

## Trait Emotional Intelligence: Behavioural Validation in Two Studies of Emotion Recognition and Reactivity to Mood Induction

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### *Abstract*

*This paper presents two experiments concerning trait emotional intelligence ('trait EI'). In study 1, ten high and ten low trait EI individuals were selected from a sample of 85 persons to participate in a computerized experiment involving the recognition of morphed emotional expressions. As hypothesized, high trait EI participants were faster at identifying the expressions than their low trait EI counterparts. In study 2, trait EI scores from 102 persons were residualized on the Big Five and subsequently 15 high and 15 low trait EI individuals were selected to participate in a mood induction experiment. As hypothesized, high trait EI participants exhibited greater sensitivity to the mood induction procedure than their low trait EI counterparts. The findings are discussed in terms of the construct validity of trait EI, with particular emphasis on the issue of incremental validity vis-à-vis broad personality traits. Copyright © 2002 John Wiley & Sons, Ltd.*

In the last few years, emotional intelligence (EI) has been the object of intense and intensive theoretical examination. The number of empirical studies is also steadily increasing, although the quantity of the emerging evidence has certainly not kept pace with theoretical propositions. As a result, core parts of several salient EI conceptualizations remain untested. The relative dearth of empirical evidence is more pronounced for controlled experiments than for correlational research. The two experimental studies in this paper aim to contribute towards addressing this imbalance in the EI literature.

The theoretical antecedents of EI have been presented in many papers (e.g. Ciarrochi, Chan, & Caputi, 2000; Davies, Stankov, & Roberts, 1998; Salovey & Mayer, 1990). Broadly speaking, the construct of EI posits that individuals differ in the extent to which they attend to, process, and utilize affect-laden information of an intrapersonal (e.g. managing one's own emotions) or interpersonal (e.g. managing others' emotions) nature. There are several salient conceptualizations, differing primarily in their scope, with some being relatively narrow (see e.g. Mayer & Salovey, 1997) and others relatively broad (see

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*Received 26 March 2002*

*Accepted 28 August 2002*

e.g. Bar-On, 1997; Goleman, 1995; Petrides & Furnham, 2001). With respect to the *theoretical domain* of the construct, these conceptualizations overlap, sometimes substantially. Thus, for example, 'emotional self-awareness' is a facet common to all salient conceptualizations of EI. Nevertheless, there is a *crucial* way in which the various approaches to the study of EI differ. As further explained below, this difference concerns the measurement of the construct.

An important theoretical shortcoming in the area of EI concerns the neglect of the distinction between typical and maximal performance (Cronbach, 1949; Hofstee, 2001). The latter has cogently argued that the empirically demonstrable independence of personality traits and cognitive abilities (Eysenck, 1994) should be taken into account when developing new theories or hypothesizing new constructs.

This distinction between typical and maximal performance has been largely overlooked in EI research, which has led to some degree of theoretical confusion and contradictory results (cf. Petrides & Furnham, 2001). For some time, we have been trying to advance the idea that the type of measurement (self-report versus maximum performance) used to operationalize EI bears directly on the conceptualization of the construct, on the hypotheses that are advanced and tested during the validation process, and, ultimately, on the results and conclusions of this process (Petrides & Furnham, 2000a, 2000b, 2001). The operationalization of EI through maximum-performance tests cannot, and will not, produce the same findings as its operationalization through self-report inventories.

Based on the considerations above, we proposed a theoretical distinction between *trait EI* (or 'emotional self-efficacy') and *ability EI* (or 'cognitive-emotional ability'; see Petrides & Furnham, 2000a, 2001). The former is measured through self-report questionnaires, whereas the latter is measured through maximum-performance tests, i.e. tests that are based on items that have correct and incorrect answers. It is important to realize that these are two different constructs because the procedures used in their operational definition are fundamentally different, even though their theoretical domains might overlap. Thus, the primary basis for discriminating between trait EI and ability EI is to be found in the type of measurement approach one chooses to employ and not in the theoretical domains of the various EI conceptualizations. Along with other researchers, we have argued that it seems very difficult to devise EI items that are amenable to objective scoring *and* cover the domain of the construct comprehensively (Roberts, Zeidner, & Matthews, 2001; Zeidner, Matthews, & Roberts, 2001; but also see Mayer, Salovey, Caruso, & Sitarenios, 2001, for the opposing viewpoint). For example, the entire *intrapersonal* component of EI seems to be impervious to maximum-performance measurement because the information required to score as correct or incorrect responses to items such as 'I am aware of my emotions as I experience them' is available only to the individual who is providing those responses. Our research, like that of the majority of researchers in this area (e.g. Ciarrochi, Chan, & Bajgar, 2001; Parker, Taylor, & Bagby, 2001; Reiff, Hatzes, Bramel, & Gibbon, 2001; Saklofske, Austin, & Minski, in press; Schutte et al., 2001; van der Zee, Schakel, & Thijs, 2002), has focused on what we have labelled 'trait EI' or 'emotional self-efficacy'.

Trait EI refers to a constellation of emotion-related self-perceptions and dispositions, assessed through self-report. The precise composition of these self-perceptions and dispositions varies across different conceptualizations, with some (see e.g. Bar-On, 1997) being broader than others (see e.g. Schutte et al., 1998). Petrides and Furnham (2001; see Table 1) presented a sampling domain of trait EI derived through a content analysis of several existing models. As noted, the construct has received much attention in the

literature, although most researchers have examined it under the general label of 'emotional intelligence'. Thus, it has been found that trait EI is related to goal orientation and life satisfaction (Martinez-Pons, 1997), depression and affect intensity (Dawda & Hart, 2000), and marital satisfaction (Schutte et al., 2001). In one of the few experimental studies in the area, Ciarrochi et al. (2001) showed that a specific facet of trait EI (emotion self-regulation) is related to mood management behaviour. In this paper, we focus on global trait EI scores and attempt experimentally to address several issues, including construct validity, incremental validity in a controlled context, and the extent to which the emotion-related self-perceptions that the construct encompasses are related to specific actual abilities.

