Selective attention to emotional stimuli:

What IQ and Openness do, and emotional intelligence does not

Marina Fiori, Ph.D.

Faculty of Social and Political Sciences

Institute of Psychology

University of Lausanne

CH-1015 Lausanne-Dorigny

Switzerland

John Antonakis, Ph.D.

Faculty of Business and Economics

Department of Organizational Behavior

University of Lausanne

CH-1015 Lausanne-Dorigny

Switzerland

"in press"

Intelligence

Correspondence regarding this article should be addressed to: Marina Fiori, Institute of Psychology University of Lausanne, Switzerland. Email: Marina.Fiori@unil.ch.

Abstract

We examined how general intelligence, personality, and emotional intelligence—measured as an ability using the MSCEIT—predicted performance on a selective-attention task requiring participants to ignore distracting emotion information. We used a visual prime in which participants saw a pair of faces depicting emotions; their task was to focus on one of the faces (the target) while ignoring the other (the distractor). Next, participants categorized a string of letters (word or nonword), which was either congruent to the target or the distractor. The speed of response to categorizing the string was recorded. Given the emotional nature of the stimuli and the emotional information processing involved in the task, we were surprised to see that none of the MSCEIT branches predicted performance. However, general intelligence and openness to experience reduced response time.

Keywords: selective attention, emotional intelligence, intelligence, personality, MSCEIT, emotion processes, lexical decision task, inhibition.

Research Highlights

- We modeled emotional intelligence, personality, and general intelligence as predictors of performance in an emotional task requiring selective attention
- We used an errors-in-variables specification to correct for measurement error in the predictors
- Scores on the ability EI test (MSCEIT) did not show any association with performance in the selective attention task, casting doubt on the construct validity of the MSCEIT
- General intelligence and Openness to Experience speeded up correct answers.

1. Introduction

In light of recent findings demonstrating the important role emotions play in decision-making and behavior, the ability to manage emotions has emerged as a fundamental quality for everyday functioning (cf. Bechara & Damasio, 2005). Emotions have adaptive functions; thus, accurately interpreting emotional signals may provide substantial evolutionary advantages (Cosmides & Tooby, 2000).

Gardner (1983) first suggested that the ability to handle emotions is an important foundation of adaptive behavior. In his theorization of the "multiple intelligences," Gardner introduced the notion that interpreting and understanding emotions in oneself and others may be considered two distinct types of intelligence: Intrapersonal and interpersonal intelligence. The basic idea that adaptive functioning cannot simply be captured by standard intelligence tests—and that paying attention to emotions and acting on them being an equally important facet of intelligent functioning—was again put forward some years later by Salovey and Mayer (1990); they coined the term "Emotional Intelligence" (EI) to suggest that emotion and intelligence were not adversaries but complementary. Some have suggested, though, that emotions may interfere with thought (Steel, 1997); however, emotions may also support thinking processes, for example by directing attention and emotional resources towards more advantageous solutions (Bechara & Damasio, 2005).

Whether alternative conceptions of intelligence beyond general intelligence (i.e., "*g*") are viable is still a hotly debated area (e.g., Antonakis, Ashkanasy, & Dasborough, 2009; Gottfredson, 2003; Locke, 2005; Sternberg, 1985) as is the issue of how to conceptualize and measure EI (Mayer, Caruso, & Salovey, 2000; Zeidner, Matthew, & Roberts, 2001). Among the questions that remain unanswered is whether: (a) EI, as currently measured, is distinct from general intelligence and personality, (b) can predict incremental variance in outcomes beyond personality and intelligence, and (c) involves emotion information processing.

Our purpose was to contribute to these issues by investigating if EI, measured using a performance-based (i.e., ability) test, could predict performance on a selective-attention task that required participants to ignore distracting emotion information, and this beyond the effects of personality and general intelligence. Evidence that a EI measure can predict such a task would provide some support for the theory and its operationalization.

We first discuss how EI might be situated in the nomological space of intelligence and personality and then present the design of our study.

1.2 Is EI an intelligence?

Theorists of EI suggest that EI is a higher-order factor comprised of four subabilities moderately correlated with general intelligence (Mayer & Salovey, 1997). However, these theorists have not specifically tackled how the subabilities constituting EI should be related to each other and to different components of intelligence, such as fluid (G*f*) and crystallized intelligence (G*c*).

Cattell (1963) introduced the notion of G*f* and G*c* to distinguish two correlated components of *g*. The first is defined as the ability to perceive relationships among objects and to solve novel problems without relying on previous specific practice or instruction; G*f* is generally measured with tests that have little cultural and scholastic content, such as those including abstract figures and perceptual tasks. G*c* refers to the knowledge gained through learning and experience and it is measured with tests based on verbal skills and acquired knowledge. These two components tend to correlate strongly with each other (Cattell, 1963), thus providing evidence for an overall *g* factor. Importantly, there is substantial evidence to suggest that overall *g* predicts important criteria across a variety of domains (Gottfredson & Deary 2004; Schmidt & Hunter, 1998; 2004) and that specific brain regions correlate with variability in *g* measures (Colom, Jung, & Haier, 2006; Frangou, Chitins, &Williams, 2004; Jung & Haier, 2007; Narr, Woods, Thompson, Szeszko, Robinson, Dimtcheva, et al., 2007). The very general nature of *g*, and the fact that it predicts such a general class of outcomes suggests that it should predict performance on task requiring pattern identification in novel stimuli, whether on emotional or non-emotional ones.

To what extent is EI different from general intelligence? Being conceptualized as a form of intelligence, EI might be related to both G*f* and G*c*. In fact, it is conceivable that high EI individuals would have wider emotion knowledge, but also stronger problem-solving abilities in dealing with emotionally charged situations; this latter aspect would not depend exclusively on the amount of emotion knowledge possessed, but also on emotion-processing resources available. The relationship of EI with G*f* and G*c* has not been systematically addressed by theorists of EI, however. Positive correlations between the Mayer, Salovey and Caruso's MSCEIT and G*c* have been reported (Mayer, Roberts, & Barsade, 2008), suggesting that the ability test partly captures knowledge (i.e., emotional knowledge); yet, Mayer and Salovey's definition of EI includes aspect that refer also to G*f*, such reasoning about emotions and solving problems related to emotions. Understanding to what extent current measures of EI as an ability tap into one or the other aspect of intelligence, or both, would help better understand the construct and refine current tests.

In the framework of Carroll's three stratum model of mental abilities (Carroll, 1993), EI might be conceived as a narrower ability subsumed under stratum 2 broad abilities; alternatively it might also be considered as a higher order ability on the same level of *Gc* and

Gf (Matthews, Zeidner, & Roberts, 2002). Locating EI at the level of either stratum 1 or 2 would imply that how individuals manage emotions ultimately depends on their level of intelligence. Another possibility is to conceive EI as related to, but also distinct, from general intelligence and located on Carroll's stratum 3. Although this possibility has not been overtly discussed in the literature of EI, it has been looked at in the cognition and emotion literature, in particular regarding the debate on the independence of emotion from cognition (see Eder, Hommel, & De Houwer, 2007). Relying on experimental (e.g., Murphy & Zajonc, 1993) as well as neuroanatomical evidence (e.g., Bish, Luu, & Posner 2000) certain scholars have suggested that emotion and cognition are "separate but interacting mental functions mediated by separate but interacting brain systems" (LeDoux, 1998, p. 69).

