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Ability-Related Emotional Intelligence

Knowns, Unknowns, and Future Directions

Edited by
Michael D. Robinson

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Ability-Related Emotional Intelligence: Knowns, Unknowns, and Future Directions

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Editor

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About the Editor

Michael D. Robinson

Dr. Michael D. Robinson is an expert in personality, social cognition, motivation, and emotion. He has published several edited books and approximately 300 research articles in diverse areas within the sub-disciplines of personality and social psychology. Professor Robinson has received several awards, including the James A. Meier Junior and Senior Professorships (at North Dakota State University) as well as the Hogoboom Professorship. Professor Robinson, who currently serves as the Editor of *Personality and Social Psychology Bulletin*, received his PhD from the University of California, Davis.



Opinion

Ability-Related Emotional Intelligence: An Introduction

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Abstract: Emotionally intelligent people are thought to be more skilled in recognizing, thinking about, using, and regulating emotions. This construct has garnered considerable interest, but initial enthusiasm has faded and it is time to take stock. There is consensus that ability-related measures of emotional intelligence (EI) can be favored to self-report tests, in part because the resulting scores cannot be equated with personality traits. However, there are questions surrounding measurement as well as predictive value. Experts in the field were encouraged to chart new directions, with the idea that these new directions could reinvigorate EI scholarship. Special Issue papers speak to theory, mechanism, measurement, and training. In addition, these papers seek to forge links with research traditions focused on interpersonal perception, emotional awareness, and emotion regulation. As a result of these efforts, new insights into what EI is and how it works can be anticipated in upcoming years.

Keywords: emotional intelligence; ability; emotion; measurement; theory

1. Special Issue on Ability-Related Emotional Intelligence: An Introduction

Emotions figure prominently in many realms such as decision making (Lerner et al. 2015), relationships (Engelberg and Sjöberg 2004), and well-being (Watson 2000). Owing to such links, emotion-related capacities might be expected to help individuals succeed rather than fail as they negotiate the complexities of daily life. Modern interest in emotional intelligence (EI)—which is thought to encompass skills related to the identification, understanding, management, and use of emotions (Kotsou et al. 2019)—began with a definitional effort by Salovey and Mayer (1990). Goleman (1995) then popularized the construct by arguing, without sufficient evidence, that EI could be more important than general mental ability in determining whether lives were successful or not. These popularization efforts, which culminated in a Times magazine piece and an Oprah Winfrey episode (Roberts et al. 2010), inevitably led some to suggest that interest in EI could be likened to a fad that would surely perish, like the dodo bird (Antonakis et al. 2009). This has not happened, but there are major questions concerning the construct as well as its value in predicting real-world outcomes (Zeidner et al. 2008).

It is often suggested that there is confusion about whether emotional intelligence should be thought of in terms of personality traits, which can be self-reported, or abilities, which require performance-based tests (Matthews et al. 2004). Although it is useful to compare the predictive validities of these two types of tests (MacCann et al. 2020a; Martins et al. 2010), there seems to be enough consensus to state that these two modes of assessment need to be distinguished from each other, in part because self-reports of EI rarely correlate highly with ability-based assessments of EI (Roberts et al. 2010). In many cases, self-reports of EI display greater predictive validity (e.g., Martins et al. 2010), but such tests also correlate highly with standard personality trait measures, rendering their discriminant validity suspect (Joseph et al. 2015). And, if one endorses an ability-based perspective on EI, which one arguably should (Mayer et al. 2008), the field will need to prioritize the ability-based model and its assessments (Daus and Ashkanasy 2005; Roberts et al. 2010). The current Special Issue does so.

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Ability-based tests seek to determine whether individuals are good at perceiving emotions, whether they understand how emotions work, and whether they can (at least as inferred from their responses to standardized test materials) manage emotions in effective ways (Joseph and Newman 2010). These tests, more or less, assess emotion-related knowledge and its application (Hoemann et al. 2021) and they seek to place individuals along a continuum, from low to medium to high levels of emotion-related ability (Joseph and Newman 2010). The first widely used test was the Multifactor Emotional Intelligence Scale (MEIS: Mayer et al. 1999). This test was followed by the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT: Mayer et al. 2003), the Situational Test of Emotional Understanding (STEU: MacCann and Roberts 2008), the Situational Test of Emotion Management (STEM: MacCann and Roberts 2008), the North Dakota Emotional Abilities Test (NEAT: Krishnakumar et al. 2016), and the Geneva Emotional Competence Test (GEC: Schlegel and Mortillaro 2019). Assessment-inclined researchers have also developed a number of tests of emotion recognition ability, which will relate to the perception branch of EI (Mayer et al. 2003), including the Matsumoto and Ekman’s Japanese and Caucasian Brief Affect Recognition Test (JACBART: Matsumoto et al. 2000), the Multimodal Emotion Recognition Test (MERT: Bänziger et al. 2009), and the Geneva Emotion Recognition Test (GERT: Schlegel et al. 2014). These tests tend to correlate with each other, but perhaps not so highly that the tests could be considered interchangeable (Krishnakumar et al. 2016; Mayer et al. 2016).

Goleman (1995) proposed that emotional intelligence would prove to be a strong predictor of workplace success, relationship success, and well-being. We have now conducted enough research to evaluate this proposal. Ability-based assessments of EI have displayed some predictive power with respect to workplace performance (O’Boyle et al. 2011), relationship quality (Lopes et al. 2004), and well-being (Sánchez-Álvarez et al. 2016), but these correlations are often fairly small (around .2) as well as inconsistent (Miners et al. 2018; Roberts et al. 2010). To give some examples, Di Fabio and Kenny (2016) found correlations between the MSCEIT and well-being in the .04 range (very small) and Miao et al. (2017) reported, in a meta-analysis, that ability EI was a weak predictor of workplace citizenship behavior ($r = .17$) and a non-significant predictor of counterproductive work behavior ($r = .01$). Such weak correlations often disappear when controlling for personality and/or cognitive ability (Roberts et al. 2010) and there appears to be uncertainty as to what to do next (e.g., Côté 2014; Matthews et al. 2012; Mayer et al. 2016; Ybarra et al. 2014). Special Issue papers provide relevant answers.

2. In Search of Theory

Please see Table 1 for some of the major questions that will be considered in this Special Issue. To begin, much of the knowledge that people have—such as concerning countries in Africa or types of tea—could be considered relatively circumscribed, barely affecting their lives as a whole. People who score high in emotional intelligence presumably have more extensive or accurate knowledge about emotion, yet much of this knowledge may be largely semantic in nature, raising questions about whether or how this knowledge affects the course or tenor of lives, whether in the moment or over longer time frames (Ybarra et al. 2014). Among other points, it should probably be recognized that most behaviors are multiply-determined (e.g., by the situation, by personality, by cognitive abilities) and EI-related influences could be subtle, depending on the situation and/or the behavior (Mayer et al. 2016).

Given such complexities (Mayer et al. 2016), we will simply need to develop some theoretical perspectives on EI, which are surprisingly scarce, in order to understand what these individual differences should predict. Some theorizing could be imported from personality psychology, social psychology, the emotion literature, and/or clinical science. As an example, research on reactive aggression (Wilkowski and Robinson 2010) and emotional impulsivity (Carver et al. 2009) makes the point that emotions often trigger urges to act in an impulsive manner, owing to their links to primitive approach and avoidance

systems (Carver et al. 2009; Frijda 2010). People with higher levels of EI, because they possess more extensive knowledge about emotion and its management, may be capable of down-regulating their tendencies toward emotional impulsivity in ways that people with lower levels of EI cannot (Heatherton and Wagner 2011). In support of such theorizing, research has shown that high-EI individuals are less vulnerable to reactive aggression (Gutiérrez-Cobo et al. 2018), distress-influenced suicidal behavior (Cha and Nock 2009), and counterproductive work behavior, particularly when triggered by job negative affect (Krishnakumar et al. 2017).

Table 1. Some Questions Asked in the Special Issue (and/or Introduction).

Focus	Questions
Theory	How does emotional knowledge impact people’s lives? Are low-EI individuals prone to emotionally impulsive behaviors? How would cognitive control in emotional contexts manifest itself? Might EI be linked to higher levels of emotional reactivity? Is EI linked to psychological flexibility?
Mechanisms	Do high-EI individuals favor problem-focused coping? Might low-EI individuals be prone to experiential avoidance? Do high-EI individuals reappraise rather than suppress their emotions? Is EI linked to average levels of positive and negative affect?
Measurement	Should emotion perception materials use fewer prototypical stimuli? How can we model social context in emotion perception tasks? Can we develop theory-informed tests of emotional understanding? Can emotion regulation theories inform emotion management assessments? Should we develop more context-specific assessments of EI?
Neighboring Areas	Are higher perception abilities always beneficial? Might EI levels display within-person fluctuations? Can EI be linked to wisdom, maturity, or resilience? Can we develop ability-based approaches to resilience?
Training	Can emotional intelligence be trained? What sorts of skills should be trained in intervention studies? Can EI be trained using online training methods?
Future Directions	Do interoception abilities contribute to emotional intelligence? Do high-EI individuals experience emotions in a differentiated manner? What are the daily diary signatures of ability EI? How does ability EI impact decision making? Do different EI skills interact with each other?

Note: EI = Emotional Intelligence.

A related line of work has started to show that individual differences in ability EI, but not self-reported EI, can be linked to cognitive control in emotion-related contexts (Checa and Fernández-Berrocal 2019; Gutiérrez-Cobo et al. 2017). What these process-related abilities would predict in more molar terms is not entirely certain, but these abilities could explain why levels of EI seem to be beneficial to performance under conditions of stress (Udayar et al. 2020). As Udayar et al. (2020) emphasize, retaining control under stressful circumstances could impart a certain sense of self-efficacy in handling emotional arousal, which should render behavior more effective (Bandura 1982). Relatedly, one might expect high-EI individuals to gravitate toward rather than away from emotional stimuli as they would be more confident in their abilities to handle the resulting emotional arousal (Appel et al. 2012).

As suggested by the first two Special Issue papers, another sort of theory is possible. As the materials presented on EI tests require individuals to attach emotional meaning to events or stimuli, it is reasonable to suggest that high-EI individuals (relative to low-EI individuals) are more skilled at doing so. Assuming that similar skills are applied in daily life, the relevant skills should result in higher levels of well-being (e.g., experiences of positive affect) under favorable circumstances, but lower levels of well-being (e.g., experiences of negative affect) under unfavorable circumstances (Cacioppo and Berntson

1999). This framework can explain why high-EI individuals sometimes display higher levels of emotional reactivity in response to stressful events (Bechtoldt and Schneider 2016; Ciarrochi et al. 2002; Matthews et al. 2006). It can also explain the links between EI and well-being (Sánchez-Álvarez et al. 2016), with the presumption that positive events (which would generate higher levels of positive affect among high-EI individuals) tend to be more common than negative events (Alves et al. 2017).

Viewed another way, though, average tendencies (e.g., to report higher or lower levels of well-being in some type of general sense) should not be emphasized. Rather, EI should be associated with dynamic operations (MacCann et al. 2020b), sometimes linking positive evaluations to current conditions (when they are pleasant) and sometimes linking negative evaluations to current conditions (when they are unpleasant). In other words, variations in EI should produce emotional states that are “attuned” to current conditions, as emphasized in functional accounts of emotion (Keltner and Gross 1999). A related construct is psychological flexibility. According to this line of theorizing, psychological health is marked by flexibility, meaning that the person is attuned to situational demands and capable of reconfiguring the self to respond to them (Kashdan and Rottenberg 2010). An important component of psychological flexibility is emotional flexibility, defined in terms of situation-appropriate emotional states (Beshai et al. 2018; Hardy and Segerstrom 2017). Emotional intelligence is very likely to be linked to emotional flexibility, but the implications of this connection are just now being studied (Vanuk et al. 2019).

The point of this section has not been to argue for any particular theory of ability EI. Rather, it has been to argue that we need *some* theorizing, at the present time, so that we can better understand what EI is and what it should do. People with low versus high levels of EI are likely to differ in multiple ways and linking these variations to theory will allow us to make new predictions that can reinvigorate the field.

3. Mechanisms and Processes

The “Big Idea” approach contends that emotional intelligence will lead to success in one’s life (Goleman 1995). Given the modest nature of the results that have followed from this perspective (Miners et al. 2018; Ybarra et al. 2014), and given the need for theorizing concerning this class of individual differences, it would seem valuable to identify mechanisms or processes that may represent more proximal, and therefore reliable, correlates. Above, we suggested that emotional intelligence may facilitate processing under emotional circumstances (Checa and Fernández-Berrocá 2019), likely giving rise to a sense of emotion-related self-efficacy, which should benefit self-regulation and performance under stressful circumstances (Schwarzer 2001; Udayar et al. 2020).

Other mechanisms and processes also suggest themselves. When people feel self-efficacious (which we suggest should be linked to higher levels of EI), they are likely to tackle stressful circumstances using a mode of coping termed problem-focused coping (Lazarus and Folkman 1984). This form of coping tends to be adaptive because problems get resolved, clearing a pathway for long-term goal pursuit (Carver and Scheier 2014). In support of this model, MacCann et al. (2011) linked variations in ability EI to variations in problem-focused coping, which in turn predicted higher grade-point averages among students. Results of this type have been replicated (MacCann et al. 2020a) and they suggest that EI is likely to be beneficial in the many circumstances in which problem-focused coping can be advocated (see Carver and Scheier 2014, for a relevant analysis).