## STUDY 1

Study 1 is the first of two experimental<sup>1</sup> investigations aiming to compare the response patterns of high and low trait EI individuals under controlled conditions. The main aim of the study is to examine whether there is any correspondence between people's self-perceptions of their ability to recognize, process, and utilize emotion-laden information (trait EI or emotional self-efficacy) and their specific actual ability to identify facial expressions. Self-perceptions, it is important to note, need not be accurate to exert influence on behaviour or mental health and much research has focused specifically on the effects of inaccurate self-perceptions, which may have both positive (Taylor & Brown, 1988) and negative (Beyer & Bowden, 1997) repercussions. Nevertheless, establishing the extent to which trait EI self-perceptions are accurate is likely to reinforce our understanding of the construct and to shed some light on the mechanisms through which it relates to 'real-world' behaviours.

The stimuli for the task, which involves the ability to identify emotional expressions as they develop, were taken from Ekman and Friesen (1976) and represent six universally identified (Ekman, 1994; Ekman et al., 1987; Izard, 1994; but also see Russell, 1994) facial expressions, *viz.*, happiness, sadness, fear, disgust, anger, and surprise. As has been noted elsewhere (Roberts et al., 2001), the progress that has been achieved in the area of facial expression of emotion (Ekman, 1999; Keltner & Ekman, 2000) makes it possible to devise tasks that can be objectively scored according to veridical criteria.

There is evidence that self-perceived abilities have low-to-moderate positive correlations with actual abilities (Furnham, 2001; Paulhus, Lysy, & Yik, 1998). To the extent that this holds true for trait EI, the construct might be expected to predict performance on an emotion identification task through one or more of the relevant self-perceived abilities that it comprises (e.g. emotion awareness). It has also been argued that the perception and expression of emotions is strongly influenced by emotional dispositions (King, 1998; Malatesta & Wilson, 1988). More specifically, King (1998) demonstrated that 'ambivalence over emotion expression' is implicated in deficits in emotion perception and interpretation. Further, Riggio, Tucker, and Coffaro (1989) found various measures of dispositional empathy, a central facet of trait EI, to correlate positively with performance on an emotion recognition task. Finally, evidence obtained with a slightly modified version of the task used in this study (see the 'Method' section) showed that psychopaths, who are

<sup>1</sup>For reasons of convenience we refer to the two studies in this paper as experimental, but it should be noted that they are actually quasi-experimental, since participants have not been assigned to groups randomly.

characterized by a lack of empathic skills (Blair, Jones, Clark, & Smith, 1997; Hare, Hart, & Harpur, 1991), are impaired in their ability to recognize facial expressions, particularly those involving fear (Blair, Colledge, Murray, & Mitchell, 2001; Blair et al., manuscript submitted for publication).

In this study, we hypothesized that high trait EI participants would perform significantly better on the emotion recognition task than low trait EI participants. However, it should be noted that neither the EQ-i nor the 'emotion mastery' scale that was added to it (see the 'Method' section) cover a trait EI facet of particular relevance in the present context, *viz.*, the self-perceived ability to identify others' emotional states. Consequently, failure to support the experimental hypothesis will be open to at least two interpretations, *i.e.* a problematic theory (incorrect sampling domain) or a problematic measure (unsuccessful assessment of the sampling domain). Conversely, if the hypothesis is supported, there will be further evidence that the main aspects of the theory are both valid and reasonably operationalized by the present measure.

## Method

### *Participants*

From an initial pool of 85, 34 first-year psychology students were selected to participate in the experiment based on their scores on the EQ-i (17 high and 17 low on trait EI). Participants (25 females and nine males) came from unequal parts of the distribution, roughly above the 75th and below the 30th percentiles. The mean age for the sample was 20.27 years ( $SD = 1.23$ ).

### *Measure*

*BarOn EQ-i* (Bar-On, 1997). This is a 133-item self-report measure of EI that comprises 15 different subscales. Petrides and Furnham (2001) included an additional subscale with the intention of covering some of the important trait EI facets that the EQ-i does not. The additional scale was labelled 'emotion mastery' and includes items concerning the self-perceived ability to identify and regulate one's own emotions. Example items include 'I have a hard time identifying my emotions', 'It's fairly easy for me to calm down when I realize I'm angry', and 'I am unable to keep negative emotions in check' (R). The internal consistency of the full-scale score based on the initial sample pool of 85 individuals was 0.90.

### *Apparatus*

The stimuli of the emotional expression task were presented on a 14 inch screen connected to a standard PC. They comprised videos of male and female faces culminating in one of the six prototypical emotional expressions (happiness, sadness, fear, disgust, anger, and surprise) over a sequence of 21 frames of increasing intensity (from 'neutral' frame 1 to 'maximum intensity' frame 21). Each stimulus subtended a horizontal visual angle of 3.6 degrees and a vertical angle of 5.2 degrees. There were three presentations for each emotional expression, bringing the total number of videos to 18. A standard stopwatch was used to measure response latencies, *i.e.* the time taken to identify each stimulus correctly. Because frames have to be switched manually, by pressing a key on the keyboard, the number of the frame at which correct identification occurred was also recorded for purposes of cross-examination.

### Procedure and scoring of the task

About five months after they had completed the trait EI measure, participants were contacted through special notices and e-mails. Each participant was tested individually in a quiet room in the presence of two experimenters, one of whom recorded time and the other the number of frames. Each participant was given instructions both in writing and verbally and was subsequently presented with a trial video involving the expression of happiness. Following this, the 18 test videos were presented in pseudo-random order. The video frames progressed sequentially between two polarized images, i.e. from a neutral face to one of the six prototypical expressions. Each frame was presented for two seconds before switching to the next morphed face in the sequence. The morphing sequence continued until the final frame of the video, regardless of whether the participant had identified the correct answer. Participants were told that they should give their response as quickly as possible, without merely guessing, and that they could change it at any time during the sequence. The scoring of the task was based exclusively on the final response. Participants were scored both according to their response latencies (in seconds) and the number of frames it took to identify each emotional expression. In those cases where a participant failed to identify the stimulus, we chose to assign the total available time (i.e. 42 seconds) and the total number of frames (i.e. 21) as the respective scores. Two analyses were conducted; one was based on the mean response latency for each emotional expression, i.e. the average time over the three presentations, and the other on the mean number of frames.