1.3 Is EI personality?

How to conceive EI with respect to personality is another open question. The domain of research on EI is basically split in two between those who consider EI as an ability measured with performance tests (Salovey & Mayer, 1990) and those who subsume EI as a broad personality dimension assessed through self-report questionnaires (e.g., Petrides & Furnham, 2001). From a theoretical point of view only the latter approach endorses correlations between EI and personality traits. Nevertheless, more recent research (which has accounted for measurement error in the variables) has shown that EI as measured by an EI ability test (i.e., the MSCEIT) significantly overlaps not only with IQ, but also with personality (Fiori & Antonakis, 2011; Schulte, Ree, & Carretta, 2004). In principle, there is no drawback in finding correlations between ability measures and personality. What poses concerns is when the construct measured, either EI as an ability or as a broad personality trait, overlaps so much with existing personality traits to the extent of becoming redundant.

To date, the investigation of the relationships among EI, general intelligence, and personality have been approached almost exclusively with a psychometric approach in which EI tests' scores were correlated with personality and intelligence measures. This approach has been helpful to evaluate the viability of EI measures, especially their discriminant and incremental validity. Yet, the psychometric approach has not addressed which mental processes should be associated to emotionally intelligent functioning. In the current study we compared the contribution of general intelligence, personality, and EI in predicting performance on a selective attention task that required being able to avoid distracting emotion information in order to succeed in the task.

1.4 EI, emotion information processing, and selective attention

In the current study, we will focus on EI as an ability because this approach is more theoretically sound and uses performance-based tests (Daus & Ashkanasy, 2003; Matthews et al., 2002). The flagship EI ability test is the Mayer-Salovey-Caruso Emotional Intelligence test (MSCEIT, Mayer, Salovey, & Caruso, 2002). This test, and particularly its precursor the MEIS (Mayer, Salovey & Caruso, 1997), was the first attempt to measure EI according to an objective performance assessment rather than relying on self-report measures. The issue of scoring the correct answer of items involving emotions was tackled by using what has been termed a "general consensus method," that is, by scoring as correct the answer provided by the majority of people. In addition, the test offered also the possibility to score the test according to an "expert consensus," in which the correct answer was the one chosen as correct by a pool of experts in emotions.

The MEIS included 402 items and was developed mainly to test the model of EI as composed of 4 sub-abilities or branches: Perceiving emotions, using emotions to facilitate thought, understanding emotions, and managing emotions. The factorial structure of the MEIS did not provide strong evidence of the second branch "Facilitating Thought." With the purpose of making the test easier to administer and improve some of its facets, the authors modified some features of the MEIS into a newer version that was called Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT, User's Manual, Mayer, Salovey, & Caruso, 2002), which has now gone through two revisions.

The psychometric properties of the latest version have been reported to be satisfactory according to the User's Manual; in particularly, the test appears to be consistent with split-half reliabilities of .91 for Perceiving Emotions, .79 for Facilitating Emotion, .80 for Understanding Emotions, and .83 for Regulating Emotions (MSCEIT, User's Manual, Mayer, Salovey, & Caruso, 2002). Also, in this version of the test the correlation of the two scoring systems, general and expert consensus, is higher than the previous versions with correlations ranging from .93 to .99; this high correlation, between the general and expert consensus, is not necessarily a strong point because having lay individuals correlate highly with experts suggests that the test may be tapping common knowledge and not expert performance (Fiori & Antonakis, 2011). Nonetheless, this ability EI test is reported to be incrementally valid given that it is apparently orthogonal to neuroticism, extraversion, and conscientiousness, and modestly correlated with agreeableness and openness (Mayer, Roberts, & Barsade, 2008) as well as with general intelligence (IQ) (Brackett & Mayer, 2003).

In the history of the study of intelligence, the integration of the traditional psychometric approach with the analysis of the cognitive processes underlying performance proved to be fruitful for understanding the concept of intelligence (Pellegrino & Glaser, 1979). Surprisingly, little has been done to employ the same approach for understanding EI. Pioneering work was conducted by Austin (2004, 2005), who compared inspection time (IT) performance of emotional and non-emotional tasks with self-report measures of EI and intelligence tests. Results using structural equation modeling showed two correlated factors: One including performance on the non-emotional IT task and the Raven matrices, and the another regarding performance in the emotion task. Overall, speed of processing and emotional performance emerged as two related but distinct dimensions. Results also showed a significant correlation ($r = .21$) between the interpersonal scale of the Schutte EI test (Schutte et al., 1998) and performance in a task of facial emotion recognition (Austin, 2005), suggesting that performance in emotional task was associated to scores of the EI test.

Whereas results regarding self-report EI measures—such as the Schutte EI test—confirm some associations with emotion processing, results regarding ability measure of EI are rather contrasting. In particular, Roberts and colleagues (2006) found that emotion measures, such as recognition of emotions in voice and in pictures, and the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT, 2002) failed to load on the same underlying factor. Interestingly, the aforementioned emotion measures, but not the MSCEIT factors, loaded on general intelligence. The authors concluded: "we can not suggest that the MSCEIT has stood a test of an important aspect of the validation process" (p. 668).

Farrelly and Austin (2007) analyzed the association between MSCEIT scores, social perception ability, general intelligence, and performance on inspection time (IT) task. Results of Study 1 showed an association between social perception and the MSCEIT, but not between MSCEIT and inspection time of emotional stimuli. In Study 2, inspection time of sad faces predicted scores on all MSCEIT branches except Emotion Regulation. However, the MSCEIT scores appeared unrelated to inspection time of non-emotional stimuli and to *Gf*. Furthermore, in contrast to Study 1, social perception ability as measured by the Interpersonal Perception Task (IPT, Costanzo & Archer, 1993)—a test that analyzes the ability to interpret spontaneous social situations in short conversations—did not predict MSCEIT scores.

These inconsistent results regarding the relationship between the MSCEIT and emotion processing call for further investigation. Theorists of emotional intelligence claim that EI concerns the capacity "to carry out sophisticated information processing about emotions and emotion-relevant stimuli and to use this information as a guide to thinking and behavior" (Mayer, Salovey, & Caruso, 2008, p. 503); this suggestion is what provided the impetus for our study because how EI is related to emotion processing is still unclear. Furthermore, most studies either do not include important related constructs (e.g., personality and intelligence) or ignore the effects of measurement error, which can engender misleading results (Fiori & Antonakis, 2011).

