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Individual Differences in Facial Emotion Processing: Trait Emotional Intelligence, Cognitive Ability, or Transient Stress?

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Abstract

This study tested whether trait emotional intelligence (TEI) measures of narrow bandwidth predict perception of facial emotion, using two tasks: identification of microexpressions of emotion and controlled visual search for target emotions. A total of 129 undergraduates completed multiple scales for TEI, as well as cognitive ability, personality, and stress measures. TEI was associated with a reduced stress response, but failed to predict performance on either task, contrary to the initial hypothesis. However, performance related significantly to higher cognitive intelligence, subjective task engagement, and use of task-focused coping. Individual differences in attentional resources may support processing of both emotive and non-emotive stimuli.

Keywords

trait emotional intelligence, emotion perception, facial emotion, microexpressions, attention, task engagement, stress

Conceptual models of emotional intelligence (EI) identify emotion perception as central to this construct (Matthews, Zeidner, & Roberts, 2002). In research, emotion identification has often been operationalized using facial perception tasks, reflecting the importance of facial emotion in social interaction (Ekman, 2007; Roberts et al., 2006). Thus, a valid assessment of EI should predict facial emotion perception. However, several key issues remain unresolved. As further discussed below, associations between EI and emotion perception are inconsistent across studies,

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and it is unclear what moderating factors might be critical (Fiori & Antonakis, 2012). Also, assessments of EI remain divided into two contrasting types. Tests for *ability EI* (AEI) seek to measure the construct as an ability akin to a standard intelligence, whereas questionnaires for *trait EI* (TEI) aim to assess personality traits that facilitate identifying, processing, and acting on emotive events (Zeidner, Matthews, & Roberts, 2012). Both AEI and TEI have multiple facets that may be differentially related to emotion perception. We focused here on TEI, given difficulties in finding significant associations between AEI and emotion perception (Roberts et al., 2006), and recent evidence suggesting that TEI plays a role in emotion decoding (Edgar, McRorie, & Sneddon, 2012). The present study aimed to extend previous research by examining the role of several facets of TEI in two demanding tasks: perceiving emotional microexpressions and searching a multi-element display for target emotions.

Trait Emotional Intelligence and Facial Emotion Processing

TEI scales might predict facial emotion recognition given that relevant personality traits predict identification of nonverbal social cues. A meta-analysis of 216 studies (Hall, Andrzejewski, & Yopchick, 2009) found that various "positive" traits correlated significantly with objective tests for cue recognition. Effect sizes were typically small: Few exceeded an *r* of .20. The analysis did not differentiate emotive and non-emotive cues. Predictive traits included some that correlate substantially with TEI, including extraversion, agreeableness, and emotional stability, although no studies included a TEI measure.

The few studies of TEI and facial emotion recognition provide inconsistent results. For example, Petrides and Furnham (2003) found that higher total TEI predicted faster speed of identifying dynamic morphed expressions. Using a different measure of TEI, Edgar et al. (2012) similarly found that higher total TEI predicted higher consistency in decoding dynamic, spontaneously elicited expressions of emotions. However, their study focused on the intrapersonal reliability of decoding, rather than on the validity of emotion judgments. Austin (2004, 2005; Farrelly & Austin, 2007) found no significant associations between total TEI and accuracy of processing static facial emotional stimuli. One study (Austin, 2004) found that accurate emotion recognition was positively associated with one specific facet of TEI only, namely appraisal of emotions in others, although this association has yet to be replicated. TEI also correlates with psychophysiological response to emotive stimuli (Knyazev, Mitrofanova, & Bocharov, 2013; Tolegenova, Kustubayeva, & Matthews, 2014). As for more complex social judgments involving decoding of emotions, the findings have been less positive. In a study using realistic multimedia stimuli, the self-reported ability to express and perceive emotion was associated with *poorer* performance in discriminating sincere and insincere emotional displays (Baker, ten Brinke, & Porter, 2012). Trait EI also failed to predict the ability to learn a facial emotion as a cue for discriminating a person's intent (Fellner et al., 2012).