### Results

First, a *t*-test was performed to compare the mean response latencies (in seconds) of the high and low trait EI groups. There was a significant difference in the hypothesized direction ( $t_{(32)} = 1.79$ ,  $p < 0.05$ , one tailed;  $M_{(\text{high})} = 21.90$ ,  $SD_{(\text{high})} = 4.33$ ;  $M_{(\text{low})} = 24.66$ ,  $SD_{(\text{low})} = 4.68$ ). Highly similar results were obtained in the analysis based on the mean number of frames ( $t_{(32)} = 1.81$ ,  $p < 0.05$ , one tailed;  $M_{(\text{high})} = 11.13$ ,  $SD_{(\text{high})} = 2.22$ ;  $M_{(\text{low})} = 12.52$ ,  $SD_{(\text{low})} = 2.25$ ).

Subsequently, two new groups were created in order to look closely at extreme-scoring participants from comparable parts of the distribution. The two groups comprised participants whose scores fell above the 85th or below the 15th percentiles (12 females and eight males). The means and standard deviations for each of the six expressions across the two groups are presented in Table 1, where it can be seen that the high trait EI group had uniformly shorter response latencies and required fewer phases for correct identification than the low trait EI group.

A split-plot  $2 \times 6$  ANOVA was performed with the six emotional expressions as the within-subjects factor, trait EI group (high versus low) as the between-subjects factor, and response latency (in seconds) as the dependent variable. There was a significant main effect of trait EI ( $F_{(1, 18)} = 5.04$ ,  $p < 0.05$ ), with the high group identifying the expressions faster ( $M = 20.55$ ,  $SD = 2.99$ ) than the low group ( $M = 24.14$ ,  $SD = 4.06$ ). There was also a significant main effect of type of expression ( $F_{(5, 90)} = 10.63$ ,  $p < 0.01$ ). Sidak *post hoc* tests indicated that happiness was identified significantly faster ( $p < 0.01$ ) than each of the other five expressions (see Table 1 for means and SDs). There was no interaction between the two independent variables ( $F < 1$ ). Nevertheless, a simple main effects analysis, with the degrees of freedom adjusted as per Satterthwaite (1946), showed that there were significant group differences on happiness ( $F_{(1, 89)} = 4.27$ ,  $p < 0.05$ ) and surprise ( $F_{(1, 89)} = 2.97$ ,  $p < 0.05$ , one tailed), both of which were recognized faster by high trait EI participants.

Table 1. Means and standard deviations (in seconds and number of phases) for the high ( $N = 10$ ) and low ( $N = 10$ ) trait EI groups

	Happiness		Sadness		Fear		Disgust		Anger		Surprise	
	Time	Phases	Time	Phases	Time	Phases	Time	Phases	Time	Phases	Time	Phases
High trait EI	11.85 (3.93)	6.23 (1.99)	24.57 (6.93)	12.43 (3.42)	22.87 (3.22)	11.70 (1.81)	20.25 (7.43)	10.37 (3.81)	22.58 (5.17)	11.50 (2.52)	21.22 (4.64)	10.83 (2.25)
Low trait EI	17.49 (7.03)	9.10 (3.80)	27.72 (5.71)	14.10 (2.70)	24.69 (5.71)	12.40 (2.72)	24.56 (7.96)	12.50 (4.12)	24.45 (5.50)	12.47 (2.70)	25.92 (7.89)	13.13 (3.84)
Total	14.67 (6.25)	7.67 (3.30)	26.15 (6.39)	13.27 (3.12)	23.78 (4.61)	12.05 (2.27)	22.41 (7.82)	11.43 (4.02)	23.51 (5.29)	11.98 (2.59)	23.57 (6.74)	11.98 (3.28)

The data based on phases were also analysed via a  $2 \times 6$  split-plot ANOVA. The results were consistent in showing a main effect of trait EI ( $F_{(1, 18)} = 4.85, p < 0.05$ ), with the high group requiring fewer phases ( $M = 10.51, SD = 4.06$ ) than the low group ( $M = 12.28, SD = 2.00$ ). There was also a main effect of type of expression, with happiness identified faster than all other expressions ( $F_{(5, 90)} = 74.11, p < 0.01$ ; see Table 1 for means and SDs). There was no interaction between the independent variables ( $F < 1$ ). The results from the simple main effects analyses were very similar to those reported for the time data, indicating that the high trait EI group recognized the expressions of happiness and surprise significantly faster than the low trait EI group. The effect of trait EI was somewhat weaker in the whole sample ( $N = 34$ ; see *t*-tests in the first paragraph of the 'Results' section) than in the sub-sample ( $N = 20$ ), which was the main difference between the two analyses.

## Discussion

The hypothesis that the high trait EI group would perform better than the low trait EI group was clearly borne out by the data, thereby supporting the validity of the sampling domain from which it was derived. On the whole, the findings accord well with the proposition that emotional dispositions can affect emotion perception (King, 1998; Malatesta & Wilson, 1988) as well as with the evidence that depressive tendencies and deficits in empathic skills are associated with decreased perceptual sensitivity to emotional expressions (Carton, Kessler, & Pape, 1999; Kropp & Haynes, 1987; Riggio et al., 1989; Wexler, Levenson, Warrenburg, & Price, 1994). Despite the fact that the task was modified to accommodate the needs of this research (e.g. two rather than three seconds of exposure per phase were given in order to elicit individual differences), the findings were consistent with Blair et al. (2001; manuscript submitted for publication) and with Murray et al. (manuscript submitted for publication) in showing that happiness is recognized faster than the other five expressions. This could be the result of happiness being used as a trial stimulus in the present study, although there is cross-cultural evidence that this emotion is generally easier to identify than others (Ekman et al., 1987; Matsumoto, 1992).