Thus, we designed an experiment using robust modeling procedures to examine what predicts performance on a selective attention task requiring participants to ignore distracting emotion information. Individuals are often required to manage distracting emotion information when optimizing decision making, which makes the task ecologically valid. We chose an attentional task in light of its relevance to measure aspects of intelligence (Schweizer, Moosbrugger, & Goldhammer, 2005). Attentional control has been found to be related to working memory capacity (WMC) and fluid intelligence; also, attentional control accounted for additional variance, together with secondary memory, in G*f* beyond WMC (Unsworth, Spillers, & Brewer, 2010). In addition, the neuroscience literature has examined individual differences concerning the neural underpinnings of self-oriented and other-oriented empathy—a construct that shares similarities to EI— and has demonstrated that activation of the Anterior

Cingulate Cortex (ACC) is associated to both emotional self-awareness and focused and narrow attention (Decety & Batson, 2007; Decety & Michalska, 2010); this finding suggests that the kind of attentional mechanisms investigated in the current study, which refer in particular to the selection of appropriate responses and the inhibition of inappropriate ones, may be involved in the experience of feelings for oneself and for others.

In the current study, we used a measure of fluid intelligence—Cattell's Culture Faire—because we were particularly interested to analyze: (a) If the MSCEIT correlates with this aspect of *g* and (b) whether fluid intelligence predicts performance in an attentional task that involves *emotional*, rather than *nonemotional*, stimuli. The extent to which EI predicts performance on the task beyond the effects of personality and intelligence will provide some support for the EI ability measure. Furthermore, it will be theoretically interesting to see whether performance in a task requiring emotion information processing is predicted by general intelligence and personality. Our study thus sheds unique light on the EI construct; it also provides a contribution to the broader literature of individual differences in that not much research has examined the concurrent effect of IQ and personality in tasks involving selective attention to *emotional* stimuli.

1.2 Overview of the study

Most decision activities require one to allocate resources to informational stimuli. Two fundamental processes undergird this routine: Activation and inhibition (Posner & Snyder, 1975). Activation ensures consideration of goal-relevant information, whereas inhibition prevents goal-irrelevant information from interfering with task execution. Inhibition has been defined as "the stopping or overriding of a mental process, in whole or in part, with or without intention," which may influence attention or memory among other processes (MacLeod, 2007, p. 5).

Our experimental task is similar to those used in the emotion and cognitive literatures, in particular the affective negative priming (e.g., Joorman & Gotlieb, 2010) and semantic priming from attended and unattended parafoveal words (e.g., Ortells et al. 2001). The task, which is supposed to involve processes associated to selective attention, is illustrated in Figure 1 and consisted of two consecutive trials: In the *prime trial* two diagrams representing human faces with different emotions are introduced. Participants are instructed to attend to one of the faces (the target) while ignoring the other (the distractor). In the *test trial,* a letter string appears and participants' have to indicate whether the letter string is a word, as in a typical lexical decision task (LDT). We operationalized performance on this task in terms of how quickly participants indicated whether the string was a letter or not.

Performance in the LDT involving the judgment of a word related to the *target* was expected to facilitate both speed of processing and correct answers. According to the associative network model (Bower, 1981), information is stored in nodes that are related by semantic and affective meaning. When a node is activated, it also activates other connected nodes. In the case of the present task, the prime should activate a network of similar valence information that would increase accessibility of related nodes and, as a consequence, reduce response time. Instead of being facilitated, performance involving the judgment of a word related to the *distractor* should be impaired. Paying attention to a stimulus that was previously dismissed from attention should interfere with task execution, making information processing slower and performance more challenging. Explanations of inhibition effects include impaired retrieval in processing information previously categorized as distractors (Houghton & Tipper, 1994; Neill, 1977; Tipper, 1985, 2001; Yee, 1991) and conflict between two possible responses: “select it” because it is the current object of evaluation, or “ignore it” because it was first introduced as a distractor (Neill & Valdes, 1992). Both explanations support the presence of inhibitory mechanisms that suppress response—either memory retrieval or attentional focus—suggesting that inhibitory processes play a role in response time.

2. Method

2.1. Participants

We recruited 91 participants from the University of Illinois at Chicago subject pool. We obtained useable data on 85 participants (55% females); their mean age was 19.03 years (SD = 1.62) and the composition of the sample was quite diverse: 37.6% Asian, 16.5% Hispanic, 29.4% White, and African-American 16.5 %.

2.2 Measures

2.2.1. Selective attention task

The task procedure was drawn from Moon and Lord (2004) and included a series of two consecutive trials: A prime trial (3 conditions) crossed with a test trial (3 conditions), the latter being the LDT; along with these nine conditions we also included two control conditions (for a total of 11 conditions). The *prime trial* alternated two faces, each one expressing one of three different emotions: Anger, sadness, and happiness. In each trial two face diagrams, measuring 2 X 2 inches each, were displayed next to each other. The target face was always designated as green. The emotions depicted on the target and the distractor were counterbalanced across trials and their position changed randomly across trials; thus, participants had to search for the target at every trial. In the *test trial*, adjectives and nouns synonymous with happy, angry, and sad were presented, which could be congruent with the target, the distractor, or not related to either of them (control condition); we also included surprise words of the same length as additional control conditions as well as nonwords. They were formed by changing the first character of 24 meaningful words used as test trials. We randomized the combination target-distractor and word-nonword within each set. We measured reaction time as the time elapsing between presentation of the word/nonword and the “yes” or “no” choice made by the participant.

To ensure participants attended to the prime, we gave them a categorization task right after the test trial: A list of 4 words indicating different emotions was displayed and participants had to indicate which emotion was conveyed by the target face they attended to by pressing the key 1, 2, 3 or 4 corresponding to the listed emotion. The categorization task did not have any maximum response time and was introduced uniquely to “force” participants to attend to instructions.

Assessment of correct answers and RT was made via computer using Dell Dimension L933r and Dimension 2400 computers and the software program E-Prime, Version 1.2 (Schneider, Eschman, & Zuccolotto, 2002), which is accurate to the millisecond.

2.2.2. Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT)

The Mayer, Salovey, and Caruso Emotional Intelligence Test (MSCEIT) is a performance-based measure of EI (Mayer et al., 2002). This on-line 141 item test is scored by the publishers and assesses four EI factors or “branches” (each measured using two subscales): (a) Perceiving Emotions, (b) Facilitating Thought, (c) Understanding Emotions and (d) Managing Emotions. Correct answers were scored according to agreement with expert opinion. The test internal consistency reliability (split-half) is r = .93 (Mayer, Salovey & Caruso, 2004).

2.2.3. Personality Questionnaire

The Big Five Inventory (BFI; John & Srivastava, 1999) measures five self-rated personality dimensions: Extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience. We used the short version (BFI-44, Benet-Martinez & John, 1998), which includes 44 items. Benet-Martinez and John (1998) reported alpha coefficients of .88, .84, .79, .82, and .81, respectively, for the dimensions listed above in a sample of 711 English-speaking participants.

2.2.4. General Intelligence Test

We used Cattell's "Culture Fair" test, Scale 3 Form B (Cattell, Krug, & Burton, 1973). The scale includes four subtests involving different tasks: Completing series, classifying, solving matrices, and evaluating conditions. This scale's reliability is .85.