There are two plausible reasons for these inconsistent associations (beyond simple lack of construct validity). First, personality effects on cognitive processes are commonly sensitive to task demands, reflecting associations between traits and specific components of information-processing (Matthews & Zeidner, 2012). Some emotion perception tasks may be more sensitive than others to TEI, for example, when emotional displays are difficult to interpret. For example, studies of alexithymia, a trait related to low TEI, suggest that processing of emotional facial expressions is impaired in individuals high in alexithymia especially when stimuli are difficult to recognize as a result of task features such as degradation of stimuli or short presentation times (Grynberg et al., 2012). Fiori (2009) highlighted the potential importance of attentional processes in EI. Emotionally intelligent individuals may allocate attentional resources to emotional stimuli, leading to an advantage in recognizing brief or subtle emotional displays. Thus, studies of TEI and facial emotion processing should include tasks varying in processing requirements and difficulty.

A second source of these anomalies may be the heterogeneous nature of TEI. Typically, alternate self-report scales for TEI converge, and the "general factor" of TEI also correlates substantially with higher order personality traits such as the Five Factor Model (FFM; Pérez-González & Sanchez-Ruiz, 2014). Working with trait facets may help to identify the components of TEI more genuinely distinct from the higher order personality traits that are potentially a source of confounding in empirical studies. Thus, in studying facial emotion processing, it may be more productive to select facets of TEI that are related to emotion perception (e.g., attention to emotions, appraisal of emotions in self and others) than to work with overall TEI.

Individual Differences in Resources for Emotional Processing

Other trait and state factors may also influence attention to emotive stimuli. Cognitive ability is correlated with performance on a range of demanding attentional tasks, perhaps because ability is associated with supervisory executive processing (Schweizer, 2010). Recent work confirms that both fluid ability (Gf) and crystallized ability (Gc) correlate with perceptual sensitivity on resource-limited signal detection tasks (Matthews, Warm, Shaw, & Finomore, 2014). Associations between personality traits and attention are more variable, although some work implicates extraversion, conscientiousness, and emotional stability in superior executive processing (e.g., Matthews & Zeidner, 2012).

Attention is often more sensitive to transient affective states than to personality traits (Matthews et al., 2014; Shaw et al., 2010). A state dimension of task engagement—that is, energy, alertness, and task-directed motivation—reliably predicts performance on a range of attentional tasks. These include vigilance, controlled visual and semantic search, and executive processing (Matthews, Warm, Reinerman, Langheim, & Saxby, 2010; Matthews & Zeidner, 2012). Task engagement is typically more strongly correlated with performance on higher workload versions of tasks (Matthews, Warm, Reinerman, Langheim, & Saxby, 2010). Because more demanding task versions are more likely to be limited by general attentional resources, this finding suggests that task engagement may be a marker for resource availability. However, resources appear to reflect multiple underlying processes that may be characterized both physiologically and psychologically (Matthews et al., 2014). In a vigilance study, Matthews, Warm, Reinerman, Langheim, Washburn, and Tripp (2010) found that higher engagement predicted a stronger cerebral bloodflow velocity response, an index of brain metabolism that may provide a physiological marker for resources. Task engagement also correlates with use of coping strategies including task-focus that may support more effective allocation of resources to processing (Matthews, Szalma, Panganiban, Neubauer, & Warm, 2013; Matthews, Warm, Reinerman, Langheim, & Saxby, 2010; Matthews, Warm, Reinerman, Langheim, Washburn, & Tripp, 2010).

By contrast with other attention factors, TEI should relate to allocation of resources to emotional processing only (Fiori, 2009). Studies should include a non-emotive control task to check the specificity of any TEI–performance association. However, TEI might have an indirect effect on attention mediated by resilience to stress, given that stress state response might disrupt attention to both emotive and non-emotive tasks. High TEI individuals have been found to show healthier physiological stress response and to use more adaptive coping strategies when dealing with task-induced stress (Mikolajczak, Roy, Luminet, Fillée, & de Timary, 2007; Salovey, Stroud, Woolery, & Epel, 2002).

Aims of Study

We aimed to investigate further the validity of TEI scales as predictors of emotion perception by investigating two demanding facial-processing tasks. One task was perceptually demanding. Emotions may be expressed as short-lived microexpressions (Ekman, 2007), especially when the person is attempting to conceal emotions or intent (Matsumoto & Hwang, 2011). Although it remains controversial whether TEI is associated with superior detection of deceptive emotion (Baker et al., 2012), TEI should relate to more accurate perception of emotion microexpressions.

The second task was attentionally demanding, following Fiori's (2009) suggestion that EI may relate to attentional resource allocation. The task required controlled visual search for designated emotional (faces) or non-emotional (nuts) target stimuli. Controlled search requires an increasing allocation of attentional resources as search demands increase (Fisk & Schneider, 1983; Matthews, Davies, Westerman, & Stammers, 2000). If high TEI persons have more resources available for emotional attention, they should process emotional face stimuli more efficiently, but not nut stimuli. By contrast, cognitive ability, task engagement, task coping, and possibly general personality traits should affect emotional and non-emotional tasks similarly.