Other relevant mechanisms can be found in the psychological flexibility literature. According to this clinical model, human suffering increases as the result of at least two pathological processes (Hayes et al. 2012). Some people are scared of their feelings (i.e., experiential avoidance), which can lead them to restrict their lives in unfortunate manners (Kashdan et al. 2013). Although we are not aware of research linking EI to experiential avoidance, it seems probable that low-EI individuals would be more vulnerable to experiential avoidance given their relative incapacity to understand their feelings. As indicated previously, EI should also be related to emotional flexibility (versus lack of flexibility),

defined in terms of situation-appropriate emotional reactions. Following the lead of Klein et al. (2023), high-EI individuals should display intense, but short-lived reactions to both pleasant and unpleasant events.

One can also draw from the emotion regulation literature in making predictions about how EI should operate. According to Gross (2002), emotions can be regulated at various stages of the emotion elicitation process. Much of this research has contrasted to the mechanism of reappraisal, which involves altering appraisals of an eliciting event to alter one's emotions with suppression, which involves inhibiting the expression of emotions that are felt. Reappraisal can intervene earlier in the emotion eliciting sequence than suppression can, and a considerable body of evidence has pointed to the adaptive nature of reappraisal relative to suppression (John and Gross 2004). There are multiple reasons for thinking that high-EI individuals should be capable of regulating their emotions in more skilled manners (Peña-Sarrionandia et al. 2015), and an emerging body of evidence does in fact suggest positive relationships between ability EI and reappraisal as well as negative relationships between ability EI and suppression (e.g., Megías-Robles et al. 2019; Śmieja et al. 2011). This model can be extended to the correlates of reappraisal and suppression, which include well-being and social behavior (John and Gross 2004).

By regulating negative emotions, high-EI individuals may typically experience lower levels of negative affect (MacCann et al. 2020b). They may also experience higher levels of positive affect, possibly through mechanisms that link EI to engagement with the environment (Robinson et al. 2022). These associations could in turn mediate relationships between variations in ability EI and variations in life satisfaction, eudaimonia, and meaning (Fernández-Berrocal and Extremera 2016). One Special Issue paper explores mediational processes of this type.

4. Should We Develop New Tests?

There is an emerging consensus that ability EI consists of three separable, but correlated sets of skills (i.e., “branches”: Mayer and Salovey 1997) that are involved in the perception of emotion, the understanding of emotion, and the management of emotion (Joseph and Newman 2010; MacCann et al. 2014; Shao et al. 2015). But, there is no agreement on the exact materials or scoring procedures that should be used to assess each set of skills. With respect to the perception branch, a number of points have been made. In the MSCEIT (Mayer et al. 2003), perception is assessed with two tasks, one of which involves identifying emotions in faces and the other of which involves identifying emotions in pictures (e.g., abstract paintings). The former task is probably more central to emotion perception than the latter (Hall et al. 2009) and interventions designed to increase emotion perception have succeeded in altering face perception, but not picture perception (Herpertz et al. 2016). Hence, there are doubts about the picture perception task.

Face perception tasks often use high-intensity, prototypical expressions. In daily life, however, emotional displays tend to be less intense and less prototypical (Matsumoto and Hwang 2014). There could be value in assessing decoding ability with respect to less intense stimuli, which might capture skills that are more often used in daily interactions with others (Matsumoto and Hwang 2014). In addition, some EI experts have contended that static facial expressions are limited and have called for assessments of emotion perception accuracy in relation to more dynamic materials such as videos (Schlegel et al. 2014).

Also pertaining to ecological validity, some theorists have emphasized the importance of context in the manner in which emotion perception processes operate (Barrett et al. 2011). The idea here is that facial perception in particular, as well as person perception more broadly, rarely occurs in a context-free manner, such that many sources of contextual meaning impact the perceptions that people have (also see van Kleef and Côté 2022). Some of these contextual features of meaning can be added to emotion perception materials. Hess and Kafetsios (2021) have explored procedures of this type by presenting target expressers together with surrounding expressers (i.e., other individuals). Procedures of this type can allow one to calculate separable measures of accuracy (perceiving the intended

emotions) and bias (perceiving additional emotions to those intended), with each type of score possessing social cognition significance. One of the Special Issue papers reviews this research program.

In the MSCEIT, emotional understanding (EU) is assessed by asking test-takers about combinations of emotion that are likely to be felt by target characters. But, emotional understanding encompasses a broad set of processes (Castro et al. 2016) and other assessment procedures could be used. Hellwig and Schulze (2021) describe a new EU test that incorporates appraisal information into situational descriptions. A good test-taker is able to infer the likely emotions that would be felt on the basis of the appraisals that were made, resulting in a theory-informed scoring system (also see MacCann and Roberts 2008). Another particularly ambitious test describes situations that would likely give rise to 1 of 10 emotions. With respect to each scenario, test-takers make inferences concerning the appraisals, action tendencies, expressions, and subjective feelings of each character (Sekwena and Fontaine 2018). The skills involved in these inferences are numerous and the test is, therefore, a particularly comprehensive one. As readers will encounter, one of the Special Issue papers also discusses the creation of EU tests based on core relational themes (i.e., molar summaries of the appraisals linked to a particular emotion: Smith and Lazarus 1993).

The management branch of the MSCEIT seems to capture important intrapersonal and interpersonal skills (Lopes et al. 2004; MacCann et al. 2011), but there are questions concerning the assessment of these skills. The skills involved in managing one's own emotions, for example, are probably different than the skills involved in managing the emotions of others and these skills might be distinguished (Durham et al. 2023). The emotion regulation literature has also made a great deal of progress in understanding the different types of emotion regulation strategies that people can use (e.g., Olderbak et al. 2023), but these developments have not been incorporated into ability EI tests in any systematic manner. Finally, the emotion regulation literature has increasingly suggested that people regulate their emotions for instrumental as well as hedonic reasons (Tamir 2016) and the former sorts of reasons could be modeled in ability EI tests to a greater extent (also see Mayer et al. 2016 for additional thoughts about expanding the emotion management testing space).

In summary, EI researchers are busy developing new tests of ability EI, some of which are discussed in this Special Issue. It is uncertain whether some of the tests could be packaged together such that there is a new comprehensive test like the MSCEIT. If not, we will at least have new tests targeting particular branches that are likely to display higher levels of predictive validity. With respect to this point, one last development should be mentioned. Organizational researchers have found that altering generic personality measures such that they target a particular context (e.g., the workplace) results in higher validity coefficients when predicting outcomes pertinent to that context (Bowling and Burns 2010; Shaffer and Postlethwaite 2012). Results of this type have inspired ability EI tests targeting the workplace (Krishnakumar et al. 2016; Schlegel and Mortillaro 2019) and one could imagine similar developments targeting other contexts (e.g., interpersonal relationships: Pratscher et al. 2019).

5. Connecting with the Other Literature

As Hoemann et al. (2021) emphasize, much of the literature has proposed variations in emotion-related expertise, with relevant constructs including alexithymia, emotional awareness, emotional clarity, emotional complexity, emotional competence, empathic accuracy, and emotional intelligence. Although the test procedures used to assess ability EI may be somewhat unique, it would be surprising if there were no links (whether empirical or theoretical) between emotional intelligence and other expertise-related constructs that have been proposed. Empathic accuracy, which conceptually overlaps with the perception branch of EI (Mayer and Salovey 1997), quantifies the extent to which inferences concerning the thoughts and feelings of a target, typically after a communication episode, overlap with the actual thoughts and feelings of the target, as reported on by the target (Hall and

Mast 2007). Such skills seem to be highly dependent on who the target is and whether the perceiver is motivated to understand the thoughts and feelings of that target in a particular setting (Sassenrath et al. 2022). Aside from this point, this piece of literature is useful in highlighting several potential downsides to empathic accuracy, such as the possibility that these skills can be used for Machiavellian purposes (Hodges and Myers 2007) and that they can threaten relationships, such as when a person correctly infers that their partner is attracted to another person (Simpson et al. 2003). The potential downsides to emotional intelligence, thus far, have only received scattered attention (Davis and Nichols 2016).

Emotional awareness encompasses two constructs—attention to emotion and emotional clarity. Some people value their emotions to a greater extent and they attend to them for this reason. Such individuals tend to report stronger reactions to emotional events, but they also display emotional wisdom (e.g., by choosing to avoid events that would give rise to negative emotion: Robinson et al. 2021). Emotional clarity is meta-cognitive in nature and it occurs when people sense that they understand their emotions well (Boden and Thompson 2017). Like emotional intelligence, there are individual differences in emotional clarity and they are associated with higher levels of well-being (Lischetzke et al. 2012) as well as lower levels of psychopathology (Vine and Aldao 2014). But emotional clarity also varies quite a bit within a person, with predictable consequences (Thompson and Boden 2019). The ability EI literature has not yet focused on within-person changes in EI, with the exception of intervention studies (Durham et al. 2023). Theorizing at this within-person level might allow researchers to better understand the “fluid” (Fiori et al. 2022) aspects of EI.

Emotional intelligence should, ideally, support achievements such as wisdom, maturity, and resilience. These are difficult constructs to measure, but our understanding of optimal functioning requires such efforts (Seligman and Csikszentmihalyi 2000). Resilience seems to involve some paradoxical elements. On the one hand, resilient people are more reactive to pleasant and unpleasant events in momentary experience (Waugh et al. 2011). On the other hand, resilient people are capable of experiencing positive emotions under adverse circumstances (Fredrickson et al. 2003) and they are capable of rebounding from negative circumstances more quickly (Masten 2001). In other words, resilience seems to promote “stability through change”, which is a fundamental feature of healthy physiological and psychological systems (McEwen and Lasley 2002). Resilience clearly involves abilities and these abilities clearly involve appraisals and emotions (Tugade and Fredrickson 2004). In future research, it would seem valuable to attempt to operationalize such skills in ability-related terms.

6. Can Emotional Intelligence Be Trained?

One of the benefits of the ability EI model is that it conceptualizes EI in terms of skills that could, potentially, be trained (Hoffmann et al. 2020). We now have enough of this research that it is safe to conclude that EI can be trained, although effect sizes are medium rather than large (Hodzic et al. 2018). The literature has limitations, however. Among them, Kotsou et al. (2019) suggest the need for more studies that randomly assign participants to intervention versus control groups, that use “active” control groups to guard against expectancy effects, that use ability EI measures as outcomes, and that examine long-term as well as short-term changes. There is also the need to create standardized interventions, with a clearly specifiable content, which will facilitate comparisons among training procedures in future efforts (Kotsou et al. 2019). In addition to these developments, one Special Issue paper considers the question of whether EI training is efficacious when it is delivered online rather than in face-to-face terms. Success with such digital interventions will permit wider dissemination, though one issue is that volunteers in such studies will tend to have higher levels of education as well as (quite likely) higher levels of pre-existing EI, which would be linked to interest in volunteering for EI studies.

7. Additional Future Directions

As we reflect on the state of the ability EI literature, many questions suggest themselves. One question is whether ability EI can be linked to interoceptive abilities, defined in terms of individual differences in the accurate representation of afferent signals from the body (Herbert and Pollatos 2012). Bodily signals clearly contribute to emotional experience (Critchley and Garfinkel 2017), but EI tests also seem to assess variations in semantic knowledge concerning emotion, which would not vary as a function of current bodily experiences (Hoemann et al. 2021). Nonetheless, data do suggest that interoceptive abilities are involved in the representation (Zaki et al. 2012) and experience (Dunn et al. 2010) of emotion, such that links between ability EI and interoception might be expected (also see Klein and Robinson 2021). Given these potential links, as well as their importance to theories of emotion (Zaki et al. 2012), further work on this EI–interoception interface seems warranted.

One conception of emotional expertise contends that it involves differentiated feelings, which can be assessed by computing within-subject correlations between emotional experiences of a given valence (e.g., the anger–sadness correlation across reports of experience, with lower correlations suggesting a greater differentiation of these emotions: Smidt and Suvak 2015). Briefly, it is thought that higher levels of emotion differentiation support behavior that is more emotionally intelligent (Kashdan et al. 2015). Ability EI tests ask people to make distinctions among emotions (e.g., anger versus sadness) and it is intuitive to suggest that individuals obtaining high EI scores will exhibit greater emotion differentiation in their daily lives. However, MacCann et al. (2020b) report results that are contrary to this prediction. Hence, it would seem that more work is necessary in clarifying the relationship between ability EI and emotion differentiation. If emotion differentiation is not captured by current tests, we may need to create new ones.

More generally, we need to know a lot more about whether and how ability EI manifests itself in daily life. With respect to this point, the emotion dynamics literature has used variations of the experience-sampling paradigm (Scollon et al. 2003) to answer many questions about variations in emotional reactivity, emotion regulation, and other components of emotion change (e.g., inertia: Koval et al. 2015; see Kuppens et al. 2022, for a general review). In the future, we would like to see a greater integration of the EI and the emotion dynamics literature, whether in relation to laboratory (Klein et al. 2023; Waugh et al. 2011) or experience-sampling (MacCann et al. 2020b) paradigms. As shown in some examples, high-EI individuals may exhibit stronger emotional reactions to daily events of a given valence (Beshai et al. 2018), but they may be more capable of regulating pathological reactions to such events (Robinson et al. 2012). Clearly, there are complexities here that merit research.

