack of aggression.

5. In this and subsequent tables, * means $p < 0.05$, and ** means $p < 0.01$.

6. The group consisted of young people with a high level of scholastic achievement and possibly did not include the variation in psychoticism to be expected in a sample from the general population, or from clinical samples.

7. Due to a technical mishap one item was missed and one was deleted for other reasons. The response scale used four categories, not five as in the standard version. A few items were slightly rephrased.

8 . Two items were deleted due to concerns over privacy invasion issues.