We assessed various TEI scales and cognate affective constructs, including mood-regulation and (lack of) alexithymia. We focused on traits that appear to be acceptably distinct from the FFM (i.e., where correlations with FFM traits do not exceed .50 or so). Fifteen scales were selected from five different instruments covering various facets of TEI, including perception of emotions in self and others, attention to emotions, and emotion regulation. Two scales assessed constructs that appear to be especially relevant to face perception: the Emotion Perception scale of the Trait Emotional Intelligence Questionnaire (TEIQue; Pérez-González, Petrides, & Furnham, 2005) and Wong and Law's (2002) Appraisal and recognition of emotion in others scale (Wong and Law Emotional Intelligence Scale [WLEIS]). We used factor analysis to identify dimensions of TEI in our predictor set. We hypothesized that TEI dimensions associated with emotion perception would predict performance on the two emotional tasks, with cognitive ability and personality controlled.

As a secondary aim, the study investigated subjective stress responses to performing the cognitive tasks. Emotionally intelligent individuals should be less vulnerable to states of stress (Zeidner et al., 2012). In this case, we tested the extent to which any relationships between TEI and attentional task performance were mediated by stress state and coping factors.

Method

Participants

A total of 129 psychology students (79 women, 50 men) participated in this study. Mean age was 20.8 years (*SD* = 3.8 years), with a range of 18-38 years. Participants were required to have normal or corrected-to-normal vision, and fluency in English. They were offered course credit in return for participation.

Measures

Table 1 summarizes measures. The only objective tests were two cognitive ability tests. *Letter Series* required respondents to determine the next letter in a sequence. *Esoteric Analogies* contained 24 semantically related word pairs and required the respondent to use the analogical relationship between the two words to identify a further pair of words that are similarly related. Both tests required a choice of one of four response options for each item; 4 min was allowed for each test. The remaining measures were questionnaires. Items were answered using Likert-type rating scales as described in the source publications. In most cases, scale scores were found by summating item scores. For the Dundee Stress State Questionnaire (DSSQ), the three stress state scores were estimated from the 11 primary scales as described by Matthews, Campbell, et al. (2002).

Table 1. Summary of Measures.

Construct	Measure	No. of items	Scales	Source
Trait emotional intelligence (EI)	*Trait Emotional Intelligence Questionnaire* (TEIQue)	29	Expression, Perception, Empathy	Petrides and Furnham (2003)
	Wong and Law Emotional Intelligence Scale (WLEIS)	16	Appraisal and expression of emotion in oneself, Appraisal and recognition of emotion in others, Use of emotion to facilitate performance, Regulation of emotion in oneself	Wong and Law (2002)
	Twenty-Item Toronto Alexithymia Scale (TAS-20)	20	Difficulty identifying feelings, Difficulty describing feelings, Externally oriented thinking	Bagby, Taylor, and Parker (1994)
	Mood Awareness Scale (MAS)	10	Monitoring, Labeling	Swinkels and Giuliano (1995)
	Trait Meta-Mood Scale (TMMS)	30	Attention, Clarity, Repair	Salovey, Mayer, Goldman, Turvey, and Palfai (1995)
Personality	*Mini-markers*	40	Extraversion (E), Neuroticism (N), Agreeableness (A), Conscientiousness (C), Openness (O)	Saucier (2003)
Cognitive Ability	*Gf/Gc test battery*	39	Letter Sets (LS), Esoteric Analogies (EA)	Stankov (2000)
Stress State	*Dundee Stress State Questionnaire* (DSSQ)	96	Task Engagement, Distress, Worry	Matthews, Campbell et al. (2002); Matthews, Szalma, Panganiban, Neubauer, and Warm (2013)
Coping	*Coping Inventory for Task Situations* (CITS)	21	Task-focus, Emotion-focus, Avoidance	Matthews and Campbell (1998)

Tasks

Micro Expression Training Tool (METT). This test (Ekman, 2003) measures recognition of micro-expressions using 180 × 180 pixel images representing seven emotions (anger, contempt, disgust, fear, happiness, sadness, surprise), each presented for 200 ms. It includes male and female Caucasian and east Asian faces. Detection was assessed at three stages. First, the participant's initial ability to recognize these emotions was tested. For each item, the participant made a forced choice response from the seven emotions, plus a "none" option. There was no time limit for answering. Next, the participant was shown short, slow-motion video clips that demonstrated critical changes in the face for specific emotions, followed by a further recognition test. This was followed by another series of slow-motion demonstration video clips. Finally, the participant was retested on new facial images. Fourteen stimuli (two for each emotion) were presented at each of the three tests; performance was assessed as percent correct. Feedback on response accuracy was provided only during the training session, and not during the pre- and post-test sessions.