A prominent neuroscience model contends that damage to emotion representation regions of the brain severely impairs everyday decision making (Naqvi et al. 2006). Such patients not only display flat affect, but they have trouble making life choices and they take unwarranted risks (Bechara 2004). Since such patients have preserved cognitive abilities, this research highlights the functional importance of feelings in decision making (Naqvi et al. 2006). Low levels of ability EI may act in a manner akin to this neurocognitive model, but very little research has focused on this possibility. Among other predictions, low-EI individuals may perform more poorly in tasks such as the Iowa Gambling Task (Bechara et al. 2000) and they may display some degree of insensitivity to hedonic considerations in tasks such as those described by Caruso and Shafir (2006) or Robinson et al. (2021).

As stated above, it is recognized that there are distinct sets of EI skills that can be broadly grouped into the perception, understanding, and management areas (Joseph and Newman 2010). Although these skill sets are separable, they tend to load onto a global EI factor (Krishnakumar et al. 2016; MacCann et al. 2014). In the future, it seems likely that some researchers will prefer to theorize at the branch level (e.g., He and Côté 2023), while others will prefer to theorize at the global level (e.g., Robinson et al. 2019). It is not clear which level of theorizing is best, but the development of new tests pertaining to particular

branches (e.g., Elfenbein et al. 2017; Sekwena and Fontaine 2018) will likely fractionate the literature to a certain extent. This trend could be countered by focusing on ways in which different EI skill sets interact with each other, much as mindfulness-related skills do (Eisenlohr-Moul et al. 2012).

8. Conclusions

In this introduction to a Special Issue on ability EI, we emphasized the importance of developing new theories, of focusing on mechanisms and processes, of developing new EI tests, of connecting with the other literature, and of training studies that answer novel questions. As displayed in Table 2, the Special Issue papers cover all of these topics. Emotional intelligence should matter in diverse realms such as decision making, social behavior, and well-being, but new developments are needed to forge these links. The present Special Issue is a timely one and it is hoped that we will learn considerably more about what ability EI is and how it works in upcoming years.

Table 2. An Overview of Special Issue Papers.

Focus	Number	Brief Summary
Theory	1	Presents a hypersensitivity theory of EI
	2	Presents an evaluation expertise theory of EI
Mechanisms	3	Positive and negative affect as well-being mediators
	4	A contextual approach to emotion perception
Measurement	5	Integrating emotion theory into EI measurement
	6	A new test of emotion perception
Neighboring Areas	7	A new test of emotional understanding
	8	A review of the correlates of empathic accuracy
	9	Emotional clarity as fluid EI
Training	10	Resilience from skill and well-being perspectives
	11	An online intervention for emotional intelligence

Note: EI = Emotional Intelligence.

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Concept Paper

With Great Sensitivity Comes Great Management: How Emotional Hypersensitivity Can Be the Superpower of Emotional Intelligence

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Abstract: With the goal of furthering the understanding and investigation of emotional intelligence (EI), the present paper aims to address some of the characteristics that make EI a useful skill and, ultimately, a predictor of important life outcomes. Recently, the construct of hypersensitivity has been presented as one such necessary function, suggesting that high-EI individuals are more sensitive to emotions and emotional information than low-EI individuals. In this contribution, we aim to shift the perception of hypersensitivity, which is mostly seen with a negative connotation in the literature, to the perspective that hypersensitivity has the capacity to result in both negative and positive outcomes. We advance this possibility by discussing the characteristics that distinguish hypersensitive individuals who are also emotionally intelligent from those who are not. Based on an emotion information processing approach, we posit that emotional intelligence stems from the ability to manage one's level of hypersensitivity: high-EI individuals are those who are better able to use hypersensitivity as an adaptive rather than a disabling feature. Ultimately, we propose that hypersensitivity can represent a sort of "superpower" that, when paired with regulatory processes that balance this hypersensitivity, characterizes the functioning of high-EI individuals and accounts for the positive outcomes reported in the literature.

Keywords: EI_K; EI_p; emotional intelligence; hypersensitivity; emotion regulation

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1. Introduction

With just over 30 years of research, emotional intelligence (EI) has been catalyzing interventions in various domains and stands strong as a cutting-edge topic in research. Despite being a young domain of research, remarkable progress has been made in the latest decades to advance its progression in fundamental issues related to its conceptualization with respect to cognate constructs, its measurement, and its role in predicting important life outcomes. The debate surrounding the legitimacy of EI as a new scientific construct—quite fierce at times—has contributed to raising the quality of contributions and has guided scholars to address the most compelling issues EI has been confronted with (Dasborough et al. 2022).

In this article, we refer to the (Salovey and Mayer 1997) conceptualization of ability EI as the expression of intelligence applied to the emotional realm of the individual by way of four interrelated facets: how individuals recognize emotions in oneself and others, how they use them to facilitate thinking, and how individuals understand and manage emotions in oneself and others. With the goal of further advancing the discernment and investigation into EI and its related constructs, the present contribution aims to address some of the characteristics that render EI a useful skill and ultimately a predictor of important life outcomes. Recently, the construct of hypersensitivity has been presented as being one such necessary function (Fiori and Ortony 2016, 2021). This idea was introduced in the context

of the “hypersensitivity hypothesis”, which states that individuals with high EI are more sensitive to emotions and emotion information than individuals with low EI.

We aim to shift the perception of hypersensitivity, mostly seen in the literature as having a negative connotation, to the perspective that hypersensitivity has the capacity to result in both negative and positive outcomes. We advance this possibility by discussing the characteristics that distinguish hypersensitive individuals who are also emotionally intelligent from those who are not. The idea is that EI stems from the ability to manage one’s level of hypersensitivity: high-EI individuals are those who are better able to use hypersensitivity as an adaptive feature instead of an impairing characteristic. Ultimately, we posit that hypersensitivity represents a sort of “superpower” that, when paired with the capacity to balance this hypersensitivity with regulatory processes, characterizes the functioning of high-EI individuals and accounts for the positive outcomes known in the literature.

In guiding the reader through our understanding of how EI would function by way of hypersensitivity, we follow the chronological line of reasoning we developed over the last few years, which includes key articles that helped us to shape the theory presented in this contribution. We start by discussing the puzzling findings regarding “side effects” of EI, to further advance potential explanations rooted in how EI is operationalized, and the processes through which it comes into play. We then advance the hypothesis that hypersensitivity to emotion and emotion information is a fundamental feature of high EI, one that describes its *modus operandi*. We provide a definition and theoretical framework that can be used to this purpose, which includes the role of regulatory processes as a key function in the management of this hypersensitivity. We conclude by discussing open questions and future directions.

2. The Starting Point: Does EI Really Have a Dark Side? We Do Not Believe So

Our reasoning originated from analyzing the mounting evidence that EI might also have undesirable consequences (Davis and Nichols 2016; Fiori and Ortony 2016). Effects at the intrapersonal level, such as the association between EI and depression or suicidal ideation in university students (Ciarrochi et al. 2002), or higher cortisol levels in stress situations (Bechtoldt and Schneider 2016; Matthews et al. 2006), have been cited. These findings are puzzling first and foremost because (ability) EI should be an asset, not an impediment. Indeed, pairing the word “intelligence” with “emotional” implies that there should be adaptive benefits for individuals using emotions to support thinking. The term coined “wise mind” by Linehan (1993, 2015), a very successful skills training module from dialectical behavior therapy (used for clinical purposes), supports this notion, emphasizing that effective decision making should neither ignore emotions using only logic (“reasonable mind”) nor rely only on emotions without accessing reason/logic (“emotion mind”). “Wise mind” allows for the integration of the two, resulting in more fulfilled choices that promote effective action. It allows one to honor and nurture emotions while also acting rationally, as opposed to, for example, suppressing feelings (reasonable mind alone) or reacting quickly or defensively (emotion mind alone).

The definition of EI as an ability, measured with maximum performance tasks, underscores the fundamental characteristic of EI as a form of intelligence. High-EI individuals should be *skilled* with emotions, which means that they should be able to outperform others in emotionally-connotated tasks (e.g., emotion detection) or in those situations charged with a heavy emotional load (e.g., interpersonal conflict, caring for a terminally ill loved one). If this does not appear to be the case, then we are facing a conceptual conundrum that requires an explanation.

2.1. *Hypersensitivity as a Possible Explanation of the Side Effects of EI*

Recent attempts to explain the drawback effects of EI have suggested that if one is higher on EI, for instance, good at perceiving emotional stimuli, this might ultimately result in being more submerged by emotions, especially if the stimuli are negative (see also Antonakis et al. 2009). This idea was tested in a lab experiment by Fiori and Ortony (2016),

who showed that high-EI individuals (in particular, those high on emotion perception) were more strongly affected by induced incidental anger. They reported stronger anger reactions and provided more negatively biased ratings of an ambiguous target. A follow-up of this study (Fiori and Ortony 2021) introduced the “hypersensitivity hypothesis” as a potential explanation for the notion that high-EI individuals amplified the importance of *both* positive and negative information when forming impressions of others. According to this hypothesis, individuals high in EI may be more sensitive to emotions and to emotion information than individuals low in EI. In this view, EI can be conceived as a magnifier through which individuals perceive and process the emotional aspects of their inner and outer lives. All in all, these results raise the issue that high-EI individuals are also hypersensitive, in that they experience an amplification of the valence and intensity of emotions, which then has an impact on (more or less advantageous) behavioral outcomes.

2.2. *The Way EI Is Operationalized and Measured May Further Explain Negative Consequences of EI*

Another reason why negative consequences might appear to arise in association with EI is because of different limitations in how ability EI is operationalized and measured in several studies. First, although EI is defined as being composed of different facets, studies rarely consider all of these facets when assessing EI. They often focus on an overall score, or on scores related to one or the other facet (see also Davis and Nichols 2016; Keefer et al. 2012). As with all psychological concepts, if the tools used to measure it are missing or fail to characterize its components, one risks misrepresenting the construct and, thus, the impact it is deemed to have on important outcomes. In the cases noted above, though an individual may yield an overall high EI, scores may be made up by very high emotion perception and very poor emotion management, among other permutations. A case in point is the study by Ciarrochi et al. (2002), who made the specific link between increased depression, suicidal ideation, and hopelessness with *only* the emotion perception factor of EI measured as an ability. Further results of this study include individuals who scored lower on the factor of managing the emotions of others (another *part* of EI, but measured through self-report scale) who had greater suicidal ideation. These findings highlight that when only one facet of EI is considered—in this case regarding EI measured as an ability—the individual’s complete EI profile is not known, possibly explaining why the profile is associated with negative outcomes: the necessary components that render EI to be “skillful” could be missing.

Second, as discussed in the EI literature, there is still a question about the extent to which current ability EI tests can capture EI *in action*, rather than mostly just knowledge about emotions. This would lead to a potential gap between scores on ability EI and observed behavior in context. A common feature of ability EI tests across EI facets is the requirement of deep reasoning about emotions; for instance, situational judgment tests typically engage test-takers into “if-then” conditional reasoning. Scores derived from such tests may be helpful to quantify the repertory of actions related to emotional situations; however, they may not fully account for how individuals would act themselves (as compared to a hypothetical character in a situation). They may additionally fail to account for the extent to which individuals would be able to engage in effortful thinking if they do not have access to their full cognitive or temporal resources (e.g., if they are submerged by a heavy emotional load or subtle emotional signs in real life). Though the cognitive reasoning piece around emotions does contribute to one’s EI, it was argued that the theorization and measurement of ability EI must also consider more automatic processing of emotion information (Fiori 2009), such as those relying on implicit methods within research in personality psychology (Robinson and Neighbors 2006). The below section (Section 2.3) makes suggestions around how using the proposed additions to EI measurement can lead us to better understand the connections between EI and varied outcomes, as well as to understand the relationship between hypersensitivity and EI (Section 3).

2.3. *EI_P and EI_K Can Help Us Understand How EI Can Lead to Both Positive and Negative Outcomes*

One way to address the limitations of current ability EI measures was the introduction of a new EI component representing how individuals experience emotions, such as how they respond to and process emotions and emotion information (Fiori et al. 2022). The basic idea is that within a broad conceptualization of ability EI as a unique construct, two distinct components can be identified: EI_K and EI_P. The first, EI_K, or the emotion knowledge component, can be measured with current ability EI tests, such as the situational test of emotion understanding (STEU; MacCann and Roberts 2008) or, in the workplace, with the Geneva Emotional Competence Test (GECQ; Schlegel and Mortillaro 2019). The type of reasoning mainly involved in EI_K is top-down, wherein individuals start from general principles about how one should behave emotionally, and then contextualize to more specific situations and constraints. The second, EI_P, or the emotion–information processing component, is a new component that can be measured with cognitive tasks assessing the efficiency of cognitive and emotional processing. This is typically performed by way of reaction time or rapid visual identification. This type of processing is bottom-up, based mainly on the sensorial properties of the stimuli, such as their saliency or intensity. Factor analyses conducted on the EI_P and EI_K components within the nomological network of intelligence show that the two components are correlated with each other, although the best fitting model is the one in which they are conceptualized as separate factors related to both fluid and crystallized intelligence (Fiori et al. 2022). Hence, the two components should be thought of as related (within a unique EI factor), but also distinct from each other.

The advantage of using this distinction is that it accounts, among other things, for a dual-process account of EI (Fiori 2009), as well as for more cognitive approaches, such as system 1 and 2 proposed by Kahneman (2011). In particular, EI_P involves rapid and more instinctive emotional reactions and emotional contagion, presenting similarities to system 1; individuals may use this process to quickly respond to emotional cues in the environment. EI_K involves the conscious and deliberate evaluation and regulation of emotions, presenting similarities to system 2. Individuals may use thoughtful strategies and reasoning to recognize, understand, and manage emotions in oneself and others.