3. Results

We analyzed data at the individual level and used MPlus's maximum likelihood cluster-robust (sandwich) MLR estimator to correct standard errors for nonindependence (Muthén & Muthén, 2010) at the individual level. Hence, we maintained a large number of observations (6449 trials for 85 subjects), while considering variability at the participant level, where individual trials depended on different manipulations. We analyzed speed of response for correct answers (i.e., 82.47% of total trials; excluding responses, n = 32 trials, that were faster than 2SD from mean response time did not change results). In addition, we used an errors-in-variables specification to correct for measurement error in the predictors (i.e., EI, intelligence, and personality); we modeled latent variables by constraining the residual variance of its observed variable x to (1- reliability_x)*Variance_x (Bollen, 1989) using the population reliabilities.

Refer to Table 1 for descriptive statistics. The means and standard deviations we report for the MSCEIT are very similar to those reported by Mayer, Salovey, Caruso, & Sitarenios (2003) in a very large scale study (n = 2,112); they reported the following means (and *SD*s): Branch 1: .54 (.13); Branch 2: .45 (.08); Branch 3: .60 (.13); Branch 4: .42 (.09). Thus, there does not seem to be any range restriction in our MSCEIT data. Of note is that three out of four branches of the MSCEIT showed a moderate correlation with the Cattell's Culture Fair, demonstrating that the MSCEIT is associated to fluid intelligence. The only branch that was not correlated with fluid intelligence was Branch 4 (Managing emotions), suggesting that this section of the MSCEIT may measure more crystallized aspect of intelligence (or indeed something else). The average bivariate latent correlation of the MSCEIT factors with response time is very low (i.e., -.02). Also, the average latent correlation of the branches with each other is only .39; we also found some very strong correlations of EI with personality (e.g., agreeableness and Branch 2 correlating .52; openness and Branch 4 correlating .46) and intelligence (e.g., with correlations up to .39) and some very low correlations within the branches (e.g., Branch 4 correlated -.02 and .12 with Branches 1 and 2 respectively). These low interfactor MSCEIT correlations suggest that a general higher-order EI factor does not drive the variance in the first-order branches. Estimating a structural model with all the predictors and a using higher order EI factor failed to fit the data, $\chi^2(71) = 140.71$, $p < .001$, CFI = .79, RMSEA = .01; thus, we modeled the EI braches as separate first-order factors so as to not mask the variability in the branches and engender biased estimates.

[Table 1 here]

In terms of the model we estimated, along with the 11 conditions (one condition is omitted as the baseline condition) and the predictors (i.e., EI, IQ, and personality) we also controlled for various respondent demographic characteristics[1]. Refer to Table 2 for full results. Surprisingly, none of the MSCEIT branches predicted performance, either individually or simultaneously; that is, the increment in prediction provided by the MSCEIT branches simultaneously, beyond the rest of the predictors and the controls, was not significant, $\chi^2(4) = 7.50$, $p > .10$. Also, the direction of the prediction went the wrong way (i.e., linear combination of $\beta = .26$, thus increasing response time though not significantly). General intelligence ($\beta = -.23$, $p < .01$) and Openness to Experience ($\beta = -.22$, $p < .05$) speeded up response time and age slowed it down ($\beta = .22$, $p < .01$).

The priming conditions had a strong simultaneous effect on response time; furthermore, response times were significantly faster when the word was congruent with the target as compared to the distractor or control conditions (see note in Table 2). With respect to the baseline condition, evaluating a word related to happiness that was previously associated with the target speeded up correct answers. This result shows that shared valence between the prime and the test trial facilitated the task when words were of positive valence. Furthermore, when the lexical decision task involved a nonword, responses were on average, slower. Considering that we used regular words with a misspelled letter as nonwords—such as “xappy” instead of “happy”—this result is not surprising and might be due to the fact that encoding the misspelled word took more processing time, leading to overall slower response.

[Table 2 here]

4. Discussion

The purpose of our study was to investigate which individual differences among EI (as measured by the MSCEIT), general intelligence, and personality predicted performance in a laboratory task involving selective attention to emotional stimuli. We found that IQ and the personality trait of openness predicted faster correct answers. Interestingly, we found that the MSCEIT correlated—at times quite strongly—with fluid intelligence and personality, but did not predict performance. Of note is that we accounted for the attenuating effects of measurement error, which the literature has oftentimes ignored (which may explain why we report higher correlations between the MSCEIT and G*f*).

The role of attentional processes in emotion regulation was recently brought up by Wadlinger and Isaacowitz (2010); selecting certain aspects of the situation as the focus of attention may be used as a regulatory strategy aimed at maintaining a desirable emotional state and at terminating or improving an undesired one. Being able to regulate emotions is a fundamental feature of individuals who use emotions intelligently. Such individuals should have greater sensitivity (or attention) to emotional cues, but also greater ability to select, among several stimuli, the emotion information that may help to reach the desirable state. Both selective-attention processes serve this purpose: Paying-attention to appropriate emotion information or ignoring inappropriate emotion information helps focus on the task at hand. Theoretically, an EI test should predict performance in a task that requires one to selectively pay attention to certain emotion information. The MSCEIT, however, did not show any relationship with the selective attention task.

These findings may be explained by the fact that we measured emotion processes occurring spontaneously and with little engagement of effortful thinking (and generally associated with nonconscious processing). Indeed, the stimuli of the selective attention task were presented at short stimulus onset asynchrony of 350 msec, which are generally associated with nonconscious processing. Interesting, Roberts and colleagues (Roberts et al., 2006) also did not find association between the emotion perception branch of the MSCEIT and the

Japanese and Caucasian Brief Affect Recognition Test (JACBART; Matsumoto et al., 2000), a test that consists of recognizing emotions in faces presented as fast as 200 msec. Important to note is that performance on the MSCEIT test may be driven by conscious processing (i.e., to answer test items participants need be engaged in thoughtful thinking about their own and others' emotional experience). Thus, the MSCEIT and the selective attention task may be tapping into different ways of processing emotion information (effortful vs. nonconscious). The main implication of the MSCEIT failing to predict performance in the selective attention task is that the MSCEIT may not predict emotionally intelligent behaviors that depend on spontaneous/nonconscious processing (Fiori, 2009). Still, though, it is reasonable to expect that a test of EI captures some sort of nonconscious performance hence our surprise in finding null results for the MSCEIT factors.

It is also possible though that the MSCEIT might not predict actual performance requiring emotional processes; in fact, the MSCEIT seems to rely on emotion knowledge individuals have about emotion (an outcome that we did not measure in the current study), rather than how individuals use emotions knowledge in real situations. Indeed, the issue that the MSCEIT does not appear to capture situational aspects of performance has been brought up recently (cf. Cherniss, 2010; Jordan, Dasborough, Daus, & Ashkanasy, 2010). As a matter of fact the MSCEIT does not measure *actual* performance, but performance in *hypothetical* situations: For instance, some items of the MSCEIT require respondents to identify the best strategy to cope with emotionally involving situations described in a short vignette. Individuals may correctly answer such items simply relying on their emotion knowledge. Yet, emotion knowledge per se does not guarantee that individuals will be able to use that knowledge in real life situations (see also Fiori, 2009). Beyond emotion knowledge, the selective attention task employed in the current research requires individuals to activate emotion information and inhibit distracting emotion information in order to succeed in the task. Clearly, the selective attention task involves mainly emotion processes in action, whereas the MSCEIT involves mainly emotion knowledge applied to hypothetical situations, (suggesting that the test might not be ecologically valid).