Search. Facial stimuli for this task were taken from the METT. Images of nut kernels, professionally photographed, were used as non-emotive control stimuli, because nuts are biological in nature, of roughly oval outline, and belong to familiar categories. Stimuli were 180 × 180 pixel images of five different nut types (almond, cashew, hazelnut, peanut, pecan) and five different facial emotions (anger, fear, happiness, sadness, surprise). E-Prime software was used to present 20 practice trials on which response feedback was given, plus 100 test trials (50 faces, 50 nuts). On each trial, a verbal target was presented (e.g., PEANUT or ANGER) followed by a display containing either one image in the center of the screen (D = 1), or four images in a 2 × 2 matrix in the center of the screen (D = 4). The display remained on-screen until the participant responded. The tasks required "controlled" search, because search–replace (S-R) mappings were varied across trials. There were equal numbers of trials for the two display sizes (D = 1 and D = 4), and equal numbers of positive and negative trials. The participant pressed the 1 key if the target was detected or the 0 key if no target was found. Response time (RT) and accuracy of response were recorded. Mean percent accuracy and median RT were calculated for each condition.

Procedure

All participants followed the same protocol. First, they completed all TEI, personality, and ability measures, followed by a pre-task DSSQ (stress state). They then completed the METT task, followed by the search task. Finally, they completed the post-task DSSQ and the Coping Inventory for Task Situations (CITS); instructions asked them to rate their overall subjective state and coping across both tasks. In the performance context, task-focus is considered more adaptive than emotion-focus and avoidance (Matthews & Campbell, 1998).

Results

Factor Analysis of TEI Scales

An exploratory factor analysis of the 15 TEI scales was conducted, using principal factor extraction and rotation to an oblique solution using the direct oblimin criterion. Horn's (1965) parallel analysis indicated a two-factor solution (Table 2). The two factors explained 58.7% of the variance, and were correlated at .38. The first factor was labeled as Emotional Clarity. It was defined by constructs including Clarity of thinking about emotion (TMMS), Labeling emotion (Mood Awareness Scale [MAS]), and Self-emotion appraisal (WLEIS), as well as TEIQue Emotion perception. The Twenty-Item Toronto Scale (TAS-20) for Difficulty identifying feelings had a high negative loading. The second factor was labeled Emotional Attention, being defined primarily by the TMMS Attention scale, as well as Monitoring emotion (MAS), low Externally oriented thinking (TAS-20), and the WLEIS Appraisal of other scales loaded on this factor. Participant factor scores were computed using a regression model for use in subsequent analyses.[1]

Table 3 shows correlates of the two TEI factors. Both were associated with higher Extraversion and Agreeableness, and neither correlated with cognitive ability. Only Clarity was correlated with Conscientiousness and low Neuroticism, whereas Attention had a larger correlation with Openness.

Predictors of Microexpression Perception

Figure 1 shows performance on the METT across the three phases of assessment. A one-factor repeated measures ANOVA showed a significant main effect for phase, F (1.91, 244.79) = 62.37, $p < .01$, $\eta_p^2 = .328$, with Box's correction applied to *df*s. As expected, the video training

Table 2. TEI Scales: Factor Pattern.

	Factor	
	1	2
TEIQue		
Expression	.48	.40
Perception	.70	.23
Empathy	.43	.37
WLEIS		
Self-appraisal	.86	−.10
Other-appraisal	.17	.57
Emotion use	.39	.08
Emotion regulation	.56	−.09
TAS-20		
Difficulty identifying feelings	−.93	.27
Difficulty describing feelings	−.56	−.38
Externally oriented thinking	.06	−.75
MAS		
Labeling	.81	.14
Monitoring	−.14	.64
TMMS		
Attention	.22	.76
Clarity	.89	−.02
Repair	.31	.23

Note. TEI = trait emotional intelligence; TEIQue = Trait Emotional Intelligence Questionnaire; WLEIS = Wong and Law Emotional Intelligence Scale; TAS-20 = Twenty-Item Toronto Alexithymia Scale; MAS = Mood Awareness Scale; TMMS = Trait Meta-Mood Scale.