It is important to reiterate that the measure used in this study does not cover the trait EI facet most relevant to the experimental task, namely, the self-perceived ability to identify others' emotions. The inclusion of items covering this area could have accentuated the differences between the high and low trait EI groups. That the hypothesis was borne out despite this deficiency supports conceptualizations that view trait EI as a constellation of strongly interrelated variables (Petrides & Furnham, 2001).

The limited range of the sample, consisting solely of first-year psychology students, may also have attenuated the differences between the two groups. It should be noted that the majority of differential studies on emotion identification are of a clinical nature and involve comparisons between sharply distinguished groups, such as psychopaths or clinically depressed individuals and controls. This is why the experiment was conducted on extreme-scoring participants, a strategy that is more likely to identify the experimental groups clearly. Indeed, the relationship between trait EI and mean response latencies seems to attenuate when participants with scores towards the middle of the distribution are entered in the analysis. If this attenuation is part of a general trend (i.e. the less extreme the scores, the weaker their association with task performance), then, in so far as middle-of-the-range trait EI scores are involved, either the criterion is insensitive or self-perceptions are inaccurate.

Experimental data are especially important from a construct validity perspective because they can clarify the processes through which trait EI relates to other variables. It is easier to understand how a construct is linked to simple experimental variables than to complex multi-determined ones, such as life satisfaction, academic performance, relationship quality, etc. The present experiment showed that high trait EI individuals seem to be adept at decoding other people's facial expressions, which may confer to them a substantial advantage as regards healthy socio-psychological functioning (Feldman, Philippot, & Custrini, 1991; Nowicki & Carton, 1997). However, this finding also suggests that high trait EI individuals may be more sensitive to emotion-laden stimuli in general. This possibility is worth exploring, not least because affective states can interfere with a broad range of evaluative judgments and cognitions (Clore, 1994).

## STUDY 2

If high trait EI individuals are indeed more sensitive to emotion-laden stimuli, it is likely that they will also be more responsive to mood induction procedures. By investigating this possibility, the present study aims, on the one hand, to explore whether high trait EI people are generally more 'susceptible to affect' and, on the other, to provide further empirical evidence that the response patterns of high and low trait EI individuals may differ considerably under controlled conditions. Furthermore, this study utilizes a statistical procedure in order to take into account the correlations between trait EI and personality, prior to assigning participants to the two experimental groups.

The central aim of the experiment is to show that trait EI, at least to some extent, reflects individual differences in sensitivity to emotion-laden stimuli. Several traits have been found to relate differentially to mood-induction procedures. For example, Rusting and Larsen (1997) showed that after a pleasant mood induction, Extraversion, but not Neuroticism, was positively associated with an increase in positive mood.<sup>2</sup> In contrast, after a negative mood induction, Neuroticism was positively associated with an increase in negative mood, while Extraversion showed a weaker negative association. While there is little doubt that there are links between personality and affectivity, their nature and degree of consistency have not been precisely determined yet (Berenbaum & Williams, 1995; Bunce, Larsen, & Cruz, 1993).

As far as we are aware, this is the first experimental study into any type of EI that controls for the entire portion of its variance that overlaps with the Big Five. The experimental hypothesis was that individuals with high scores on partial trait EI will be more sensitive to the mood induction procedures than individuals with low scores on partial trait EI.

## Method

### *Participants*

From an initial pool of 102, 30 first-year psychology students were selected, of whom 22 were females and eight males. The mean age for the sample was 20.69 years ( $SD = 2.95$ ). TEIQue scores (see below) were residualized on the Big Five and subsequently ranked.

<sup>2</sup>Neuroticism also had a positive, albeit not statistically significant, association with the increment of positive mood in the study by Rusting and Larsen (1997).



Table 2. Descriptives for the TEIQue

Scale	Number of items	Alpha	Characteristic item
Adaptability	9	0.78	I usually find it difficult to make adjustments in my lifestyle. (R)
Assertiveness	9	0.83	When I disagree with someone, I usually find it easy to say so.
Emotion expression	10	0.89	Others tell me that I rarely speak about how I feel. (R)
Emotion management (others)	9	0.61	I'm usually able to influence the way other people feel.
Emotion perception	10	0.81	I often find it difficult to recognize what emotion I'm feeling. (R)
Emotion regulation	12	0.67	When someone offends me, I'm usually able to remain calm.
Empathy	9	0.71	I find it difficult to understand why certain people get upset with certain things. (R)
Happiness	8	0.92	Life is beautiful.
Impulsiveness (low)	9	0.61	I tend to get 'carried away' easily. (R)
Optimism	8	0.86	I generally believe that things will work out fine in my life.
Relationship skills	9	0.66	I generally don't keep in touch with friends. (R)
Self-esteem	11	0.91	I believe I'm full of personal strengths.
Self-motivation	10	0.67	I tend to get a lot of pleasure just from doing something well.
Social competence	11	0.80	I can deal effectively with people.
Stress management	10	0.78	I'm usually able to deal with problems that others find upsetting.

The Spearman correlation between full and residualized TEIQue scores on the total sample was  $r = 0.48$ ,  $p < 0.01$ . The corresponding correlation based on the 30 individuals who participated in the experiment was  $r = 0.64$ ,  $p < 0.01$ . The 30 participants came roughly from above the 48th and below the 51st percentiles of the distribution of residuals.

### Materials

*Trait Emotional Intelligence Questionnaire (TEIQue)*.<sup>3</sup> Trait EI was assessed with a 144-item questionnaire using a seven-point Likert scale. Items for the TEIQue were created or adapted, such that they cover the sampling domain of the construct *comprehensively*. Detailed information about the TEIQue can be found in Table 2. The full-scale internal consistency based on the initial sample pool of 102 individuals was 0.86.

*NEO PI-R* (Costa & McCrae, 1992). This is a well established, 240-item questionnaire measuring six distinct facets for each of the Big Five factors. The internal consistencies for the Big Five, based on the initial sample pool, were 0.81, 0.79, 0.71, 0.75, and 0.78, for Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, respectively.