Finally, another possibility that explains why the MSCEIT did not predict results is that this test may measure something different from what it is claimed to measure. The MSCEIT is supposed to measure the latent construct of EI, which concerns the capacity to process emotion information and use this information for better adjustment (Mayer, Salovey, & Caruso, 2008). Our results dispute this proposition.

As concerns the other predictors, interesting results emerged regarding the relationship between general intelligence and selective attention to emotion information. A number of studies confirmed the association among intelligence, working memory, and the ability to stay focused on goal relevant information in the face of distracting stimuli (Dempster, 1991; Kane & Engle, 2003; Schweizer, Moosbrugger, & Goldhammer, 2005; Unsworth, Spillers, & Brewer, 2010). In the current study we analyzed the relationship between general intelligence and attentional processes involving emotional, rather than nonemotional stimuli. The result that general intelligence predicted faster correct responses is aligned with the finding that high IQ individuals are faster at retrieving and processing information, and this irrespective of the type of information. For instance Austin, Deary, and Willock (2001) found a correlation of -.49 between intelligence and 4 choice reaction time in a population of Scottish participants aged 56. We demonstrate a similar finding involving emotional, rather than nonemotional stimuli, thus further extending the generalizability of IQ. Furthermore, our results complement findings from other types of tasks showing that intelligence (and working memory) are very important for performance involving pre-anticipatory emotional activation (Bechara, Damasio, Tranel, & Anderson, 1998; Hinson, Jameson, Whitney, 2002) and that EI measured as a trait fails to predict performance in this domain (Demaree, Burns, & DeDonno, 2010).

As for personality, Openness to Experience showed very similar effects to general intelligence: It predicted faster correct answers. Interestingly, this personality trait (referred to as “Intellect”) usually correlates with IQ (e.g., Gignac, Stough, & Loukomitis, 2004; Goff & Ackerman, 1992); yet, in our study it also demonstrated incremental validity. It may be that open individuals, like more intelligent ones, tend to process information quickly. Also, the priming task we used involved a great deal of novelty with unusual and fast stimuli. Theoretically, individuals high in Openness might be more mentally flexible and better able to adjust their decision strategies in handling such information.

Finally, and in terms of the limitations of our work, two aspects limit its generalizability. First although the sample size of students was sufficiently large (particularly on a within-subject level) to detect significant effects for several of the covariates and the conditions we manipulated, our study should be replicated with a larger sample to ensure that the EI results were not due to a Type II statistical error (i.e., that the study was underpowered); important to note here is that despite probable the range-restriction of intelligence scores (given that students are selected to university on the basis of ability) we found significant effects of intelligence on performance, which suggests that our study was not underpowered. That we found nonsignificant effects on EI—a factor on which students are not selected to university—suggests that the null results are due to the test per se and not to lack of statistical power or range restriction (as mentioned earlier, the variability in the MSCEIT scores paralleled that of a very large-scale study). Second, our results are based exclusively on a student sample and might not necessarily hold for a more diverse population of individuals; although results from student samples usually mirror those of larger populations (Anderson, Lindsay, & Bushman, 1999) future research should use a more diverse sample particularly with younger as well as with older individuals.

5. Conclusions

The extent to which emotion processing may depend on general intelligence, emotional intelligence, and personality traits is a topic of great theoretical relevance. The current research was meant to provide a contribution on this issue by analyzing performance in an emotional task that required using selective attention to succeed in the task.

The most surprising result was that the MSCEIT did not predict performance in our experiment. This result, which adds to recent research challenging the validity of the MSCEIT (Fiori & Antonakis, 2011; Maul, in press), casts doubts on the extent to which the MSCEIT may measure EI and predict emotionally intelligent behavior. Researchers and practitioners are advised to take our findings seriously especially when using the MSCEIT for clinical or occupational decisions. Replicating results with a larger and more representative sample, and with other emotion tasks would further enrich the understanding of what the MSCEIT really measures.

We also found that IQ and the personality trait of openness predicted faster answers; these factors may facilitate information processing when dealing with emotional stimuli, especially in tasks that require ignoring distracting emotion information. Our results speak to the need for new measures of EI as an ability and for further understanding of the role of intelligence and openness in emotionally intelligent performance based on criteria different from speed of response, which is known to be related to *g*.

References

Anderson, C. A., Lindsay, J. L., & Bushman, B. J. (1999). Research in the psychological laboratory: Truth or triviality? *Current Directions in Psychological Science, 8*, 3-9.

Antonakis, J., Ashkanasy, N. M., & Dasborough, M. (2009). Does leadership need emotional intelligence? *The Leadership Quarterly, 20*, 247-261.

Austin, E. J. (2004). An investigation of the relationship between trait emotional intelligence and emotional task performance. *Personality and Individual Differences, 36*, 1855-1864.

Austin, E. J. (2005). Emotional intelligence and emotional information-processing. *Personality and Individual Differences, 39*, 403-414.

Austin, E. J., Deary, I. J., & Willock, J. (2001). Personality and intelligence as predictors of economic behaviour in Scottish farmers. *European Journal of Personality, 15*, S123-S137.

Bechara, A., & Damasio, H. (2005). The somatic marker hypothesis: A neural theory of economic decision. *Games and Economic Behavior, 52*, 336–372.

Bechara, A., Damasio, H., Tranel, D., & Anderson, S. W. (1998). Dissociation of working memory from decision making within the human prefrontal cortex. *Journal of Neuroscience, 18*, 428-437.

Benet-Martinez, V., & John, O. P. (1998). “Los Cinco Grandes” across cultures and ethnic groups: Multitrait- multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75*, 729–750.

Brackett, M. A., & Mayer, J. D. (2003). Convergent, discriminant and incremental validity of competing measures of emotional intelligence. *Personality and Social Psychology Bulletin, 29,* 1147-1158.

Bish G., Luu P., & Posner M.I. (2000). Cognitive and emotional influences in anterior cingulate cortex. *Trends in Cognitive Sciences, 4*, 215–22.

Bollen, K. A, (1989). *Structural equations with latent variables.* New York: Wiley.

Bower, G. H. (1981). Mood and memory. *American Psychologist*. 36, 129-148.

Carroll, J. B. (1993). *Human cognitive abilities: A survey of factor-analytical studies*. New York: Cambridge University Press.

Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: A critical experiment. *Journal of Educational Psychology, 54*(1), 1-22.

Cattell, R. B., Krug, S. E., & Barton, K. (1973). *Technical supplement for the culture fair intelligence tests, Scales 2 and 3*. Champaign: Institute for Personality and Ability Testing.