Table 3. Personality and Ability Correlates of TEI Factors.

	E	N	A	C	O	LS	EA
TEI: Clarity	.36**	−.39**	.48**	.39**	.25**	−.05	−.12
TEI: Attention	.31**	.08	.48**	.13	.44**	−.11	.00

Note. TEI = trait emotional intelligence; E = Extraversion; N = Neuroticism; A = Agreeableness; C = Conscientiousness; O = Openness; LS = Letter Sets; EA = Esoteric Analogies.
$^{**}p < .01$.

material was effective in enhancing performance; *d* for performance change from pre- to post-test was 0.95.

Table 4 gives correlations with METT performance, for each phase and overall. Cognitive ability (EA) and Openness correlated with more accurate emotion recognition, but the two TEI factors were not predictive. Several stress scales were also correlated with performance, with task-focused coping showing the most consistent set of associations.

Predictors of Search Performance

Figure 2 shows mean RT and accuracy at the two display sizes for each search task.

As expected, increasing display size (D) impaired performance. Bonferroni-corrected t tests showed that performance was worse at $D = 4$ than $D = 1$ for each of the four measures,

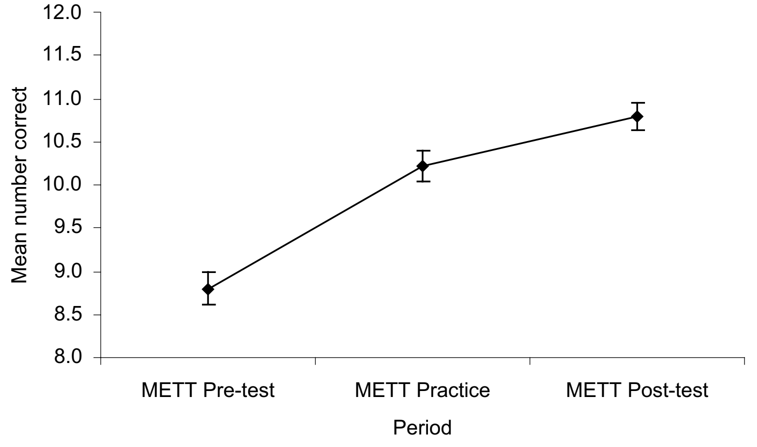

Figure 1. Mean number of correct emotion identifications by period.
Note. METT = Micro Expression Training Tool.

Table 4. Correlates of METT Performance.

	Pre-test	Practice	Post-test	Total
TEI: Clarity	.08	.02	−.02	.04
TEI: Attention	.08	.09	.03	.09
Extraversion	.03	−.01	−.06	−.01
Neuroticism	−.11	.03	.03	−.02
Agreeableness	.01	.00	.04	.02
Conscientiousness	.03	−.03	−.06	−.02
Openness	.34*	.09	.21*	.26**
Letter Sets	.10	.13	.17	.06
Esoteric Analogies	.24**	.28**	.22*	.31**
Task Engagement	.10	.14	.18*	.18*
Distress	−.14	−.18*	−.15	−.19*
Worry	−.04	−.00	.02	−.01
Task-focus	.19*	.22*	.28**	.28**
Emotion-focus	−.16	−.08	−.02	−.11
Avoidance	−.15	−.13	−.12	−.17

Note. METT = Micro Expression Training Tool; TEI = Trait emotional intelligence.
*$p < .05$. **$p < .01$.

at $p < .05$ or better. In addition, performance tended to be less accurate and slower on faces than on nuts.

The $D = 1$ and $D = 4$ measures were substantially correlated for each measure (range of *r*s: .53-.68). Performance measures were averaged across the two display conditions to simplify further analyses. Table 5 shows that neither of the two TEI factors predicted performance, and the FFM scales were also largely independent of search.[2] The two cognitive ability tests predicted speed of response on both tasks, but not accuracy. Several stress measures correlated significantly with faster and more accurate performance on both tasks, including higher task engagement, higher task-focused coping, and lower avoidance coping. No systematic differences

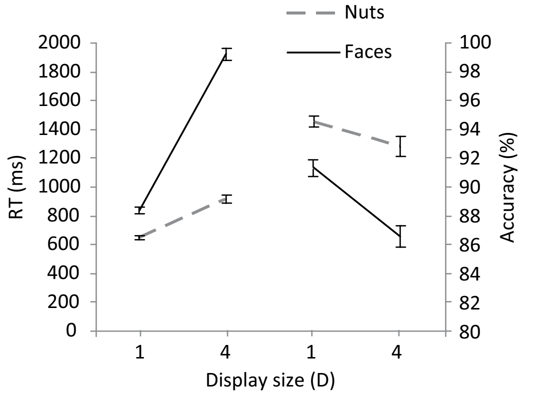

Figure 2. RT (left panel) and accuracy (right panel) of search performance as a function of display size and task type.
Note. RT = response time.