*Profile of Mood States (POMS)*: McNair, Lorr, & Droppleman, 1992). This questionnaire comprises 65 mood-related adjectives rated on a five-point Likert scale. It measures six identifiable affective states, *viz.*, tension, depression, anger, confusion, fatigue, and vigour. An overall mood disturbance score can be derived by summing up scores on each item.

<sup>3</sup>The Trait Emotional Intelligence Questionnaire (TEIQue) used in this study and a short 30-item version (TEIQue-s) are available from the first author, free of charge, for research purposes only.

Table 3. Correlations between trait EI and the Big Five based on the initial subject pool ( $N = 102$ ; above the diagonal) and on the experimental sub-sample ( $N = 30$ ; below the diagonal)

	1	2	3	4	5	6
1. Trait EI	—	-0.70**	0.68**	0.44**	-0.04	0.34**
2. Neuroticism	-0.73**	—	-0.52**	-0.23*	0.08	-0.15
3. Extraversion	0.69**	-0.63**	—	0.40**	-0.10	0.05
4. Openness	0.47**	-0.22	0.56**	—	-0.01	-0.10
5. Agreeableness	0.02	-0.07	-0.04	0.05	—	0.07
6. Conscientiousness	0.22	-0.24	0.02	-0.17	0.08	—

\* $p < 0.05$ ; \*\* $p < 0.01$ .

Participants were asked to rate how they felt 'right now'. As further explained below, participants provided ratings at three different instances (baseline, mood A, & mood B). The internal consistencies of the overall mood disturbance scores were 0.90 at baseline, 0.87 at mood A, and 0.89 at mood B. The internal consistencies of the six subscales were very satisfactory ( $\alpha > 0.80$ ) at all three measurement points.

*Video stimuli.* Two short ( $\approx 3$  min) video segments were used for the mood induction procedure. The disturbing clip was taken from a World War II documentary depicting conditions in a concentration camp. The cheerful clip was taken from a TV show depicting comical situations from amusing homemade videos.

#### *Procedure*

Participants were contacted via general notices and e-mails about five months after they had completed the TEIQue and the NEO PI-R. They were tested in group sessions over a period of about three weeks. Testing took place in a quiet seminar room and participants were expressly informed that they were free to leave at any time during the experimental session. Participants completed the POMS three times in the following order: upon arrival (baseline), following the disturbing video (mood A), and following the cheerful video (mood B).

## **Results**

Table 3 presents the correlations between trait EI and the Big Five on the initial pool from which participants were drawn as well as on the sub-sample of the 30 individuals who took part in the experiment.

The experimental hypothesis that the high and low trait EI groups would show differential response patterns across mood states was directly tested through a series of simple effects and simple contrast analyses carried out within each group.<sup>4</sup> Figure 1(a)–(f) shows that the high trait EI group was generally more sensitive to the mood manipulations than the low trait EI group.

<sup>4</sup>Box-and-whisker plots revealed two potential outliers in the high trait EI group. Although the outliers pulled the mean of the high trait EI group upwards (indicating higher mood disturbance), they did not considerably affect the analyses, which were carried out within each group. Thus, very similar findings were obtained from rerunning the analyses reported in the text with the two potential outliers removed. Nevertheless, it is important to check for outliers in experimental studies of trait EI, particularly within the high group. The reason is that this group may contain 'repressors', who are likely to provide exaggeratedly positive responses on self-report measures and unduly affect certain experimental results (Furnham, Petrides, Sistrerson, & Baluch, in press; Furnham, Petrides, & Spencer-Bowdage, 2002).