Cherniss, C. (2010). Emotional intelligence: Towards clarification of a concept. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, 3, 110-126.

Colom, R., Jung, R. E., & Haier, R. J. (2006). Distributed brain sites for the g-factor of intelligence. *Neuroimage, 31*, 1359-1365.

Cosmides, L., & Tooby, J. (2000). Evolutionary psychology and the emotions. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions, 2nd Edition.* (pp. 91-115.). NY: Guilford.

Costanzo, M., & Archer, D. (1993). *The Interpersonal Perception Task-15* (IPT-15). Berkeley: University of California Center for Media and Independent Learning.

Daus, C. S., & Ashkanasy, N. M. (2003). Will the real emotional intelligence please stand up? On desconstructing the Emotional Intelligence 'debate.' *The Industrial Psychologist, 41*, 69-72.

Decety, J., & Batson, C. D. (2007). Social neuroscience approaches to interpersonal sensitivity. *Social Neuroscience, 2*, 151-157.

Decety, J., & Michalska, K. J. (2010). Neurodevelopmental changes in the circuits underlying empathy and sympathy from childhood to adulthood. *Developmental Science, 13*, 886-899.

Demaree, H. A., Burns, K. J., & DeDonno, M. A. (2010). Intelligence, but not emotional intelligence, predicts Iowa Gambling Task performance. *Intelligence, 38*, 249-254.

Dempster, F. N. (1991). Inhibitory processes: A neglected dimension of intelligence. *Intelligence, 15*, 157–173.

Eder, A. B., Hommel, B., & De Houwer, J. (2007b). How distinctive is affective processing? On the implications of using cognitive paradigms to study affect and emotion. *Cognition and Emotion, 21*, 1137–1154.

Farrelly, D., & Austin, E. J. (2007). Ability EI as an intelligence? Associations of the MSCEIT with performance on emotion-processing and social tasks and with cognitive ability. *Cognition and Emotion, 21*, 1043-1063.

Fiori, M. (2009). A new look at emotional intelligence: A dual-process framework. *Personality and Social Psychology Review, 13*, 1, 21-44.

Fiori M. & Antonakis J. (2011). The ability model of emotional intelligence: Searching for valid measures. *Personality and Individual Differences, 50*, 3, 329-334.

Frangou, S., Chitins, X., & Williams, S. C. R. (2004). Mapping IQ and gray matter density in healthy young people. *NeuroImage, 23*, 800-805.

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

Gignac, A., C., Stough, C., & Loukomitis, S. (2004). Openness, intelligence, and self-report intelligence. *Intelligence 32,* 133–143.

Goff, M., & Ackerman, P. (1992). Personality-intelligence relations: assessment of typical intellectual engagement. *Journal of Educational Psychology, 84*, 537–552.

Gottfredson, L. S. (2003). Dissecting practical intelligence theory: Its claims and evidence. *Intelligence, 31*, 343-397.

Gottfredson, L. S., & Deary, I. J. (2004). Intelligence predicts health and longevity, but why? *Current Directions in Psychological Science, 13*, 1-4.

Hinson, J. M., Jameson, T. L., & Whitney, P. (2002). Somatic markers, working memory, and decision making. *Cognitive, Affective, & Behavioral Neuroscience, 2*, 341–353.

Houghton, G. & Tipper, S. P. (1994). A model of inhibitory mechanisms in selective attention. In D. Dagenback and T. Carr (Eds), *Inhibitory Processes of Attention, Memory and Language* (pp 53-112). Academic Press: Florida.

Kane, M. J., & Engle, R. W. (2003). Working memory capacity and the control of attention: The contributions of goal neglect, response competition, and task set to Stroop interference. *Journal of Experimental Psychology: General, 132*, 47-70.

John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York: Guilford.

Jordan, P., Dasborough, M. T., Daus, C., & Ashkanasy, N. M. (2010). A call to context: Comments on emotional intelligence and emotional and social competencies. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 3*, 145-148.

Jung, R. E., & Haier, R. J. (2007). The Parieto-Frontal Integration Theory (P-FIT) of intelligence: Converging neuroimaging evidence. *Behavioral and Brain Science, 30*, 135–154.

Joormann, J., & Gotlib, I.H. (2010). Emotion regulation in depression: Relation to cognitive inhibition. *Cognition and Emotion, 24*, 913-939.

LeDoux, J. (1998). *The Emotional Brain*. New York: Weidenfeld & Nicolson.

Lynn, R., Harvey, J., & Nyborg, H. (2009). Average intelligence predicts atheism rates across 137 nations. *Intelligence, 37*(1), 11-15.

MacLeod, C. M. (2007). The concept of inhibition in cognition. In D. S. Gorfein and C. M. MacLeod (Eds.), *Inhibition in cognition* (pp. 3-23). Washington, DC: American Psychological Association.

Matsumoto, D., LeRoux, J., Wilson-Cohn, C., Raroque, J., Kooken, K., Ekman, P., et al. (2000). A new test to measure emotion recognition ability: Matsumoto and Ekman's Japanese and Caucasian Brief Affect Recognition Test (JACBART). *Journal of Nonverbal Behavior, 24*, 179–209.

Matthews, G., Zeidner, M., & Robert, R. (2002). *Emotional intelligence: Science or myth?* Cambridge: MIT Press.

Maul, A. (in press). The validity of the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) as a Measure of Emotional Intelligence. *Emotion Review*.

Mayer, J. D., Caruso, D. R., & Salovey, P. (2000). Emotional intelligence meets traditional standards for an intelligence. *Intelligence, 27*(4), 267-298.

Mayer, J. D., Roberts, R., & Barsade, S. G. (2008). Human abilities: Emotional intelligence. *Annual Review of Psychology*, *59*, 507–536.

Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds). *Emotional development and emotional intelligence: Implications for educators* (pp. 3-31). New York: Basic Books.

Mayer, J.D., Salovey, P., & Caruso, D. (1997a). *The Multifactor Emotional Intelligence Scale – MEIS.* Connecticut: Charles J. Wolfe Associates, LLC.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) user's manual*. Toronto: MHS Publishers.

Mayer, J. D., Salovey, P., & Caruso, D.R. (2008). Emotional intelligence: New ability or eclectic mix of traits? American Psychologist, 63, 503-517.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry, 15*, 197-215.

Mayer, J. D., Salovey, P., Caruso, D. R., & Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT V2.0. *Emotion, 2*, 97-105

Moon, S. M., & Lord, R. G. (2006). Individual differences in automatic and controlled regulation of emotion and task performance. *Human Performance, 19*, 327-356.

Murphy, S. T., & Zajonc, R. B. (1993). Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality & Social Psychology, 64*, 723-739.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide (6th ed.)*. Los Angeles, CA: Muthén & Muthén.

Narr, K. L., Woods, R. P., Thompson, P. M., Szeszko, P., Robinson, D., Dimtcheva, T., et al. (2007). Relationship between IQ and regional cortical gray matter thickness in healthy adults. *Cerebral Cortex, 17*, 2163–2171.