Of note, individuals who qualify as having “high EI” should be high in both EI_K and EI_P, with each component modulating the other in a homeostatic balance. In the absence of this balance, we might still incur negative outcomes, such as difficulties with social interactions, typical of individuals with Asperger’s syndrome (now labeled high-functioning autism). These individuals depend on high EI_K, as they are often able to hold a good level of emotion knowledge (as measured by the MSCEIT), especially when given enough time to think through the options (Montgomery et al. 2010). Despite this, these individuals are partly characterized by difficulties with social interactions (American Psychiatric Association 2013), appearing to have low EI_P, which may account for a dearth in the perception of social cues. Without the processing of social cues, the cognitive understanding of them is less useful in actual social interactions. Other negative outcomes due to the imbalance between EI_K and EI_P are those typically associated with hypersensitivity effects, such as very intense and prolonged negative reactions, which may result from low EI_K (more specifically, low emotion management, which is part of EI_K) and high EI_P.

Hence, the distinction between EI_P and EI_K helps us to better understand how EI would exert positive vs. negative effects, because it deepens the comprehension of what an unbalanced profile is. This includes disequilibrium not only among ability EI facets (or EI_K), but also between EI_P and EI_K.

3. **Bringing It All Together: Emotion–Information Processing as the Theoretical Framework of Hypersensitivity**

Up to this point we have advanced the possibility that what distinguishes hypersensitive individuals who are also emotionally intelligent from those who are not resides in their capacity to balance the “hypersensitive” function of EI with regulatory processes

that would allow them to retain only the benefits of that hypersensitivity. We further push our understanding of the relationship between EI and hypersensitivity by referring to the notion that both EI_P and EI_K are required to accurately represent EI. This implies that they both play a role in determining the way hypersensitivity can be defined and the consequences it may have.

To this purpose, we employ an information processing approach that integrates basic cognitive models (such as Atkinson and Shiffrin 1968) with emotion process frameworks (e.g., Elfenbein 2007) to conceptualize the function of hypersensitivity within ability EI. An information processing account of hypersensitivity describes hypersensitive individuals as those who have high levels of EI_P , reflected in a lower threshold for the perception of emotional features, the ability to detect very subtle and fine-grained affective responses in oneself and others, attention directed preferably towards emotional stimuli, the experience of more intense emotional reactions to emotional stimuli at both the physiological and subjective level, and stronger memory for emotion-related information. In Figure 1 we present the different processes involved in the treatment of emotion information (orange boxes), which correspond to the EI_P component of EI and that may be considered the building blocks of hypersensitivity. We may find, for example, that hypersensitivity unfolds at the level of attentional mechanisms, with high-EI individuals being more attentive to emotional, as compared to neutral, pictures. Another possibility is that hypersensitive reactions might be generalized to all different information processing steps, i.e., all the different processes included in the boxes “input processing” and “further elaboration and storage” in Figure 1.

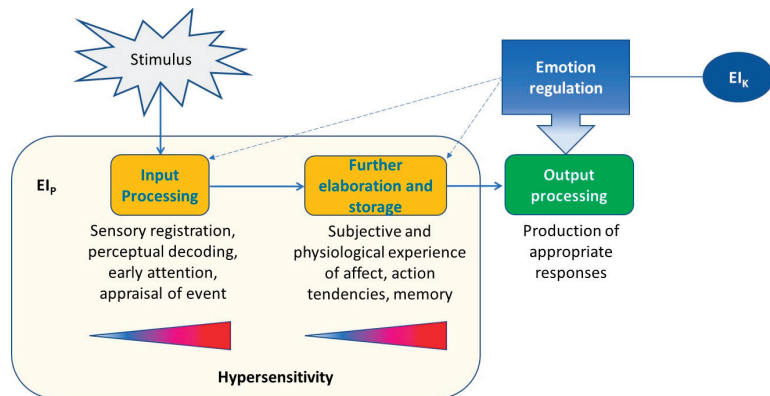


Figure 1. Description of the steps (orange boxes) leading emotionally intelligent individuals to achieve positive outcomes (green box), namely, emotional hypersensitivity plus the capacity to regulate such hypersensitivity. Levels of hypersensitivity are associated with EI_P in that the individual stands along a continuum from low (blue) to high (red) sensitivity based on different information processing steps, with hypersensitivity characterizing the functioning of high-EI individuals.

Investigating the specific processes involved in hypersensitivity in high-EI individuals may help to identify which ones are associated with the production of appropriate, adaptive responses, such as resilience or wellbeing (green box). Of note, the distinction between the color of the boxes highlights that hypersensitivity, which corresponds to high level of EI_P (orange boxes), describes the *modus operandi* of EI, rather than the *effects* of this way of operating, which relate to the *consequence* of hypersensitivity (green box). Importantly, as discussed earlier, the hypersensitivity of high-EI individuals is “managed” by emotion regulation, which is related to EI_K and is deemed to be the characteristic that renders their hypersensitivity an advantage (thus categorizing them as emotionally intelligent individuals).

In sum, we claim that the interplay of EI_P and EI_K—in particular, the EI aspect related to emotion regulation (ER)—ensures the adaptive functioning of hypersensitivity and characterizes high-EI individuals. Our theorization points out that EI stems from the interplay of these two components, with both having to be high in order to ensure adaptive outcomes. Indeed, the stronger the emotional reactivity of high-EI individuals, the more effective ER needs to be. Ultimately, we claim that hypersensitivity in high-EI individual functions like a superpower that requires the power to control such hypersensitivity through regulatory processes in order to ensure adaptive functioning.

To further understand what this theoretical concept may look like in reality, we use a practical example to illustrate how a balance between EI_P and ER can be reached, and, thus, high EI reached, or not in Table 1.

Table 1. High levels of EI_P (hypersensitivity) plus effective emotion regulation results in high EI. This table illustrates how hypersensitivity in response to an emotional event conceptualized as involving the cognitive processes shown in Figure 1 can lead to a well-managed versus poorly managed situation. When EI_P is high, there is a larger range possibility of EI. As long as the EI_P part is high, high EI is also possible but is not a given; this depends on the capacity to manage the feelings that result from this hypersensitivity. Given the intensity of emotion and reactivity this can cause, this may also lead to very low levels of overall EI (“in action”), as the consequences of not managing such hypersensitivity can be remarkable. On the other end of the spectrum, if EI_P is low, then high EI is not possible as the individual may not perceive emotional stimuli in the first place and thus would be less emotionally impacted by them.

	Situation: Giving a lecture in a classroom in which students are showing signs of boredom, annoyance, and/or difficulty understanding concepts through means such as furrowing eyebrows, rolling their eyes, worried expressions, giggling (reason unknown). The table below shows how different levels of EI _P are related to different levels of ER.		
	High Levels of Emotion Regulation¹	Medium Levels of Emotion Regulation	Low Levels of Emotion Regulation
High levels of EI_P (hypersensitivity)	<p>Possible Experience: Intense feelings of frustration in response to student behaviors (e.g., not being able to meet the students’ needs/wants).</p> <p>Possible Regulation Strategy: Quickly and effectively uses positive self-talk to note that it is not personal; uses breathing techniques to calm the body down; thinks about challenging situations from the past in which he/she has been able to manage successfully.</p> <p>Possible Highly Emotionally Intelligent Outcome: Channels cognitive resources towards engaging students in their teaching (e.g., shifts tone of voice, gives an added example, or engaging students in discussion in order to shift the dynamic); lecture ends with great satisfaction of students and the teacher.</p>	<p>Possible Experience: Intense feelings of frustration at student behaviors (e.g., at not being able to meet the students’ needs/wants).</p> <p>Possible Regulation Strategy: Struggles to get through some breathing and positive self-talk, though still emotionally overwhelmed in the moment.</p> <p>Possible Medium Emotionally Intelligent Outcome: Gets through the lecture and then improves the content/examples for future lectures. Lecture ends with students being unclear about some of the content taught and the teacher being mildly frustrated by the situation experienced in class.</p>	<p>Possible Experience: Intense feelings of frustration at student behaviors (e.g., not being able to meet the students’ needs).</p> <p>Possible Regulation Strategy: Paralysis of any known coping strategies—student reactions taken as an attack on presenter’s lecturing ability.</p> <p>Possible Non-Emotionally Intelligent Outcome: Becoming overwhelmed and unable to move forward with lecture—bursting into tears, leaving the room, or screaming at the class to sit still and listen. Lecture is over without having covered all the content planned, teacher reputation is shifted, emotional exhaustion ensues.</p>

Table 1. *Cont.*

Situation: Giving a lecture in a classroom in which students are showing signs of boredom, annoyance, and/or difficulty understanding concepts through means such as furrowing eyebrows, rolling their eyes, worried expressions, giggling (reason unknown). The table below shows how different levels of EI _P are related to different levels of ER.			
	High Levels of Emotion Regulation ¹	Medium Levels of Emotion Regulation	Low Levels of Emotion Regulation
Low levels of EI _P	N/A Individual does not have the sensitivity to detect the relevance of student behaviors in connection with his/her teaching (high EI not possible).	N/A Individual may not notice the behaviors themselves and may not link them to his/her teaching, but maybe to the subject matter or other. The teacher thinks s/he is doing OK when in fact students are not interested in the lecture. Possible Regulation strategy: Teacher may make small attempts in voice tempo or tone in order to make sure students are fully attentive and engaged in the lecture. Possible Non-Emotionally Intelligent Outcome: Lecture ends with most students being unclear about content and bored by the teaching style. The teacher does not realize that his/her way of teaching is ineffective.	Possible Experience: The relevance of student behaviors to the lecture goes unnoticed. Possible Regulation strategy: None needed. Possible Non-Emotionally Intelligent Outcome: No change in lecture format or presentation. Students unsatisfied and bored, teacher does not question her/his way of teaching.

¹ The levels of EI_P and ER are each divided into levels for the purpose of example. It is recognized that each of these lies on a continuum.

Hypersensitivity to Pleasant and Unpleasant Emotions and Positive Outcomes

A more complete picture of EI is emerging when considering the distinction between EI_P and EI_K, and the hypersensitivity hypothesis, where high-EI individuals are those who possess a) enhanced processing of emotion and emotional information (hypersensitivity) and b) the ability to balance the “hypersensitive” function with regulatory processes. These processes allow him or her to maximize the benefits of hypersensitivity without being overcome by its disadvantages (the intelligence part of EI). Our theorization fundamentally disputes the idea that hypersensitivity has a uniquely negative connotation, introducing a perspective in which hypersensitivity has the capacity to produce both negative and positive effects.

At the outset, the idea to pair EI with hypersensitivity may seem counterintuitive. There is a vast amount of research showing adverse effects of intense emotional reactions in response to (mainly) negative events. In the clinical literature, affect intensity is considered a form of dysregulation associated with various types of psychopathologies (Henry et al. 2008), such as several mood and anxiety disorders (Mennin et al. 2007).

On the other end of the spectrum, research showing a positive association between stronger reactivity and wellbeing, and resilience in healthy individuals has started to emerge (e.g., Schaefer et al. 2013; Waugh et al. 2011). More specifically, the concept of emotional flexibility, which concerns the capacity to adapt intensity and duration of emotional reactions to pleasant and unpleasant situations/stimuli (Waugh et al. 2011), presents similarities with the basic skills constituting EI. For this reason, this concept of emotional flexibility might be relevant when describing the hypersensitivity in high-EI individuals. Emotional flexibility encompasses three key elements. Emotional awareness involves being in touch with and aware of one’s emotions, recognizing and labeling them accurately. Emotional acceptance focuses on the nonjudgmental acceptance of one’s emotions, whether pleasant or unpleasant; it involves recognizing and validating emotional experiences with-

out trying to suppress or avoid them. Emotional adaptability refers to the ability to regulate and flexibly modify emotional responses to the demands of a given situation; it implies the ability to adjust emotional reactions appropriately and adaptively, taking the context and the goals one is trying to achieve into account. Overall, the concept of emotional flexibility implies that intense emotions, managed and experienced fully in an adaptive context, are an advantage (and an EI skill). In fact, emotional flexibility was found to be associated with higher trait resilience (Waugh et al. 2011).

This is also aligned with the research showing that more intense emotional reactions to both pleasant and unpleasant images were associated with higher wellbeing (Klein et al. 2023). More specifically, the procedure employed to distinguish reaction intensity (or peak intensity) from reaction duration (magnitude of the reaction) highlighted that reacting with intense emotions may have positive outcomes: it was the peak intensity in response to emotion-eliciting pictures that was associated with wellbeing and adaptive choice. Although EI was not taken into consideration in these studies, they show the most beneficial side of emotional sensitivity as linked to adaptive and functional behavior. It is precisely this side that should be at play for highly emotionally intelligent individuals, as compared to the disadvantageous side associated with psychopathology.

Further, research in the field of positive psychology has shown that people who flourish display greater positive emotional reactivity in response to pleasant events such as helping, playing, and interacting (Catalino and Fredrickson 2011). This hypersensitivity to positive stimuli might play a key role in broadening the scope of attention and in noticing things to savor (Bryant 2021). Several studies have shown that a greater ability to savor positive experiences in one's life leads to several positive outcomes, such as an enhancement of happiness (Bryant et al. 2005), life satisfaction (Smith and Bryant 2018), and resilience and wellbeing (Smith and Hanni 2017). This enhanced ability to experience positive emotions might allow individuals to overcome negativity in the wake of negative events and to thrive in personal growth (Fredrickson 2009).