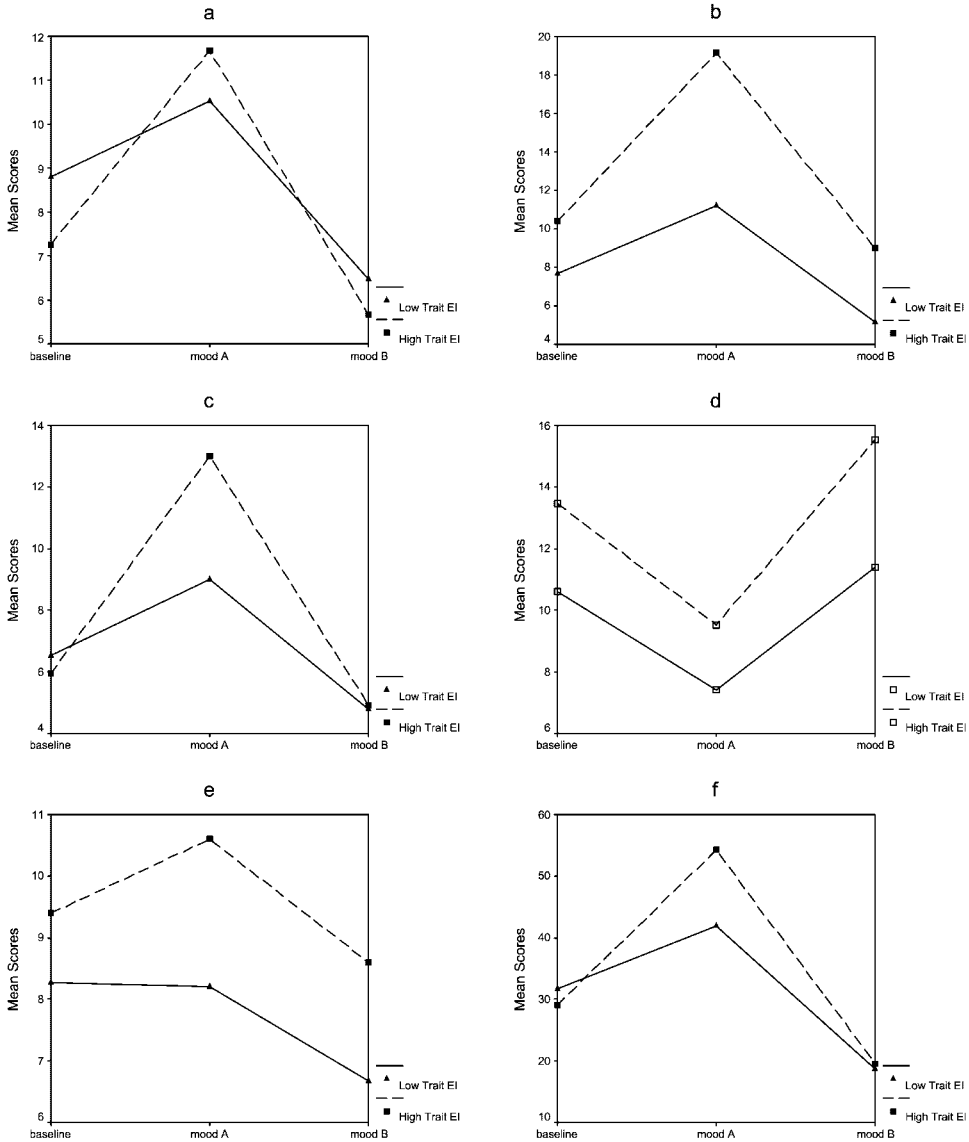


Figure 1. Profile plots for the high and low trait EI groups across the three mood conditions for tension (a), depression (b), anger (c), vigour (d), confusion (e), and overall POMS scores (f).

All one-way repeated measures ANOVAs were significant at either  $p < 0.05$  or  $p < 0.01$  ( $df = 2, 28$ ), with the exception of that for 'confusion' in the low trait EI group, which did not reach significance levels. This indicates that there were considerable mood changes in both groups as a result of the induction procedure. We now turn to the simple contrasts, each of which involves within groups (high versus low trait EI)–between conditions (baseline versus mood A, mood A versus mood B) Sidak-adjusted comparisons across the six mood states and the overall score.

After the distressing video (at mood A), there was a significant increase in 'tension' scores for the high ( $\Delta M = 4.40$ ,  $p < 0.05$ , one tailed), but not for the low trait EI group

( $\Delta M = 1.73$ ,  $p = \text{ns}$ ). There was a significant decrease in tension scores for both groups after the cheerful video (at mood B). For 'depression', there was an increase in scores at mood A and a decrease at mood B for both groups. However, the increase was more accentuated in the high trait EI group ( $\Delta M_{\text{high}} = 8.73$ ,  $p < 0.01$ ;  $\Delta M_{\text{low}} = 3.53$ ,  $p < 0.05$ , one tailed). For 'anger', there was a significant rise in scores at mood A for the high ( $\Delta M = 7.07$ ,  $p < 0.05$ ), but not for the low trait EI group ( $\Delta M = 2.47$ ,  $p = \text{ns}$ ). At mood B, there was a significant drop in scores for both groups. For 'confusion', there were no significant differences in either group at mood A, but at mood B there was a significant drop in scores only for the high trait EI group ( $\Delta M_{\text{high}} = -2.00$ ,  $p < 0.05$ ;  $\Delta M_{\text{low}} = -1.53$ ,  $p = \text{ns}$ ). For 'fatigue', there was no significant increase in scores for either group at mood A, but there was a significant drop for both groups at mood B. Last, for 'vigour', there was a significant decrease in scores at mood A for the high ( $\Delta M = -3.93$ ,  $p < 0.01$ ), but not for the low trait EI group ( $\Delta M = -3.20$ ,  $p = \text{ns}$ ). At mood B, there was a significant increase in the scores of both groups, although it was more accentuated in the former ( $\Delta M_{\text{high}} = 6.00$ ,  $p < 0.01$ ;  $\Delta M_{\text{low}} = 4.00$ ,  $p < 0.05$ ).

Looking at the *overall mood composite*, only the high trait EI group showed a statistically significant deterioration in mood after the disturbing video ( $\Delta M_{\text{high}} = 25.07$ ,  $p = 0.01$ ;  $\Delta M_{\text{low}} = 10.13$ ,  $p = \text{ns}$ ). Although both groups showed a statistically significant mood improvement after the cheerful video, the difference was clearly more pronounced in the high trait EI group ( $\Delta M_{\text{high}} = -34.06$ ,  $p < 0.01$ ;  $\Delta M_{\text{low}} = -23.13$ ,  $p < 0.01$ ).

## Discussion

The results supported the hypothesis that the group with high partial trait EI scores would be more sensitive to the mood induction procedures than the group with low partial trait EI scores. More specifically, there were five cases in which the high group showed statistically significant mood deterioration or mood improvement, whereas the low group did not (tension at mood A, anger at mood A, confusion at mood B, vigour at mood A, and overall POMS score at mood A). In addition, in every case where there were significant mood effects for both the high and the low trait EI groups, the absolute mean difference was larger in the former.

There is a wealth of empirical evidence suggesting that personality influences affective responding (Watson, 2000). The fact that trait EI seems to operate in a similar manner, *after Big Five variance has been partialled out*, further supports its conceptualization as a distinct personality trait. Other studies have also highlighted potential links between trait EI and mood. Thus, Salovey, Mayer, Goldman, Turvey, and Palfai (1995) showed that various aspects of trait EI are related to baseline mood, mood impairment, and mood recovery. Furthermore, they showed that 'clarity of feelings,' assessed with a trait EI measure, was a significant predictor of mood recovery, even after the effects of Neuroticism and depression were partialled out. More recently, Ciarrochi et al. (2001) showed that individuals high and low on emotional self-regulation (a facet of trait EI) responded differentially to positive and negative moods. Those high on emotional self-regulation generated more positive stories in a positive mood condition compared with a neutral mood condition, whereas those low on emotional self-regulation generated significantly more negative stories in a negative mood condition compared with a neutral mood condition.

In the present study, partial trait EI was linked with increased reactivity to mood induction. Although the effects appeared to be more pronounced at mood A (after the disturbing video), there is a design limitation that may have affected results at mood B, i.e.

lack of counterbalancing. If the two groups are differentially susceptible to carry-over effects, this will have been reflected in their responses at mood B (after the cheerful video). Future research may attempt to establish whether this is the case and, if so, apply counterbalancing procedures to larger and broader samples in order to guard against any confounding influences.