Neill, W. T. (1977). Inhibition and facilitation processes in selective attention. *Journal of Experimental Psychology: Human Perception & Performance*, 3, 444-450.

Neill, W.T. & Valdes, L.A. (1992). Persistence of negative priming: Steady state or decay? *Journal of Experimental Psychology: Learning, Memory and Cognition, 18,* 565-576.

Ortells, J. J., Abad, M. J. F., Noguera, C., & Lupianez, J. (2001). Influence of prime- probe stimulus onset asynchrony and prime precuing manipulations on semantic priming effects with words in a lexical-decision task. *Journal of Experimental Psychology: Human Perception and Performance, 27*, 75-91.

Pellegrino, J. W., & Glaser, R. (1979). Cognitive correlates and components in the analysis of individual differences. *Intelligence, 3*, 187-216.

Petrides, K. V., & Furnham, A. (2001). Trait emotional intelligence: Psychometric investigation with reference to established trait taxonomies. *European Journal of Personality, 15,* 425-448.

Posner M.I, & Snyder C.R.R (1975). "Attention and cognitive control". In Solso RL. *Information processing and cognition: the Loyola symposium*. Hillsdale, N.J: L. Erlbaum Associates.

Roberts, RD, Schulze, R., O'Brien, K., MacCann, C., Reid, J. and Maul, A. (2006) 'Exploring the validity of the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) with established emotions measures. *Emotion, 6*, 663–69.

Salovey, P., & Mayer, J., D. (1990). Emotional intelligence. *Imagination, Cognition, and Personality, 9*, 185-211.

Schulte, M. J., Ree, M. J., & Carretta, T. R. (2004). Emotional Intelligence: Not much more than g and personality. *Personality and Individual Differences, 37*, 1059-1068.

Schutte, N.S., Malouff, J.M., Hall, L.E., Haggerty, D.J., Cooper, J.T., Golden, C.J., et al. (1998). Development and validation of a measure of emotional intelligence. *Personality and Individual Differences, 25*, 167-177.

Schneider, W., Eschman, A., & Zuccolotto, A. (2002). *E-prime user's guide.* Pittsburgh: Psychology Software Tools, Inc.

Schweizer, K., Moosbrugger, H. & Goldhammer, F. (2005). The structure of the relationship between attention and intelligence. *Intelligence, 33*, 589-611.

Schmidt, F. L., & Hunter, J. E. (1998). The Validity and Utiltiy of Selection Methods in Personnel Psychology. *Psychological Bulletin, 124*(2).

Schmidt, F. L., & Hunter, J. E. (2004). General Mental Ability in the world of work: occupational attainment and job performance. *Journal of Personality and Social Psychology, 86*(1), 162-173.

Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.

Steel, C. M. (1997). A threat in the air. How stereotypes shape intellectual identity and performance. *American Psychologist, 52*, 613-629.

Tipper, S. P. (1985). The negative priming effect: Inhibitory priming with to be ignored objects. *The Quarterly Journal of Experimental Psychology*, *37*, 571-590.

Tipper, S. P. (2001). Does negative priming reflect inhibitory mechanisms? A review and integration of conflicting views. *Quarterly Journal of Experimental Psychology*, *54*, 321-343.

Unsworth, N., Spillers, G.J., & Brewer, G.A. (2010). The contributions of primary and secondary memory to working memory capacity: An individual differences analysis of immediate free recall. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 36*, 240-247.

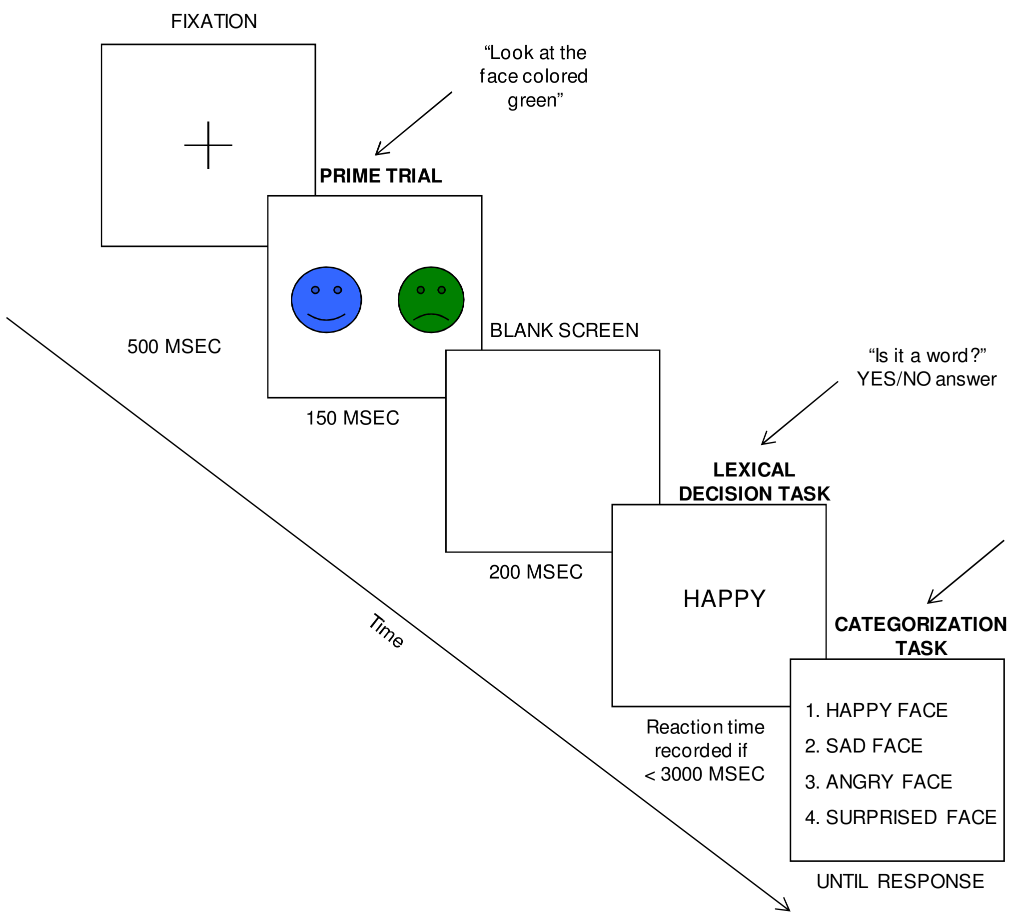
Wadlinger, H., A., & Isaacowitz, D., M. (2011). Fixing our focus: Training attention to regulate emotion. *Personality and Social Psychology Review, 15*, 75-102.

Yee, P. L. (1991). Semantic inhibition of ignored words during a figure classification task. *Quarterly Journal of Psychology, 4*, 3A, 127-153.

Zeidner, M., & Matthews, G. (2000). Intelligence and Personality. In R. J. Sternberg (Ed.), *Handbook of Intelligence* (Vol. xiii, pp. 581-610). New York: Cambridge.