Additional support for the idea that sensitivity to emotional stimuli may be beneficial under certain circumstances comes from evolutionary and developmental psychology, in particular the concept of "differential susceptibility", proposed by (Belsky and Pluess 2009). This theory suggests that people vary in their susceptibility or sensitivity to environmental influences, and this sensitivity can manifest in both positive and negative ways. Challenging the notion that some people are simply "vulnerable" to negative influences (such as stress or adversity) while others are "resilient", it theorizes that those who are more sensitive to negative influences may also be more responsive to positive influences. For example, supportive relationships or interventions would be expected to have a stronger impact among sensitive individuals, leading to more adaptive outcomes. Such considerations highlight the role of individual differences in developmental plasticity as a fundamental feature of environmental adaptation.

Experiencing unpleasant emotions intensely, though less intuitive in terms of its positive impact at first glance, can lead to several benefits when this hyper-reactivity to negative emotions is managed well. For instance, in the field of educational studies, it has been suggested that reactivity to negative emotions is adaptive because it might enhance learning and achievement (Rowe and Fitness 2018). This is also related to the fact that emotional reactions to negative events can improve cognitive processing. Stronger emotional response to negative images has been associated with better memory consolidation for those events compared to those with weaker emotional responses (Kensinger and Corkin 2003). Empirical studies in which stress was manipulated also show that activation of threat-related stimuli may help to mobilize resources and help one to finally cope effectively with perceived "danger" (Fiori et al. 2022; Mikolajczak et al. 2009). An extreme example of this can be seen with Navy SEAL warfighters, who reacted more intensely to threatening stimuli than men who are not part of the Navy SEALs (Paulus et al. 2010). This, of course, is adaptive in a war setting, where this intense reaction increases the chance of survival; however, it is acknowledged that (stronger levels of)/different techniques of emotion regulation will

then be required to manage this intense reaction in a less hostile setting. This notion also highlights the fact that different levels of sensitivity may need to be regulated to different extents (or in different ways), depending on the context.

As pleasant emotions tend to be societally more appropriate in most social contexts (at least in Western cultures), they also tend to lead to less problematic outcomes. Clinically speaking, the repression of emotions (or the act of not experiencing (often negative) emotions) for longer periods of time has shown to be harmful psychologically and thus to result in reduced wellbeing outcomes and increases in psychopathology (Chapman et al. 2013). There is value in being able to hold back intense emotions in order to reduce maladaptive reactions, such as managing one's sadness (after a loss, for example) during work hours; however, the long-term suppression of intense emotions such as grief, for instance, most often results in negative consequences (e.g., O'Connor 2019). Thus, it can be said that emotionally intelligent individuals harvest the benefits of their hypersensitivity to both positive and negative emotions and are characterized by an enhanced affective reactivity to positive and negative events subsequently sustained by up regulatory processes.

Hence, it is not the valence of emotions that determines whether the outcome will be positive or negative. It is, rather, fully experiencing intense emotions and channeling the correct action depending on the context. This important function is often what separates those with positive from those with negative outcomes. The ability to regulate emotions (such as appropriate expression versus acceptance of the emotion depending on context; appropriate duration of the emotion, as noted in the above examples, etc.) plays a fundamental role in this process. When individuals are not able to regulate their intense emotions, hypersensitivity leads to negative outcomes and different pathologies (see above and Table 1). Referring to the theoretical explanation of individuals with borderline personality disorder (BPD), the individual experiences a heightened sensitivity to emotional stimuli, while experiencing these emotions quickly and intensely (often with a long reaction duration), and a slow return to baseline (Koerner 2011; Linehan 1993). The disordered aspects are not a result of the initial perception or intensity of feeling, but the inability to inhibit or reduce the reaction as well as the difficulty of returning to a more stable emotional state (e.g., Koerner 2011). On the opposite, emotionally intelligent individuals, who, by definition, regulate their emotions adequately, may take full advantage of their hypersensitivity: they fully experience emotions and use this hyped function to obtain a deeper and more detailed apperception of the inner and outer world, without being negatively impacted by this way of functioning. Following from this, a distinction can be made when speaking about hypersensitivity and its link to psychopathology (and, thus, implying lower EI) versus hypersensitivity linked to thriving (and, thus, linked to higher EI).

4. Open Questions and Future Directions

This contribution attempts to integrate different lines of research developed during the last few years, each highlighting new perspectives on EI. The emerging overall picture provides an in-depth understanding of the processes through which EI may lead to positive outcomes. We provide an interpretative key of the EI functioning, and leave open several questions. Below, we summarize a few of these questions and share some insights about how they could be addressed in future research.

4.1. How Is Hypersensitivity Related to Sensory Processing Sensitivity?

When speaking about hypersensitivity from an information processing perspective, it is imperative that we consider its link to sensory processing sensitivity (SPS; Aron and Aron 1997), a term greatly cited in the clinical literature, and that we acknowledge the similarities and differences.

The definition we provide of hypersensitivity, which encompasses depth of processing, greater emotional reactivity, and acute awareness of subtle stimuli, presents some similarities with SPS. However, there are several differences with respect to Aron and Aron (1997)

theory: first, the current definition of hypersensitivity pertains only to emotional, rather than physical or environmental, stimulation. On the one hand, we have not yet been able to empirically verify ourselves whether emotional hypersensitivity and sensory hypersensitivity respond to the same underlying mechanisms. On the other hand, we also think that a hypersensitive person's senses are not more developed than a nonhypersensitive person; it is, rather, their brain that perceives and processes more in-depth information, especially of an emotional nature. This may lead to a hyperactivity of the nervous system that can activate the person experiencing it. In the end, we think that hypersensitivity might depend on the amplification of emotional processing associated with sensory perception rather than on a more developed sensory perception.

Second, sensory processing sensitivity is typically measured with self-report scales, whereas emotional (hyper)sensitivity associated with EI is measured through objective, performance-based tasks. Self-report hypersensitivity questionnaires typically ask people to position themselves on items describing typical hypersensitive indicators, such as "I am very sensitive to pain". This way of measuring/estimating hypersensitivity is based very much on self-knowledge and the recognition of how one usually behaves. The framework of hypersensitivity as it is presented in this contribution, and in the empirical work we have been performing so far on hypersensitivity and EI (e.g., Gillioz et al. 2023a, 2023b; Nicolet-dit-Félix et al. 2023), relies more directly on how individuals react to emotions and emotional stimuli. For example, we present emotional facial expressions and test whether hypersensitive individuals pay more attention to them as compared to neutral facial expressions, or we employ very subtle and complex blends of expressions that only hypersensitive people can recognize. This way of measuring hypersensitivity is more intuitive and unconscious, and based on behavioral indicators, such as accuracy or speed of response to typically emotional stimuli.

Third, we introduce a "special case" of hypersensitive individuals: those who are both hypersensitive *and* capable of managing such hypersensitivity, namely, emotionally intelligent individuals. This subcategory of individuals is characterized by the fact that they perceive reality (the internal and external world) through a magnifying lens that makes emotional features more salient and impactful. Hence, such individuals have much more emotional information regarding themselves, others, and the external world that may in principle represent an asset with respect to individuals who do not possess this hypersensitivity. Ultimately, we claim that all high-EI individuals are hypersensitive, but not all hypersensitive individuals are emotionally intelligent.

4.2. *What Is the Role of Emotion Regulation and What Is Its Relationship with EI_P and EI_K?*

Emotion regulation (ER) refers to the processes through which individuals influence which emotions they experience, when and how they experience them, and how they express them (Gross 2015; Gross and Thompson 2007). This framework is well suited to understanding our conceptualization of hypersensitivity. It highlights important parameters that may affect the unfolding of hypersensitivity, such as the modification of the intensity, duration, or type of emotional response to better cope with internal and external demands. In the following, we explore the association between ER and each EI component: EI_K and EI_P.

ER and the EI Components

Several theories of emotion regulation, such as the process model of emotion regulation (Gross 1998) and the emotion regulation theory (Thompson 1994), emphasize the importance of awareness of emotions in the regulation process. The component of emotional awareness within these frameworks is, in our view, fundamental to managing hypersensitivity. These theories suggest that people engage in a variety of strategies to manage their emotions, such as cognitive reappraisal or expressive suppression, but these strategies are only effective if people are aware of their emotions (a top-down process) in the first place. For example, someone unaware of their anger may not manage the associated

behavior urge and may not even know which emotion they need to be working on in order to change their behavior. Thinking about thinking (or metacognition) as well as thinking about feeling (or meta-affect) is, indeed, emerging as a key factor for self-regulation and emotionally intelligent behavior in several recent theorizations (D'Amico and Geraci 2023; Thomas et al. 2022).

Studies have found that individuals with higher EI (currently measured as EI_K) tend to have better emotion regulation skills. Xiao et al. (2022), for example, investigated the relationship between EI and the use of specific emotion regulation strategies when regulating others' emotions; individuals higher in EI, especially emotion management, used more high-engagement strategies, such as perspective-taking and problem-solving, and fewer low-engagement strategies, such as suppression and avoidance, when regulating others' emotions compared to individuals lower in EI. These findings support our hypothesis and suggest that high-EI individuals are those who can use effective ER strategies when regulating others' emotions. Overall, it seems as if by developing their emotion management skills, an important facet of EI, individuals can improve their ability to regulate their own emotions and help others manage theirs. This then leads to better mental health and interpersonal outcomes. In addition, findings suggest that the emotion management facet of EI is the most strictly related to ER.

In sum, studies and conceptualizations explained above provide various examples of the way in which a balance among ability EI facets is necessary in order to be "truly" emotionally intelligent. Evidently, numerous questions remain as to how this balance can be achieved. In this paper, we propose the inclusion of sufficient emotion regulation in order to manage high levels of hypersensitivity; are there other ways in which overall emotional intelligence can be achieved? For example, do all components of EI_K have to be sufficiently high? Or is there a means of compensating? We discussed how high emotion perception, for example, cannot stand without emotion regulation; however, could other facets help with the emotion regulation enough to compensate for a high-perception–low-management combination, or is the former a must? How does emotion understanding (the EI facet, more closely related to the key construct of emotional awareness discussed earlier) fit in? Another approach of looking into these combinations would be by considering scores of the different EI facets within persons, such as using latent profile analysis (for examples, see Keefer et al. 2012; Pirsoul et al. 2022), or by testing interactions between different EI components, such as emotion perception and emotion management. Though the latter approach is little developed in research, it has the potential to enlighten how the different EI components may work together.

Another aspect of our theorization that needs further development concerns the relationship between ER and EI_P. Going back to several years ago, Davidson argued that "... regulatory processes are an intrinsic part of emotional behaviour and rarely does an emotion get generated in the absence of recruiting associated regulatory processes. For this reason, it is often conceptually difficult to distinguish sharply between where an emotion ends and regulation begins" (Davidson 1998). This is an essential consideration as, relatedly, it may not be easy to empirically disentangle emotional hypersensitivity or high-EI_P from processes involved in regulating it. This is the reason why, in Figure 1, ER is connected with the different emotion information processing steps with a dotted line. This point relates to the question around the separation between EI_P and EI_K, with the main inquiry being how they are intertwined. For example, could there be physical processes that physically inhibit coping in certain cases (e.g., where a coping strategy like a grounding exercise would not work) due to biological or neurological mechanisms? How and to what extent can we look into this?

4.3. Why Does the Emotion Management Facet of EI Not Have a More Prominent Role in Our Theorization (as Summarized in Figure 1)?

We believe that the EI_K component, in particular emotion management, may not fully account for all aspects of emotion regulation because of the following open questions:

1. Are the measurement issues, mentioned above, limiting the predictive power of the emotion management facet of EI (e.g., does emotion management capture how people actually react in emotional situations)?
2. Are current ability EI tests that measure emotion management truly measuring the *ability* high-EI individuals have to regulate emotions? This question comes from the empirical observation (in our own studies as well as in other publications) that the emotion management facet of EI does not have much predictive power with respect to other EI branches, such as emotion understanding, even when outcomes imply a key theoretical role of emotion regulation/management (for an example, see Fiori et al. 2022). Might it be a challenge to measure emotion management through performance tests? For example, the emotion regulation subtest of the GECo (Schlegel and Mortillaro 2019) is more related to personality than to intelligence.
3. Whereas EI and its emotion management facet describe the capacities people have, emotion regulation captures their behavioral outcome, such as the strategies people use to manage emotions (Double et al. 2022); hence the two are not equivalent.

Overall, the broader conceptualization of regulatory processes, namely, emotion regulation, instead of the more narrowly defined emotion management facet of EI, better characterizes our theorization of EI in relation to hypersensitivity. Importantly, the link between EI_K and emotion regulation ensures intelligent emotion regulation or attention to both the processes underlying ER as well as individual differences in how such processes may be employed for better outcomes (Pena-Sarrionandia et al. 2015); intelligent emotion regulation may be conceived as a flexible emotion regulation that takes into considerations various parameters, such as personal goals, personal characteristics, and situational factors; it presents similarities with the concept of emotional flexibility we discussed earlier in the manuscript.