Potential associations between affect and personality can be sought within an affect-reactivity context, as we have done here, but also within an affect-level context (Gross, Sutton, & Ketelaar, 1998). The latter view posits that traits relate to affect through links that remain relatively invariant across time and circumstances. The affect-reactivity and affect-level views are not mutually exclusive (Gross et al., 1998) and it is quite possible that trait EI may have effects of both kinds. Although the present study demonstrates differential reactivity for the high and low trait EI groups, removing two potential outliers (see Footnote 4) reveals a stable tendency for the former group to report less mood disturbance relative to the latter group, both at baseline and after the cheerful video (but not after the disturbing video at mood B).

The foregoing discussion shows that there is scope for further studies on the associations between trait EI and affect. An especially interesting line of research could involve factor location studies examining the construct with respect to hierarchical structures of affect, such as that of Tellegen, Watson, and Clark (1999), particularly in view of the mood components present in certain trait EI inventories (e.g., the EQ-i). In the context of the model of Tellegen et al., trait EI would be expected to correlate positively with positive affectivity and negatively with negative affectivity and to exhibit a relatively strong positive association with the trait pleasantness–unpleasantness (or happiness–unhappiness) dimension at the apex of the hierarchy. Should these hypotheses be supported empirically, one could also expect trait EI to have effects in accordance with the affect-level view outlined above.

This study has identified several paths relating trait EI to dispositional and temporary mood and shown that the construct is likely to be associated with differential reactivity to affect-laden stimuli. In addition to providing evidence of construct validity, this finding highlights the dispositional, opposed to ability, nature of trait EI. Given that transient affective states can interfere with cognitive processing, sometimes leading to misattributions and irrational judgments (Clore, 1994; Forgas, 1990), it is unlikely that increased sensitivity to affective cues will be an advantageous attribute at all times and circumstances. It would be interesting experimentally to examine potential *disadvantages* for high trait EI individuals, such as increased susceptibility to interference from emotion-evoking stimuli in learning or memory tasks. More generally, additional research on this topic is likely to further our understanding of the links between emotional reactivity and various aspects of trait EI, including full and residualized scores and relationships with specific sub-factors or facets of the construct.

## GENERAL DISCUSSION

To the extent that the hypotheses were borne out by the data, the findings from the two experimental studies in this paper provide evidence in support of the construct validity of trait EI. It is encouraging that the data to support the two hypotheses came from two different trait EI inventories (EQ-i and TEIQue). This convergence, in combination with other promising findings based on yet different measures of the construct (e.g. Otto,

Doring-Seipel, Grebe, & Lantermann, 2001; Schutte et al., 2001), suggests that several extant questionnaires can be used to assess trait EI reliably and validly. It cannot be argued, however, that all measures of trait EI are equivalent, at least not in the technical sense of the word, as there are conceptual and perhaps psychometric differences between these questionnaires. For example, preliminary analyses suggest that the TEIQue is more readily isolable in five-factor space than the EQ-i (Petrides, 2001). An important goal for future research is to investigate the interrelationships between the various trait EI measures and clarify their degree of conceptual and psychometric convergence.

With respect to the specific findings in this paper, study 1 showed that trait EI self-perceptions tend to be accurate, at least as far as extreme-scoring participants are concerned. Study 2 demonstrated the incremental validity of trait EI *vis-à-vis* the Big Five in an experimental context. The issues of accuracy and incremental validity require some additional elaboration from a theoretical perspective.

### Accuracy of self-perceptions

It must be reiterated that self-perceptions have a strong influence on cognition, behaviour, and mental health, irrespective of whether they are accurate or not (Bandura, 1997; Beyer & Bowden, 1997; Taylor & Brown, 1988). With respect to trait EI self-perceptions more specifically, one simply has to consider the recent influx of empirical evidence presented or cited in this paper. Be they accurate or not, the emotion-related self-perceptions examined in these and other studies are implicated in academic performance, transgressive conduct, subjective well-being, and many other behaviours, subjective evaluations, and judgments (see e.g. Ciarrochi, Deane, & Anderson, 2002; Dawda & Hart, 2000; Parker et al., 2001; Petrides, 2001; Reiff et al., 2001; Schutte et al., 2001).

Perhaps it must be accepted, however, that the degree to which the entire constellation of trait EI self-perceptions is accurate cannot be determined. Extant maximum-performance measures of EI cannot serve as benchmarks for assessing the accuracy of self-reports. In fact, given that it is not possible to score emotional experiences along typical cognitive ability lines, one cannot but second the position that when discrepancies arise, self-reports must be given priority over objective measures in the study of affect (Watson, 2000).

Although study 1 provided evidence of a relationship between trait EI and the ability to identify emotional expressions, the extent to which this relationship holds over the entire trait EI continuum is not clear. To elucidate this issue it will be necessary to conduct analyses on whole samples, with continuous scores, rather than on extreme-scoring groups only. In addition, the fact that self-perceptions seem to have some degree of accuracy, at least as far as extreme-scoring groups are concerned, may not be interpreted as evidence of substantial overlap between trait and ability EI. On the one hand, the association between trait EI scores and emotion recognition remains unclear outside the confines of extreme-scoring groups and, on the other, the ability to perceive others' emotions is only a small fragment of ability EI (Mayer & Salovey, 1997).

### Incremental validity

The issue of incremental validity is considerably trickier, not least because there are persistent calls in the literature to demonstrate that trait EI has incremental validity over personality (Davies et al., 1998; Izard, 2002; Mayer, Caruso, & Salovey, 2000; Newsome, Day, & Catano, 2000). Since trait EI belongs in the domain of personality, a straightforward strategy for investigating incremental validity involves taking parts of

the variance of established trait taxonomies (notably the Eysenckian and the Five Factor) as the baseline that the construct will have to exceed in order to be considered 'incrementally valid'. This reasoning leads us to a thorny question: Which parts of trait taxonomies should be partialled out of trait EI?