Table 5. Correlates of Search Performance.

	Nuts		Faces	
	RT	Accuracy	RT	Accuracy
TEI: Clarity	−.05	.01	−.01	.06
TEI: Attention	−.11	.13	−.02	.02
Extraversion	−.03	.01	−.02	.01
Neuroticism	−.04	.02	−.06	.02
Agreeableness	.05	.12	.07	.11
Conscientiousness	.01	.16	.04	.10
Openness	−.21*	.07	−.14	.12
Letter Sets	−.25**	.15	−.28**	.12
Esoteric Analogies	−.31**	.06	−.25**	.13
Task Engagement	−.19*	.25**	−.21*	.35**
Distress	.14	−.17	.16	−.21*
Worry	.01	.04	.04	.04
Task-focus	−.29**	.36**	−.13	.37**
Emotion-focus	.16	−.04	.13	−.04
Avoidance	.24**	−.02	.26**	−.27**
METT total	−.36**	.33**	−.28**	.47**

Note. RT = response time; TEI = trait emotional intelligence; METT = Micro Expression Training Tool.
*p < .05. **p < .01.

between predictors of the nut and facial emotion search tasks were apparent. Also, total METT score was significantly correlated with all four search measures.

We also computed correlations between the METT and search performance measures with the two TEI scales identified a priori as most relevant, TEIQue Emotion Perception and WLEIS Appraisal of others. No significant correlations were found.

Table 6. Correlates of Stress Response.

	Task engagement	Distress	Worry	Task-focus	Emotion-focus	Avoidance
TEI: Clarity	.15	−.35**	−.37**	.05	−.29**	−.31**
TEI: Attention	.10	−.10	−.06	.14	−.09	−.24**
Extraversion	.08	−.14	−.09	.08	−.01	−.14
Neuroticism	−.05	.31**	.33**	.26**	.23**	.16
Agreeableness	.12	−.21*	−.08	.08	−.11	−.24**
Conscientiousness	.22*	−.08	−.21*	.09	−.17*	−.19*
Openness	.04	−.13	−.14	.10	−.18*	−.23**
Letter Sets	.12	−.22*	−.11	.09	−.08	−.11
Esoteric Analogies	−.06	−.06	−.03	.10	−.05	.01
Incremental validity of TEI over personality (ΔR^2)	.00	.04*	.06*	.00	.03	.02

Note. TEI = trait emotional intelligence.
$^*p < .05$. $^{**}p < .01$.

Predictors of Stress and Coping

Pre-task means (*SD*s) for the DSSQ state factors for task engagement, distress, and worry were .23 (.78), −.60 (.83) and .37 (1.07). Corresponding post-tasks means (*SD*s) were .10 (.80), .23 (.98), and −.19 (.92). Bonferroni-corrected *t* tests showed that exposure to the two tasks significantly increased distress ($p < .01$, $d = 1.0$) and decreased worry ($p < .01$, $d = 0.50$). This pattern of state change is characteristic of tasks that are stressful because of high cognitive demands (Matthews et al., 2013).

Table 6 gives correlations between TEI, personality, ability, and the situational stress and coping scales. The TEI Clarity factor predicted several state and coping scales, as did Neuroticism and Conscientiousness. The table also gives the increase in ΔR^2 in multiple regression equations in which the Big Five were entered at the first step, followed by the two TEI factors at the second step. TEI added significantly to the prediction of distress and worry; in each case, Clarity but not Attention was independently significant at $p < .05$ or better (βs of −.29 and −.32, respectively).

Discussion

The major finding was that measures of TEI related to emotion perception failed to predict performance on facial emotion–processing tasks. By contrast, measures associated with resource availability and utilization—notably cognitive ability, stress state, and coping—correlated with performance on both emotional tasks and the non-emotive search task. Thus, perception and attention to emotional stimuli may depend primarily on general attentional resources. Assessment of TEI may be more valuable in predicting subjective task-induced stress. In the remainder of this discussion, we consider the implications of the study for the construct validity of TEI, and for assessment of individual differences in emotion processing.