4.4. Does Hypersensitivity Start Having Negative Consequences When the Level Is Extremely High?

Following from Table 1, in which we theorize how different levels of hypersensitivity EI_P might be related to different levels of EI, the question around any person's capacity to manage hypersensitivity at extremely high levels arises. As theoretically, the emotion regulation required to transform extremely high levels of hypersensitivity would be "gigantic", is this an indicator that most individuals with such hypersensitivity levels would fall within clinical case levels and hence have negative outcomes associated with hypersensitivity? This lies within the same line of thinking as the Yerkes–Dodson law (despite its variations in conceptualization and limitations) in which an inverted U-shaped curve is used to illustrate the relationship between stress/arousal and performance, with peak performance being reached with medium levels of arousal (e.g., Teigen 1994). It is possible that a certain amount of hypersensitivity might be helpful for EI and, thus, for positive outcomes, but too much might be likely to hurt. This is in line with the example of high-hypersensitivity EI_P (hypersensitivity), low ER in Table 1. For instance, an intense onslaught of frustration and self-doubt in response to confused facial expressions from a group of students listening to one's lecture could result not only in an intense rumination process, but in a negativity "spiral" that could move into processes that inhibit coping mechanisms and thus lead to the inability to continue the lecture.

The question of whether too much hypersensitivity could still be too much remains an empirical and theoretical open question. From the one side, it might be that as long as emotion regulation is strong enough to manage any level of hypersensitivity, only positive outcomes would be expected. From a practical point of view though, it might be the case that very intense emotional reactions would be hardly managed, resulting in the "too-much-of-a-good-thing-is-still-too-much" effect (Pierce and Aguinis 2013).

4.5. Would Hypersensitivity Refer Only to Ability EI or Also to Trait EI?

Hypersensitivity is framed within an information processing approach, and research has shown that associations between EI and “hot” and “cool” cognitive processes were found to be stronger for ability EI and inconsistent for trait EI (Gutiérrez-Cobo et al. 2016). Considering this, hypersensitivity, as defined in the current contribution, would theoretically associate more strongly with the conceptualization of EI as an ability, rather than a personality trait. However, some of the literature points to potential implications of trait EI in emotion–information processing/hypersensitivity. In our studies we have also found some evidence that hypersensitivity measured with performance tasks is associated with higher trait EI, although the effects observed are less consistent than with ability EI. This once again brings up the question around EI measurement as trait EI is measured via self-report and thus requires some self-awareness around one’s emotional capacities. Perhaps hypersensitive individuals, having higher attunement to emotional stimuli, would be quite accurate in the self-report of their hypersensitivity? Or, could they have high perception of emotions without necessarily having the remaining complimentary high-EI facets as well? These questions require further investigation.

5. Implications for Applied Research and Training

Our theorization regarding the role of emotional hypersensitivity in EI by way of ER has important implications for training, public policy, and assessment. The presented model emphasizes the significance of emotion regulation (ER) in transforming emotional hypersensitivity from a possible hindrance into an asset, marking it as a key characteristic of highly emotionally intelligent individuals. In order to improve overall EI, individuals could improve their management of intense emotional responses by training their ER skills. This structured approach has been shown to foster emotional resilience, enhance relationships, and improve overall wellbeing. EI training promotes self-awareness, aiding individuals to recognize triggers to heightened emotional responses. It also helps to challenge and reframe negative thought patterns, reducing emotional reaction intensity by altering their interpretations of situation. Further EI training practices based on the development of ER skills promote staying in the present moment, curbing rumination about the past or future (e.g., mindfulness), as well as help to manage physiological aspects of hypersensitivity (e.g., relaxation techniques).

By investing in the improvement of EI skills, individuals with emotional hypersensitivity can lead more fulfilling lives, gaining greater management of their emotions, and thus engaging in more emotionally intelligent behavior. This shift in the conceptualization of hypersensitivity as no longer having a uniquely negative connotation proposes, in contrast, that hypersensitivity can be the source of EI, opening up new forms of (emotional) diversity. In addition, it reinforces the utility of training emotional competences (e.g., Vesely-Maillefer 2015), including those related to the management of hypersensitivity at school and in the workplace.

In terms of measurement, our novel conceptualization of hypersensitivity disrupts the conventional belief that it can be accurately gauged solely through self-report questionnaires. Instead, we advocate for a paradigm shift towards the use of objective measures rooted in performance-based assessments of hypersensitivity within emotional tasks. We believe that the reliance on self-reports alone may inflate the prevalence of hypersensitivity, especially among those with low ER skills. This occurs because most questionnaires employ criteria that hinge on participants acknowledging the overwhelming intensity of their emotional reactions, a criterion that could potentially overstate the issue.

In contrast, performance-based tests offer a more nuanced and balanced view of hypersensitivity. These assessments can delve into the nuanced facets of hypersensitivity, uncovering characteristics such as lower threshold of perception of emotional stimuli or fine-grained discrimination of complex emotional stimuli. In the literature, there are a few examples of tasks that could be used for this purpose, although they require further validation. These include tasks such as the facial expressions blends (FEB), which requires

identifying the emotions expressed in a series of morphed images created by blending on the same face two emotions expressed by the same person Gillioz et al. 2023b). Another task that might be employed to detect emotional hypersensitivity is the Dynamic Affect Reactivity Task (DART), a task designed to identify the precise moments of emotion onset, peak, and the speed of emotional fluctuations in response to emotional images (Robinson et al. 2023).

6. Concluding Remarks

In this paper, we advance the idea that EI is greatly influenced by one's level of sensitivity to emotional stimuli, proposing that high EI relies on hypersensitivity. However, hypersensitive individuals require the ability to manage that hypersensitivity to be considered emotionally "intelligent". In other words, people with high emotional intelligence are those who are more sensitive to emotion and are able to manage their hypersensitivity, using it as an adaptive, rather than a detrimental, characteristic. We characterize this way of functioning of EI with the analogy of an "emotional superpower" when this hypersensitivity is accompanied by the capacity to use it in the service of adaptive behavior.

Despite our conviction that EI should be associated with positive outcomes, we leave open the possibility of minor hitches related to the use of hypersensitivity as a superpower. We suspect that the great management evoked in the title, necessary to render hypersensitivity a superpower, might deplete emotionally intelligent individuals (physically and mentally) and thus limit the frequency and/or duration of their abilities. Further research may clarify this point. The solution we see in this potential limitation is that emotionally intelligent individuals may know when to limit the use of their superpower; in other words, they may acknowledge when they are running out of resources and either take a break or restrain their regulatory capacity to situations that really deserve it.

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Review

Emotional Intelligence as Evaluative Activity: Theory, Findings, and Future Directions

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Abstract: The question of whether ability-related emotional intelligence (ability EI) predicts important life outcomes has attracted considerably more attention than the question of what ability EI consists of. In the present paper, the authors draw from the attitude and emotion literatures to suggest that the evaluation dimension of meaning is likely key in understanding how ability EI operates. Measures of ability EI predict the extent to which individuals can accurately evaluate words and measures of the latter type act as emotional intelligence measures. Extending this analysis, the paper reviews recent sources of data linking ability EI to attitudinal processes, such as those involved in attitude–behavior relationships and affective bipolarity. Individuals with high EI appear to experience their affect in more bipolar terms and they display evidence of greater decisiveness in their evaluations. Pursuing links of the present type will allow researchers to generate new predictions concerning the ability EI construct.

Keywords: emotional intelligence; ability; evaluation; bipolarity; extremity

1. Introduction

Relative to the intelligence literature, the emotional intelligence literature has a shorter history. The construct was formally proposed in 1990, popularized in 1995, and redefined in 1997, as reviewed by Barchard et al. (2016). Emotional intelligence (EI) can be assessed in trait-related terms (i.e., as a set of personality traits) or it can be assessed through the use of ability-related tests such as the MSCEIT (Mayer et al. 2003), the STEU and the STEM (MacCann and Roberts 2008), or the NEAT (Krishnakumar et al. 2016). Trait-related and ability-related tests of EI do not correlate very highly with each other (Brackett et al. 2006; Joseph and Newman 2010) and the focus of the present paper primarily concerns ability-related conceptions (Mayer et al. 2008).

In addition to psychometric considerations, researchers have asked questions such as whether individual differences in ability-related emotional intelligence (ability EI) matter with respect to important life outcomes. Several papers link ability EI to social functioning, though relevant findings seem to depend on one branch of EI (management) and do not appear to be fully consistent across studies (Lopes et al. 2004; Lopes et al. 2011). There is some link between ability EI and outcomes such as health (Martins et al. 2010) and well-being (Sánchez-Álvarez et al. 2016), though these relationships are modest (in the .20 range) and often do not replicate (e.g., Di Fabio and Kenny 2016). Ability EI has been linked to better academic performance, though the magnitude of this relationship is modest and may be particularly evident in humanities courses (MacCann et al. 2020b). Links between ability EI and work-related behaviors or performance are often not significant when controlling for personality and cognitive ability (Miao et al. 2017; O’Boyle et al. 2011). These findings have been characterized as disappointing by some commentators (Matthews et al. 2012; Ybarra et al. 2014) and even advocates of ability EI have suggested that relationships between ability EI and behaviors or performance could be complicated (Joseph and Newman 2010; Mayer et al. 2016).

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One important development in intelligence research occurred when researchers began focusing on how variations in intelligence operate—namely, how they manifest themselves in stimulus processing and reactivity (Jensen 2006). Given the state of the ability EI literature, similar directions can be advocated (Fiori 2009; Miners et al. 2018). Several lines of research hint at what this next generation of ability EI research might look like. MacCann et al. (2011) found that participants with higher levels of ability EI engaged in problem-focused coping to a greater extent and this difference in coping strategies explained a portion of the link between ability EI and grade point averages. Megías-Robles et al. (2019) found that individual differences in ability EI mattered for emotion regulation strategies, with participants with high EI more likely to engage in reappraisal and participants with low EI more likely to engage in suppression. A line of research indicates that ability-related variations in EI, but not trait EI, facilitates cognitive control within tasks that involve emotional processing (Checa and Fernández-Berrocal 2019; Gutiérrez-Cobo et al. 2017).

In the current paper, we do not focus on coping, emotion regulation, or cognitive control per se. Rather, we focus on evaluative activity, which, we think, is core to how ability-related variations in emotional intelligence operate. Individuals with high EI, more or less, may be experts in evaluating the stimuli and conditions that they encounter (Hoemann et al. 2021). We begin by highlighting the centrality of evaluations to a variety of phenomena, such as connotative meaning, attitudes, and emotions. We then argue that individual differences in emotional intelligence can be conceptualized in terms of individual differences in the likelihood, precision, and certainty with which evaluations are made. After presenting several sources of data that have been amassed in support of this perspective, we outline future directions of research that can build on the present analysis.

2. Evaluation's Centrality to Affective and Emotional Meaning

Emotional intelligence can be defined in terms of abilities related to the identification, expression, understanding, management, and use of emotions (Kotsou et al. 2019). Although definitions such as these emphasize real-world emotional phenomena, assessments of ability EI concentrate on varieties of emotion-related knowledge, typically in the absence of emotional experiences. Much of this knowledge is likely to be evaluative in nature. For example, one must evaluate the situations of the STEU (MacCann and Roberts 2008) or the NEAT (Krishnakumar et al. 2016) to make accurate inferences concerning the emotions that characters would experience. Evaluative meaning is core to many of the answer options that test-takers are presented with, which often consist of emotion words (e.g., sad, grateful, angry). When simpler stimuli such as landscapes or art images are presented (Mayer et al. 2003), these stimuli must also be evaluated in order for the test-taker to provide accurate answers. Participants who are more inclined to evaluate the objects that they are exposed to may typically receive higher scores on ability EI tests, provided that their evaluations accord with other test-takers (or experts) to any extent. Ability EI tests certainly assess things beyond evaluative knowledge, but the possession and use of such knowledge may be key. We provide empirical support for this idea in the next section.

One reason for focusing on evaluations, as this review does, is that they are key to any type of meaning that is personal and subjective rather than impersonal and descriptive (Epstein 2003). This point was repeatedly made by Osgood and colleagues, who asked participants to characterize numerous concepts and stimuli in terms of semantic contrasts such as good–bad, weak–strong, hard–soft, and so on (Osgood 1962). Factor analyses of these ratings reveal that the connotative space of meaning is (universally) anchored by three dimensions termed evaluation (is the stimulus good, bad, or in between?); potency (is the stimulus strong, weak, or in between?); and activity (is the stimulus active, passive, or in between?). Evaluation is the first factor of this space, meaning that the most robust distinctions are made with respect to the evaluative dimension of meaning relative to the other two dimensions (Osgood et al. 1957). If emotionally intelligent people are skilled at assigning affective meaning to the stimuli and situations they encounter, as we have

suggested is the case, they should be skilled at evaluation, which is the most central component of the affective meaning system (Osgood 1962).

Evaluations are certainly central to emotion. All appraisal theories of emotion posit that appraisals related to evaluation (e.g., is this situation pleasant or unpleasant?) shape emotional reactions (Roseman and Smith 2001) and the “pleasantness check” is thought to occur early in the emotion generation process (Scherer 2009). All emotions can be characterized in terms of their valence—that is, whether the emotion feels pleasant or unpleasant (Barrett and Russell 1999)—and this dimension of emotion is thought to organize the diverse emotional experiences that we have (Russell 2009). Indeed, all unpleasant emotions tend to covary with each other, as do all pleasant emotions, highlighting the centrality of valence (or evaluation) to the emotion space (Watson 2000). Barrett (2006) summarizes this literature by proposing that valence is the basic building block to all emotional phenomena.