The need for partialling arose from the fact that most EI conceptualizations (see e.g. Bar-On, 1997; Goleman, 1995; Salovey & Mayer, 1990) encompass facets such as 'empathy', 'impulsivity', and 'flexibility', which are already incorporated in the major personality hierarchies. Ideally, then, these are the facets that should be specifically targeted for partialling. Indeed, McCrae (2000) provided a thorough review of the conceptual correspondences<sup>5</sup> between the NEO PI-R facets and Bar-On's (1997) and Goleman's (1995) EI models, which could perhaps be used as a guide to partialling procedures.

The problem with the foregoing approach is that it could leave the analyses open to semantically based objections. Thus, it would be simple to call into question, and eventually dismiss, any evidence of incremental validity on the grounds that a few more personality items or scales should be partialled out before the results can be appropriately evaluated. In study 2, we employed a straightforward, albeit indiscriminate, procedure to attend to this matter. Thus, we resorted to partialling out the variance tapped by an established trait hierarchy *in its entirety*.<sup>6</sup> The results of that study showed that despite the considerable overlap between trait EI and the Big Five, the former did predict participants' sensitivity to the mood induction procedure over and above the latter five.

Empirical evidence demonstrating the incremental validity of trait EI over personality variables is accumulating rapidly (Ciarrochi et al., 2001; Petrides, 2001; Saklofske et al., in press). This trend is likely to continue because a trait EI factor can be isolated in Eysenckian as well as in Big Five factor space, which constitutes strong evidence of discriminant validity (Petrides & Furnham, 2001).

At the same time, there can be little doubt that trait EI is strongly correlated with basic traits, particularly Neuroticism and Extraversion (see e.g. Dawda & Hart, 2000; Petrides, 2001). But just how interesting is this fact from a theoretical perspective? The answer is not too much. It is not particularly interesting to know that 'some weighted linear combination of the Giant Three or the Big Five' correlates strongly with trait EI because 'some weighted linear combination of the Giant Three or the Big Five' is likely to correlate strongly with alexythymia, self-esteem, depression, and indeed with many other constructs measured via self-report, especially those that are relatively broad and highly reliable.<sup>7</sup>

<sup>5</sup>It is important to note that 'conceptual correspondence' does not imply duplication. Thus, as McCrae (2000) points out, some conceptual correspondences are particularly close (e.g. NEO PI-R 'impulsiveness' and 'impulse control' in trait EI measures), whereas others are not (e.g. NEO PI-R 'values' and 'independence' in trait EI measures). On a subtler note, even facet scales that look like straightforward duplicates (e.g. trait EI 'empathy' and EPP 'empathy') could provide incremental information simply because the facets, and by extension the scope of their operationalization, are differentially relevant to the domain from which they have been sampled.

<sup>6</sup>The vital disadvantage of this approach is that along with variance resulting from simple duplication, it also partials out overlapping variance resulting from valid associations. For example, the variance due to the relationship between, say, Extraversion and the self-perceived ability to identify others' emotional expressions is suppressed, even though it is clearly not caused by duplication. Perhaps less importantly, overlapping variance is artificially created, and subsequently removed from trait EI, through common method assessment and chance (sample-specific) associations that arise between the various self-report measures.

<sup>7</sup>Perhaps more interesting is the investigation of the extent to which basic trait dimensions capture the common, as opposed to specific, variance of various personality constructs (O'Connor, 2002), especially those that are thought to be located at lower levels of trait taxonomies. In the case at hand, such an investigation would have to follow a psychometric analysis of extant trait EI measures, particularly with reference to their factor structures. A psychometric analysis of comprehensive trait EI measures would also contribute to our understanding of the structure of emotion-related individual differences (Gohm & Clore, 2000).

Of course, in the case of trait EI, whatever overall correlation we can legitimately expect is considerably inflated by the fact that several traditional personality facets are, to varying extents, duplicated in trait EI measures. However, as mentioned above, in many circumstances the construct retains its predictive validity, even when the variance of personality taxonomies, such as the Eysenckian or the Big Five, is partialled out. This does not guarantee, however, that trait EI will also have incremental validity over any combination of *lower order* traits (facets) from extant taxonomies. For example, it is possible for a combination of Big Five facets to show a stronger relationship with trait EI than the Big Five factors themselves (see Paunonen & Ashton, 2001). On the other hand, it is also possible that a combination of trait EI subscales will exhibit even stronger incremental validity with respect to certain criteria than the global score.

In any case, it should be stressed that even if there were *complete* overlap between trait EI and the main personality dimensions, the explanatory power of the former would not be compromised in the least. As Funder (2001) pointed out, describing personality constructs in terms of the broad personality dimensions, albeit frequently possible, fails to capture the essence of the constructs.

We believe that the theoretical and explanatory power of any psychological construct, including trait EI, is much more important than its incremental validity, which can vary considerably across contexts, variables, and samples. It is precisely this power that is compromised when we attempt to conceptualize trait EI in terms of the Giant Three or the Big Five. To illustrate this point, in study 1 we hypothesized and found that high trait EI individuals identified emotional expressions faster than their low trait EI counterparts. The question is this: what theoretically derived hypothesis or psychologically meaningful explanation could be advanced for study 1 based on the potentially variable empirical observation that individuals low on trait EI tend to be high on Neuroticism and Introversion and low on Conscientiousness and Openness?

### Concluding remarks

Irrespective of the incremental predictive utility that trait EI may afford, it is its value as a conceptual and explanatory framework that renders it attractive for psychological investigation. Indeed, it is the appeal of this framework that sparked research on trait EI and surely not any faith in claims that the construct is twice as important as IQ or thrice as significant as personality. Future research should be directed towards developing the nomological network of trait EI and further elucidating the processes through which it relates to other variables, instead of attempting to demonstrate its incremental utility under different conditions and circumstances.

### ACKNOWLEDGEMENTS

The first author was supported by a Postdoctoral Fellowship from the Economic and Social Research Council (ESRC). We are grateful to Lindsey Murray, who developed the interactive task used in study 1, and James Blair and Derek Mitchell for making the materials available as well as for providing preprints of their work and helpful comments. We also wish to thank C. Buck, N. Dang, R. Davies, Z. Fortune, A. Miers, S. Spencer-Bowdage, L. Střbac, K. Thomson, and T. Spranger for their assistance in data collection and coding.



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