Construct Validity of TEI Facets

We focused on facets of TEI relevant to emotion perception. A two-factor structure for the selected facets distinguished two correlated dimensions. Coffey, Berenbaum, and Kerns (2003) obtained a similar two-factor solution, based on TAS-20, TMMS, and MAS only. It suggests two different ways of conceptualizing "emotion perception." It might relate to a general facility for coherent perception and interpretation of emotional stimuli, as suggested by the loading of the TEIQue Emotion Perception and the WLEIS Self-Appraisal scales on the first, "Clarity" factor. Alternatively, perception might be a function of attention to emotional stimuli, including attention to others' expressions, as suggested by the second "Attention" factor. Like Coffey et al. (2003), we did not find an emotion regulation factor. Possibly the relevant scales from TMMS and WLEIS assess different aspects of regulation, or a more extensive selection of regulation scales may be needed to define a separate factor.

However, neither TEI factors nor individual scales predicted objective performance. The simplest inference is that people lack accurate insights into their own emotion-perception abilities, but there are other explanations. Possibly, the current study lacked power to detect the small associations of .10 to .20 that are typical for self-report scales (Hall et al., 2009). Power to detect *r*s of .10, .20, and .30 was .20, .62, and .94, respectively ($p < .05$, two-tailed). Relationships between TEI and performance may be moderated by additional factors, such as gender (e.g., Edgar et al., 2012). Other TEI facets than those sampled might be more predictive, although our use of multiple instruments partially mitigates against this argument. TEI might relate to general awareness of the emotional state of others, such as overall hedonic tone, but not to the discrimination/identification of specific emotions. There is some psychometric evidence that both general and emotion-specific recognition competencies contribute to emotion recognition (Schlegel, Grandjean, & Scherer, 2012). Also, TEI may relate not so much to basic encoding and attentional processes but to higher order processes for assimilating contextual information into emotion perception (although, see Baker et al., 2012; Fellner et al., 2012). Newer multimedia assessment approaches might be investigated as predictors of context-dependent perception (Fallon et al., 2014).

Although further empirical evidence is needed, there are reasons why accurate self-assessment of general EI and emotion-perception abilities may be difficult. Self-estimates of competency in a variety of domains are often inaccurate (O'Sullivan, 2007; Sheldon, Dunning, & Ames, 2014); specifically, TEI is typically poorly correlated with objective tests of AEI (Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005). A key factor is whether people receive feedback on their abilities within a given context (O'Sullivan, 2007). Everyday social interaction may not be conducive to providing accurate feedback on personal competence relative to others. There is no clear benchmark for competency in emotional perception; most people perform near ceiling in detecting basic emotional expressions, and norms for civility discourage negative feedback (Matthews, Zeidner & Roberts, 2002). It may require high ability to pick up the subtle feedback cues that signal the person has committed an error. Furthermore, competency depends on skills learned within a specific context; it is easier to read the emotions of a spouse or partner than a stranger. In a sample of psychotherapists, Zeidner, Hadar, Matthews, and Roberts (2013) found a stronger TEI–AEI correlation ($r = .39$) than is typical, suggesting that the skills and professional experience of this group may increase the validity of their self-ratings. In the general population, TEI measures may lack validity because they are decontextualized. Sheldon et al. (2014) found that not only did those low in ability EI overestimate their self-rated EI, but they appeared unmotivated to improve their performance. Low ability EI individuals tended to respond to negative feedback defensively, for example, by disparaging the test. Thus, the intrinsic difficulties of assessing one's own EI may be compounded by motivated neglect of relevant feedback among those lacking in competency.

The present findings contrast with those from studies showing that alexithymia is reliably associated with impairments in detecting, matching, and labeling emotions (Grynberg et al., 2012). Thus, the impact of TEI on emotion perception may be stronger at the lower end of the ability spectrum. Individuals at the bottom of the range may be prone to commit gross social faux pas in misreading emotion that do generate negative feedback from others, shaping their self-assessments. This suggestion implies that assessments of TEI may have more applied value in clinical than in non-clinical populations. TEI factors were more strongly related to stress and coping response during performance; the Clarity factor was the more predictive of the two. Even with the FFM controlled, Clarity was associated with lower distress and worry, consistent with evidence that TEI predicts various stress and well-being indices (Zeidner et al., 2012). Clarity was not uniquely associated with coping, suggesting that other mechanisms may support resilience under task stress, such as constructive appraisal of task demands (Fallon et al., 2014).[3]