Our analysis will emphasize the close affinity that exists between the attitude and emotion literatures (Cacioppo et al. 1997), given that attitudes are, at their core, evaluations of stimuli, whether concrete objects or values or ideas (Eagly and Chaiken 1993). Attitudes are thought to structure the environment, meaning that a person without strong or retrievable attitudes would experience difficulties knowing how to relate to what they encounter (Lewin 1935). In a compelling line of research supporting this point, Fazio and colleagues show that accessible (easy to retrieve) attitudes guide attention (Roskos-Ewoldsen and Fazio 1992), ease decision-making (Fazio et al. 1992), reduce stress (Fazio and Powell 1997), and render it more likely that the person acts in a manner consistent with their attitudes (Fazio and Williams 1986). In studies reported below, we leverage the attitude literature to make the case that individuals with higher levels of ability EI are, in a sense, expert evaluators (Hoemann et al. 2021).

One difference between the ability EI and attitude domains is that many of the attitudes that we have (e.g., a liking for mint chip ice cream) would not seem to lend themselves to an ability-related analysis. However, we believe that abilities are involved in the attitude domain nonetheless. For example, in deciding how we feel about a stimulus, we must retrieve stimulus-relevant previous experiences, many of which could extend well into the personal past (Cunningham and Zelazo 2007). Further, such previous experiences could be numerous and would, therefore, need to be integrated in a skillful manner (Rolls and Grabenhorst 2008). The possession of most attitudes requires experience with the domain and experts make evaluations in a manner that is different (e.g., more integrative) than novices (Brauer et al. 2004). Further, attitudinal judgments can be practiced and doing so increases the accessibility of the relevant attitudes as well as their ability to guide behavior (Fazio 2007). Finally, we suggest that attitudes can be incorrect when they fail to adequately capture the self’s experiences, either past or future. In this connection, Wilson and colleagues show that some attitudes, despite guiding behavior in the present, are demonstrably incorrect (e.g., Wilson et al. 1993). The attitude domain is, therefore, one that involves skills.

Although the results that we report are novel, there is precedent for the idea that some people, more so than others, are either more inclined toward, or more skilled at, making evaluations. As an example, individual differences in mindfulness are thought to sensitize individuals to the affective features of their existence, in turn facilitating capacities-related emotion regulation and self-regulation (Teper et al. 2013). Of greater pertinence, Jarvis and Petty (1996) hypothesized that individuals differ in their need to evaluate—that is, their tendencies to care about and evaluate the stimuli and issues that they are exposed to. Jarvis and Petty (1996) found support for variations along this individual difference continuum and showed that participants with a higher need to evaluate had more extreme attitudes. They were also more likely to spontaneously engage in evaluative activity (e.g., with respect to unfamiliar paintings).

Barrett (2006) proposed a seemingly parallel set of individual differences termed valence focus. Valence-focused individuals emphasize the valence (pleasant–unpleasant) dimension in their self-reports of emotional experience and exhibit tendencies—such as

in perceiving emotional stimuli (Barrett and Niedenthal 2004) or reacting to the events of the day (Pietromonaco and Barrett 2009)—that implicate greater sensitivity to evaluative components of meaning. Although ability-related variations in EI should probably not be equated with need to evaluate or valence focus (particularly given that the personality-related correlates of valence focus appear to be different: Barrett 2006), the operations involved in ability EI could function similarly (also see Fiori and Ortony 2021). We build this case in a systematic manner, highlighting older and newer lines of research from our laboratory.

3. Results Involving a Word Evaluation Task

In the creation of new ability EI tests, investigators often embrace new technologies such as multimedia assessments (Roberts et al. 2010). However, if evaluation is core to emotional phenomena (Barrett 2006), we might think about developing deliberately simple or basic measures, such as those involving word evaluations. Moeller et al. (2012) developed such a test, which simply asked participants to evaluate (1 = negative; 8 = positive) 100 common, well-known words (e.g., world, passion, illness, gossip) that varied in valence norms (Bradley and Lang 1999; Meier and Robinson 2004). Positive words were evaluated more favorably than negative words, partial $\eta^2 = .89$, but we were interested in subtler distinctions involving the stimuli. For each participant separately, for example, we correlated the evaluations that a participant made with mean evaluations from the whole sample, with higher correlations reflective of greater evaluative insight (Legree et al. 2005).

That word evaluation tests of this type relate to emotional intelligence was examined in study 4 of Krishnakumar et al. (2016), who administered the North Dakota emotional abilities test (NEAT), which uses the situational judgment test format (Libbrecht and Lievens 2012) to assess individual differences in emotion perception (inferring the emotions that would be experienced by characters in emotional situations), emotion understanding (knowing which emotions would tend to co-occur or transition from one to the other), and emotion management (endorsing ways of responding to emotional situations that are deemed more effective by an expert sample). In this particular study, the word evaluation task was scored in terms of discrepancies from evaluation means, with higher scores indicative of poorer (or less normative) evaluations (Legree et al. 2005). The correlation between the NEAT and word evaluation accuracy scores was $r = -.49$, indicating that there is substantial overlap between evaluative expertise and ability-related emotional intelligence. For individual branches, these correlations were $-.40$, $-.42$, and $-.45$ for emotion perception, understanding, and management, respectively, indicating that all branches of the ability EI test seem to benefit from simple evaluation skills.

Furthermore, the word evaluation test acts as an emotional intelligence test. Moeller et al. (2012) pursued the premise that interpersonally cold individuals, who are hostile, disengaged, or quarrelsome (Horowitz et al. 2006), may lack the emotional repertoire that allows them to bond with others (Moskowitz 1994, 2005), which should be evident in terms of lower levels of ability EI. This premise was supported in studies that used an emotion perception task involving faces (study 1), dynamic video stimuli (study 2), an emotional understanding task (study 3), and with respect to the normative accuracy of word evaluations (study 4). In the latter case, for example, the correlation between participant word evaluations and evaluation norms was $.36$ at low (-1 SD) levels of interpersonal coldness and $.27$ at high ($+1$ SD) levels, $\eta^2 = .07$. More generally, the fact that results were parallel across tasks and studies supports the idea that what is assessed by word evaluation accuracy shares some affinity with what is assessed by more complex EI tests, including one (the STEU: MacCann and Roberts 2008) that has been extensively validated (Libbrecht and Lievens 2012).

Robinson et al. (2012) then used a word evaluation task to examine regulatory processes in daily life. Borrowing from cybernetic frameworks for self-regulation (Carver and Scheier 1998) and emotion regulation (Robinson et al. 2010), Robinson et al. (2012) reasoned that a better attuned affective monitor (Teper et al. 2013) would allow individuals

to better regulate their responses to daily stressors (Compton et al. 2008). In study 2 of Robinson et al. (2012), participants completed a daily diary protocol (Bolger et al. 2003) for 15 consecutive days. On each day, participants indicated how many stressful events had occurred to them and they also reported on their daily experiences of somatic symptoms (e.g., headaches, nausea), which are often exacerbated by stressors (Pennebaker 1982). As displayed in Figure 1, stressors precipitated somatic complaints at low levels of evaluative accuracy, but not at high levels. The skills assessed by a simple word evaluation task, therefore, covary with other skills that are beneficial in regulating daily stressor reactivity.

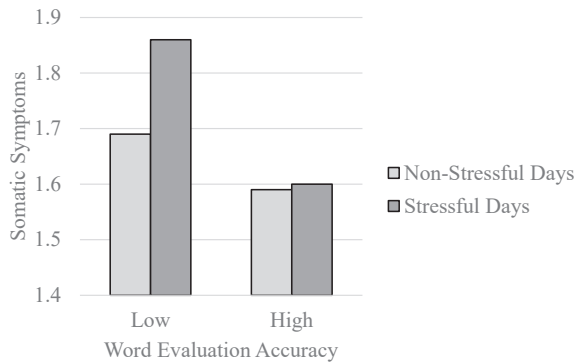


Figure 1. Word evaluation accuracy as a moderator of relations between daily stressors and somatic symptom experiences (re-graphed results from Robinson et al. 2012).

In the domain of self-regulation, being attuned to affective signals could permit one to make wise decisions in response to current affective states (Clore et al. 2001). Negative affective states are thought to encourage withdrawal (Watson 2000), in part because interacting with others when one is feeling upset can result in interpersonal conflict (Forgas 2002). In three studies, Moeller et al. (2014) examined whether affectively attuned individuals (i.e., those with higher EI levels) would modulate their social behavior in response to naturally occurring variations in negative affect. On days on which people were experiencing higher levels of negative affect, participants engaged in fewer social behaviors, but this relationship was stronger among participants who were more skilled in the word evaluation task (see Figure 2). Results were parallel across other ability EI measures and the convergence of findings across studies again attests to the point that a word evaluation measure acts as an emotional intelligence measure.

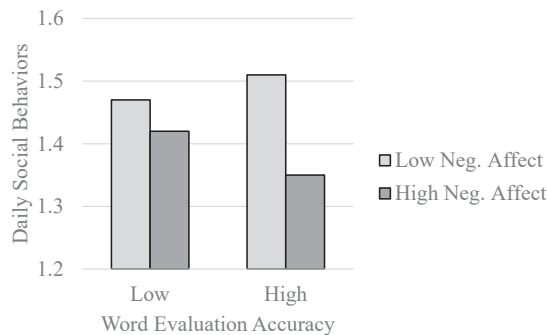


Figure 2. Word evaluation accuracy as a moderator of relations between daily negative affect and daily social behavior (re-graphed results from Moeller et al. 2014).

In summary, we created a simple word evaluation measure (that exhibits modest correlations with cognitive ability: $r = .18$) to assess basic skills related to evaluation. Consistent with the idea that basic evaluation skills are linked to ability EI, Krishnakumar et al. (2016) found that individuals whose word evaluations better matched norms also achieved higher levels of ability EI and relationships of this type were evident across all branches of the ability EI test. Three other investigations support the point that the word evaluation test acts as an emotional intelligence test. For example, individuals who are better able to evaluate words are better able to regulate their responses to daily life stressors (Robinson et al. 2012). These results support the idea that individuals with high EI, relative to individuals with low EI, appear to be more skilled in making evaluations.

4. Bipolarity in Affect and Evaluation

Emotion scholars have long been interested in the structure of affective experience (e.g., Schlosberg 1941). Of particular interest is the question of whether pleasant (positive) and unpleasant (negative) emotional experiences are bipolar to each other (e.g., if one is experiencing high levels of positive affect, one is necessarily experiencing low levels of negative affect) or can vary independently, such that one could experience at least moderately intense positive and negative affects at the same time (Russell 2017). Some scholars, such as Wundt, Schlosberg, and Russell (as reviewed in Barrett and Russell 1999), have favored bipolarity (strong inverse correlation) and others, such as Bradburn, Tellegen, and Watson (as reviewed in Reich et al. 2003), have favored independence.

There have been some attempts to reconcile bipolarity and independence. For example, two investigations conclude that a bipolar (pleasant–unpleasant) factor might exist in addition to relatively independent positive and negative affect factors (Leue and Beauducel 2011; Tellegen et al. 1999). However, the more interesting suggestion, from our point of view, is the idea of individual differences, with some people exhibiting a greater degree of bipolarity in their affective experiences than others (Rafaeli et al. 2007). In support of the reality of such individual differences, Dejonckheere et al. (2018) found that within-subject correlations between positive and negative affect (with reporting occasion as the unit of analysis) varied from $-.82$ (strong bipolarity) to $.12$ (independence).

There are differences of opinion, however, concerning whether higher levels of bipolarity are beneficial or problematic. Related to the former possibility, some scholars suggest that sophisticated affect systems tend toward independence, such that it would be hazardous to infer negativity levels from positivity levels (Ong et al. 2017; Reich et al. 2003). For example, it is thought that older individuals (Hay and Diehl 2011) or those from cultures with a history of dialectical thinking (Hui et al. 2009) may, at least under some circumstances, experience moderately high levels of both positive and negative affect at the same time (Ong et al. 2017). These ideas have not produced a very coherent body of findings (Grossmann et al. 2016; Hay and Diehl 2011), however, and one can amass multiple arguments for why greater bipolarity (lesser independence of positivity and negativity) would be more functional.

In the attitude literature, a mix of positive and negative evaluations appears to be problematic. Mixed evaluations are experienced aversively (van Harreveld et al. 2015) and ambivalent attitudes are also less predictive of behavior as well as being less stable over time (Conner and Armitage 2008). To function effectively, one's attitudes may need to possess reasonably high degrees of bipolarity—that is, liked objects should not be disliked and disliked objects should not be liked (Fazio 2000; Fazio and Powell 1997). In fact, mixed affective states often generate approach–avoidance conflict, which is pernicious for multiple reasons (Aupperle et al. 2011; Miller 1944; Robinson et al. 2008). In the emotion realm as well, bipolarity may provide better guidance concerning the current conditions of the self-environment interface (Russell 2017).

We have suggested that individuals with high EI are more capable evaluators. Given that evaluation is a bipolar dimension (Osgood 1962), the affective states of individuals with high EI may also tend toward greater bipolarity. In the studies that follow, ability EI

was assessed using the NEAT (Krishnakumar et al. 2016), which has performed well in many studies (e.g., Krishnakumar et al. 2017, 2019a, 2019b; Robinson et al. forthcoming b; Robinson et al. 2019) and which, despite its branches, primarily assesses EI in global terms (Krishnakumar et al. 2016).