Zeidner, M., Matthew, G., & Roberts, R. D. (2001). Slow down, you move too fast: emotional intelligence remains an “elusive” intelligence. *Emotion, 1*, 265-275.

Figure 1. Sequence of the priming task.



Note: in the above example, the lexical decision task (LDT) was congruent with the distractor.

Table 1: Correlation matrix and descriptive statistics of key variables

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	IQ (/10)[1]	2.25	.49													
2	EI: Branch 1 (Perceiving.)	.60	.11	.33												
3	EI: Branch 2 (Facilitating)	.46	.08	.34	.40											
4	EI: Branch 3 (Understanding)	.56	.11	.39	.33	.52										
5	EI: Branch 4 (Managing)	.38	.10	-.02	.12	.57	.42									
6	Extraversion	3.24	.75	.01	-.01	.00	-.22	.22								
7	Agreeableness	3.84	.64	.02	.14	.52	-.04	.31	.09							
8	Conscientiousness	3.69	.60	-.24	.21	.06	.02	.11	.03	.30						
9	Neuroticism	2.91	.71	-.29	-.31	-.15	-.09	.07	-.29	-.41	-.16					
10	Openness	3.65	.54	-.06	.11	.13	.40	.46	.10	-.14	.20	.14				
11	Male	.45	.50	.09	-.12	-.32	-.14	-.27	.07	-.20	-.12	-.26	-.09			
12	English-speaking	.88	.32	.18	.28	.21	.39	.25	.10	-.03	.05	-.05	.17	.01		
13	Age	19.10	1.62	-.16	-.25	-.41	-.21	-.08	-.03	-.33	.07	.12	.06	.24	-.09	
14	Response time (/1000)[2]	1.15	.45	-.15	-.06	.04	-.09	.00	.03	.11	.05	-.02	-.16	.02	-.08	.14

Note: n = 6649 trials (for n = 85 participants). [1,2]We divided these variables with a constant to move the decimal place to the left and assure convergence of the estimator (original SDs for IQ and Response time were 4.92 and 453.87 respectively). Given the nested nature of the data, we do not report p-values for the significance of the correlations; we corrected for non-independence of observations in the estimation procedure using a cluster-robust variance estimator. Correlations are latent level.

Table 2: Structural equation estimates predicting response time

	Unstandardized Estimates				Standardized Estimates			
	Coef.	*SE*	*z*	*p*	*β*	*SE*	*z*	*p*
Individual Difference Predictors								
IQ	-.23	.08	-2.82	.01	-.23	.08	-2.84	.00
EI: Branch 1 (Perceiving)	.12	.35	.33	.74	.03	.08	.33	.74
EI: Branch 2 (Facilitating)	1.07	.97	1.11	.27	.18	.17	1.10	.27
EI: Branch 3 (Understanding)	.69	.84	.83	.41	.15	.19	.82	.41
EI: Branch 4 (Managing)	-.51	.60	-.84	.40	-.11	.13	-.84	.40
Extraversion	.10	.07	1.30	.19	.15	.11	1.31	.19
Agreeableness	.10	.16	.61	.54	.12	.20	.62	.54
Conscientiousness	-.02	.07	-.21	.83	-.02	.08	-.21	.83
Neuroticism	.06	.09	.76	.45	.09	.12	.75	.45
Openness	-.20	.09	-2.34	.02	-.22	.09	-2.30	.02
Male	.06	.06	1.10	.27	.07	.06	1.11	.27
English-speaking	-.13	.10	-1.23	.22	-.09	.08	-1.22	.22
Age	.06	.02	2.60	.01	.22	.09	2.44	.02
Asian	-.02	.10	-.23	.82	-.03	.11	-.23	.82
Hispanic	.09	.12	.73	.47	.07	.10	.73	.47
White	.04	.11	.33	.74	.04	.11	.33	.74
Conditions[1]								
1. Angry/Distractor (1376)	.00	.03	-.11	.91	.00	.01	-.11	.91
2. Sad/Distractor (1380)	.00	.02	.05	.96	.00	.01	.05	.96
3. Happy/Distractor (1389)	.01	.02	.44	.66	.01	.01	.44	.66
4. Angry/Target (1420)	.04	.03	1.59	.11	.02	.01	1.57	.12
5. Sad/Target (1420)	.04	.02	1.87	.06	.02	.01	1.86	.06
6. Happy/Target (1270)	-.11	.02	-5.88	.00	-.07	.01	-5.89	.00
7. Angry/Control (1481)	.10	.03	3.58	.00	.04	.01	3.54	.00
8. Sad/Control (1361)	-.02	.03	-.71	.48	-.01	.01	-.71	.48
9. Happy/Control (1411)	.03	.02	1.67	.09	.02	.01	1.67	.10
10. Nonword/Control (1462)	.08	.02	4.15	.00	.08	.02	4.04	.00
Intercept	-.05							
R-square	.14	.04	3.11	.00				

Note: [1]The mean model-predicted response time is reported in parentheses. n = 6649 trials (for n = 85 participants). We reported standardized coefficients in the text. The baseline dummy variable for race was "African-American"; the baseline dummy variable for condition was "Control/Surprise" (mean predicted value was 1379 ms). *SE*'s (standard errors) are cluster robust. The conditions simultaneously predict response time as indicated by a Wald test, $\chi^2(10) = 111.70$, $p < .001$. The linear combination of Conditions 4, 5, and 6 significantly reduced response time, $\beta = -.03$, $p < .001$, that of Conditions 1, 2, and 3 did not significantly reduce response time, $\beta = .01$, $p > .10$, and that of Conditions 7, 8, and 9 significantly increased response time, $\beta = .12$, $p < .10$. The linear combination of Conditions 1, 2, and 3 as well as Conditions 7, 8, and 9, had significantly slower response times than did Conditions 4, 5, and 6 (p's < .001).

Footnote

[1]The exact model we estimated, whose coefficients are reported in the same order in Table 2, for individual *i* responding on trial *j*, was:

$$y_{ij} = \beta_0 + \beta_1 E_i + \beta_2 A_i + \beta_3 C_i + \beta_4 N_i + \beta_5 O_i + \beta_6 IQ_i + \beta_7 EI_{B1i} + \beta_8 EI_{B2i} + \beta_9 EI_{B3i}$$

$$+\beta_{10} EI_{B4i} + \beta_{11} Male_i + \beta_{12} English_i + \beta_{13} Age_i + \sum_{k=1}^{3} \delta_k R_{ki} + \sum_{m=1}^{10} \eta_m C_{mij} + e_{ij}$$

Where *y* refers to response time, β_0 refers to an intercept, *E* through *EI,* refers to the latent variables extraversion, agreeableness, conscientiousness, openness, general intelligence, and the four EI branches respectively. Male is a dummy variable indicating sex, English is a dummy variable indicating having English as a first language, and age refers to chronological age. *R* refers to four race categories captured in *k-1* dummy variables. *C* refers to the 11 conditions, captured in *m-1* dummy variables. Finally, *e* is a disturbance term.