Predictors of Emotion Processing

Findings substantiate Fiori's (2009) view that attention and resource allocation are important for emotion processing. The significant correlations between the METT and speed and accuracy on the search tasks imply that decoding microexpressions partly reflects superior attention. Indeed, performance on the non-emotive task was associated with METT performance. Several ability and stress predictors were associated with performance on both emotion-processing tasks and the non-emotive search task. Thus, esoteric analogies (G_c), high task engagement, use of task-focused coping, and low avoidance may all be associated with superior attention, irrespective of emotive stimulus content. None of the variables were selectively predictive of the emotive tasks, suggesting that individual differences in overall attentional functioning predominate over any emotion-specific attentional process.

Results are consistent with the Matthews et al. resource model (Matthews, Warm, Reinerman, Langheim, & Saxby, 2010; Matthews, Warm, Reinerman, Langheim, Washburn, & Tripp, 2010; Matthews et al., 2014). It characterizes "resources" as a higher order, emergent construct associated with multiple processes that are only weakly interrelated, so that no single latent factor for resources can be identified. Matthews et al. (2014) and Shaw et al. (2010) found that cognitive ability, subjective engagement, and coping were all predictive of perceptual sensitivity on non-emotive, attention-demanding signal detection tasks. Thus, the associations between task engagement and performance here may result from greater availability of a resource that may enhance emotive and non-emotive processing alike. Similarly, Fellner et al. (2012) found that task engagement was associated with faster learning of facial emotion cues in a discrimination learning task. It remains conjectural whether there is any additional resource or resource allocation process that is exclusive to emotional tasks.

Possibly, AEI is more predictive than is TEI of facial emotion recognition processes. However, convincing evidence that AEI predicts facial emotion recognition is rather lacking (Fiori & Antonakis, 2012; Roberts et al., 2006). Studies using AEI tests have either shown no significant association with standard emotion perception tests (Roberts et al., 2006), or weak associations with facial-processing measures that are inconsistent across studies (DeBusk & Austin, 2011; Farrelly & Austin, 2007). As with TEI, it may be more productive to seek associations with more complex or context-bound processing. For example, Wojciechowski, Stolarski, and Matthews (2014) found that AEI was associated with more effective processing of faces showing inconsistent emotional cues. Again, given that a range of cognitive ability factors correlate with general attentional resources (Schweizer, 2010), it may be challenging to isolate specifically emotional abilities that are related to AEI.

Conclusion

In the present study, cognitive ability predicted processing of facial emotion better than TEI. Given that we achieved a partial coverage of the sampling domain of TEI, these findings are a challenge to the predictive validity of narrow self-reports of TEI in the interpersonal emotion communication setting. Coupled with the mixed findings of previous studies, practitioners may need to look elsewhere for assessments of emotion-processing abilities in educational settings. Direct objective tests of emotion perception may have greater validity (e.g., Schlegel et al., 2012), although the contextualization of perception competency remains a challenge. However, TEI correlated with less distress and worry during the performance tests. Thus, TEI may be of more value in assessment of resilience under stress, although, in the present instance, resilience did not translate into superior task performance.

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Authors' Note

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Notes

1. Although emotion regulations scales were included among the various facets of Trait Emotional Intelligence (TEI), including Wong and Law Emotional Intelligence Scale (WLEIS) Emotion Use and Emotion Regulation, and Trait Meta-Mood Scale (TMMS) Repair, they failed to form a separate factor and, instead, loaded moderately on the Clarity dimension. Extracting a three-factor solution did not produce an emotion regulation factor.
2. We also confirmed that neither TEI factor predicted search performance measures computed separately for $D = 1$ and $D = 4$ conditions.
3. Previous studies (e.g., Salguero, Extremera, & Fernández-Berrocal, 2013) have shown that mood-regulation scales, as well as Clarity, predict more positive affective states and more adaptive coping. In the present data, one of the mood-regulation traits showed associations with subjective stress comparable to the Clarity factor. The WLEIS Regulation scale correlated at −.35 ($p < .01$) with distress and −.23 ($p < .01$) with emotion-focus, which is considered a maladaptive strategy for performance. The TMMS Repair scale was more weakly associated with outcomes. It was negatively correlated with distress ($r = -.18$, $p < .05$), but was not significantly associated with any coping scale.

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