Robinson et al. (2020) conducted three studies that assessed experiences of positive and negative affect at work, during the previous month (studies 1 and 2), or in daily life (study 3). In all cases, the NEAT moderated relations between positive and negative affect, which were more bipolar among individuals with higher ability EI scores. In study 2, for example, a median split on the ability EI measure revealed that experiences of positive and negative affect were more bipolar above the median ($-.49$) than below it ($-.17$). These results, which were replicated using continuous predictors in moderated multiple regression, suggest that the emotional experiences of individuals with high EI tend toward greater clarity; that is, if such individuals are experiencing higher levels of positive affect, they are experiencing lower levels of negative affect, and vice versa. By contrast, individuals with low EI may be more confused about how they feel, at least from an affect structure perspective (Russell 2017).

In a more recent paper (Robinson et al. 2023), we considerably extended this analysis. In study 1, participants completed the NEAT as well as a number of tasks suited to examine within-person bipolarity. In an attitude task, participants were asked to indicate how positively (1 = not positive at all; 7 = very positive) and negatively (1 = not negative at all; 7 = very negative) they felt about a series of 20 attitude objects (e.g., chemicals, exercising, mornings, secrets), presented in a randomized order. For each participant separately, we then calculated a bipolarity coefficient by correlating positivity ratings with negativity ratings ($n = 20$; M across participants = $-.85$). Higher levels of ability EI were linked to greater bipolarity, $\beta = -.38$. Of additional importance, ability EI predicted how variable evaluative ratings were (across the 20 objects) and this was true for both positive, $r = .37$, and negative, $r = .40$, ratings. The EI–bipolarity relationship remained significant when controlling for evaluation variability, however, indicating that variability, per se, could not account for the bipolarity relationship that was observed.

In another task, we asked participants to report on their positive (e.g., happy, excited) and negative (e.g., angry, fearful) reactions to a series of 10 emotional images (Lang et al. 2005). For each participant separately, we then calculated a bipolarity coefficient in a manner parallel to that described above ($n = 10$; M across participants = $-.58$). Participants with higher EI levels displayed greater bipolarity, $\beta = -.23$, and they also exhibited greater variability (across stimuli) in their positive, $r = .22$, and negative, $r = .33$, emotional reactions. With respect to this task, the EI–bipolarity relationship was reduced to non-significance when controlling for the variability of emotional responses. Regardless, that individuals with high EI display more variable emotional reactions is part of the point, in that EI should be associated with patterns of emotional responding that are more situation- or stimulus-specific (Waugh et al. 2011).

In study 2 of Robinson et al. (2023), we applied a bipolarity analysis to experiences of job satisfaction, which predict numerous organizational outcomes such as attendance, turnover intentions, job performance, and workplace civility (Judge and Klinger 2008). Most scales of job satisfaction contain both positively (e.g., “I find real enjoyment in my work”) and negatively (e.g., “I consider my job rather unpleasant”) keyed items, the latter of which are typically reverse-scored. Rather than reverse-scoring the latter items, we computed two scores within three employee samples—a job satisfaction score, capturing favorable attitudes toward one’s work, and a job dissatisfaction score, capturing unfavorable attitudes. Bipolarity with respect to this important life domain would result in a stronger inverse correlation between job satisfaction (favorable attitudes) and job dissatisfaction (unfavorable attitudes).

Median splits on the NEAT variable produced descriptive statistics consistent with expectation. Below the median (low EI) satisfaction–dissatisfaction correlations were $-.48$ (sample 1), $-.03$ (sample 2), and $-.34$ (sample 3). Above the median (high EI), these

correlations were $-.64$, $-.63$, and $-.73$. Multiple regression results, which examined whether continuous variations in ability EI moderated the relationship between satisfaction and dissatisfaction or between dissatisfaction and satisfaction, consistently resulted in interactions and estimated means for sample 2 are displayed in Figure 3. As can be seen in the figure, both satisfaction–dissatisfaction and dissatisfaction–satisfaction relationships were more inverse at higher levels of ability EI. That is, if employees with high EI are satisfied with their jobs, they are not dissatisfied (and vice versa). Employees with low EI, by contrast, are more prone to mixed evaluations of their jobs.

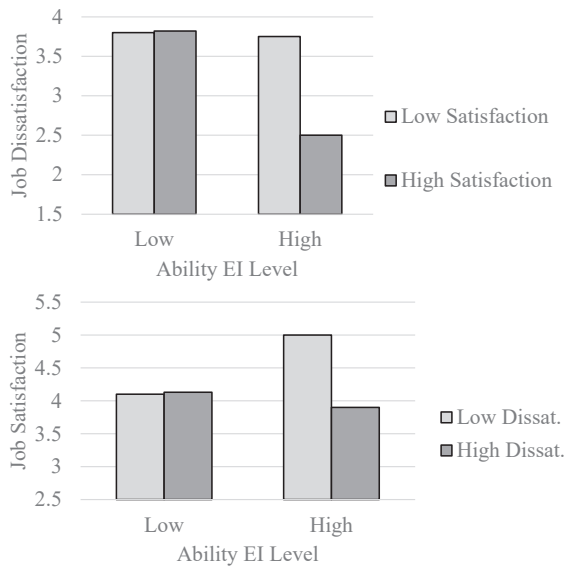


Figure 3. Ability emotional intelligence moderates the relationship between job satisfaction and job dissatisfaction (**top panel**) and job dissatisfaction and job satisfaction (**bottom panel**).

5. Further Insights Based on an Attitudinal Analysis

We suggest that individuals with high EI are experts in evaluation and evaluation is the central feature of the attitude construct (Eagly and Chaiken 1993). As this is true, new insights concerning ability EI can be achieved by integrating these literatures to a greater extent. The concept of attitude strength (Petty and Krosnick 1995) merits particular attention because researchers demonstrate, in many different ways, that some attitudes are stronger than others. Strong attitudes (relative to weak ones) are more stable over time and more predictive of perception and behavior (Luttrell and Sawicki 2020). Predictors of attitude strength are numerous (Krosnick and Smith 1994) and we primarily focus on certainty (how certain a person feels concerning an attitude report), extremity (how polarized from the midpoint the attitude report is), and cognitive–affective consistency (whether cognitive and affective responses to the attitude object are consistent or inconsistent).

In a series of three studies, Irvin et al. (2023) conducted research of this type, again assessing variations in ability EI in terms of total NEAT scores (Krishnakumar et al. 2016). Study 1 asked individuals to make several judgments concerning a series of single word attitude objects (e.g., capitalism, dentists, gossip, politics, romance, science, etc.). Following the tripartite distinction between affect, behavior, and cognition (ABC: Breckler 1984), participants were asked how positive their thoughts concerning each attitude object were (1 = negative; 4 = neutral; 7 = positive), whether each attitude object made them feel happy or unhappy (1 = unhappy; 4 = neutral; 7 = happy), and whether they would approach or avoid the attitude object (1 = definitely avoid; 4 = neutral; 7 = definitely approach).

Participants were also asked how certain they were concerning their attitudinal responses (1 = not certain; 7 = very certain), again concerning each object.

Higher levels of EI were predictive of greater (average levels of) attitudinal certainty, $\beta = .41$. In addition, we calculated extremity scores for the affect, behavior, and cognition ratings by calculating distance from the midpoint (e.g., a response of 4 would be scored as 0). Participants with higher levels of EI had more extreme attitudes, whether defined cognitively, $\beta = .37$, affectively, $\beta = .31$, or behaviorally, $\beta = .41$. The behavioral response is particularly notable because the findings suggest that individuals with high EI are likely to exhibit more pronounced approach or avoidance behavior, depending on their evaluations of the attitude object (Lewin 1935). In addition, we calculated cognitive–affective, cognitive–behavioral, and affective–behavioral consistency scores by correlating these measures with each other, with attitude object ($n = 20$) as the unit of analysis. Participants with higher EI tended toward greater consistency in their thoughts, feelings, and behaviors concerning particular objects, as EI was a significant predictor of cognitive–affective consistency, $\beta = .22$, cognitive–behavioral consistency, $\beta = .27$, and affective–behavioral consistency, $\beta = .23$.

In study 2 of Irvin et al. (2023), we examined the stability criterion of attitude strength (Luttrell and Sawicki 2020) by asking for affective and behavioral ratings of objects early on in the session and then by re-presenting the objects and questions later in the session, this time in a different randomized order. Of note, participants were told that this was not a memory task; rather, we wanted fresh evaluations each time. Even so, and for each participant separately, we correlated time 1 ratings with time 2 ratings, which resulted in two stability coefficients, one for affective responses and one for behavioral responses. Ability-related variations in EI predicted the stability of both affective, $\beta = .27$, and behavioral, $\beta = .35$, responses across time. That is, the attitudinal responses of participants with high EI appeared to be stronger according to the stability criterion.

An additional purpose of study 2 was to examine the scope and range of the extremity effect identified in study 1. Participants were asked to evaluate abstract paintings that they almost certainly had not seen before (1 = I do not like this painting at all; 7 = I like this painting very much). They were also asked to evaluate metaphors (e.g., “creativity is a toaster”, “a bird is nature’s airplane”) that ranged from very good to very poor, using the norms of Katz et al. (1988). Participants rated how good, apt, or pleasing each metaphor was (1 = not good, apt, or pleasing; 7 = very good, apt, or pleasing). Finally, participants guessed how pleasant or unpleasant (1 = very unpleasant; 7 = very pleasant) the objects signified by obscure foreign languages (e.g., kaamos, prosim) were. For each of these three tasks, we computed extremity scores (distance from the neutral midpoint) and then averaged across objects. Participants with higher EI levels tended to make more extreme evaluations of all three classes of objects, whether paintings, $\beta = .20$, metaphors, $\beta = .29$, or foreign language words/objects, $\beta = .18$. Although the magnitudes are not large, the consistency of the results is impressive, and it appears that individuals with high EI evaluate many objects more definitively.

In study 3, we (Irvin et al. 2023) applied the extremity analysis to two very important objects—the self and one’s job. With respect to the self, participants were asked whether personality statements (e.g., I don’t talk a lot, I have a vivid imagination) accurately described them (e.g., 1 = very inaccurate; 3 = neither inaccurate nor accurate; 5 = very accurate). The statements were mixed in the sense that items referred to multiple traits and both positively keyed and negatively keyed items were present. Rather than scoring personality traits, though, we simply scored each rating in terms of its deviation from the neutral midpoint. Participants with higher EI levels report higher levels of agreement or disagreement with the statements and this is true in four samples (sample 1: $\beta = .17$; sample 2: $\beta = .35$; sample 3: $\beta = .37$; sample 4: $\beta = .30$). Ability EI, therefore, seems to facilitate greater certainty concerning the self’s attributes.

The same four samples (of employees) also completed job satisfaction scales. All scales were bipolar in nature (e.g., 1 = very dissatisfied; 3 = neutral; 5 = very satisfied) and we could, therefore, score all answers in terms of deviations from a neutral midpoint. In all

cases, higher levels of ability EI are linked to greater extremity in these ratings (sample 1: $\beta = .26$; sample 2: $\beta = .27$; sample 3: $\beta = .36$; sample 4: $\beta = .32$). That is, employees with higher EI levels are more certain of whether they like their jobs or not. These data attest to the importance of the phenomena identified by Irvin et al. (2023). For example, on the basis of the job satisfaction results, we would expect employees with high EI to be more committed to their jobs when they like them and less committed to them when they do not.

6. Implications, Analysis, and Future Directions

Evaluative activity transforms a meaningless environment into one that possesses meaning for the individual (Osgood 1962). As emotions are generated on the basis of evaluative activity (Scherer 2009) and because evaluation is core to emotions themselves (Barrett 2006), it makes sense to posit that individuals who obtain higher emotional intelligence scores (on ability tests) are, among other things, experts at evaluation. That is, they may be more prone to evaluate objects and experiences and they may be more certain, or decisive, concerning the evaluations that they make. In the present paper, we pursued such ideas in both theoretical and empirical terms. Theoretically, for example, we suggest that considerable progress could be made by linking the emotional intelligence literature to that concerned with attitude-related processes.

That emotionally intelligent individuals are experts at evaluation is supported by a fairly substantial correlation between emotional intelligence levels, assessed in standard terms (Krishnakumar et al. 2016), and performance in a word evaluation task. Specifically, participants with higher EI made evaluations of words that agreed with word evaluation norms to a greater extent. It is also shown that word evaluation accuracy acts as an emotional intelligence test. Among other relevant findings, Moeller et al. (2014) showed that participants obtaining higher word evaluation accuracy scores were more likely to alter their behavior on the basis of their daily emotional experiences. Although we would probably not recommend the word evaluation measure over other measures of ability EI, it is, nonetheless, an interesting test that arguably captures at least one core of the sorts of abilities that ability EI tests measure.

Facility with the evaluation dimension would reasonably result in higher levels of bipolarity, given that evaluation itself is a bipolar dimension (Eagly and Chaiken 1993). Consistent with this idea, Robinson et al. (2020) found that participants with higher levels of EI exhibited greater bipolarity in their positive and negative affective states and in daily life. A more general case for links between EI and bipolarity was made by Robinson et al. (2023). In their evaluations of words and in their simulated and actual emotional responses to stimuli, participant with higher EI displayed more inverse within-person relations between their positive and negative evaluations and/or their levels of positive and negative affect. The importance of such dynamics was highlighted in an analysis of experiences of job satisfaction and job dissatisfaction, which were more inverse (i.e., bipolar) at higher levels of EI. It therefore appears that individuals with high EI are more certain as to whether they like or dislike their jobs.

This evaluation-related perspective on ability EI was reinforced in a second series of studies by Irvin et al. (2023). Participants with high EI, relative to low EI, were more certain about their attitudes and their evaluative ratings were more polarized. For example, high EI participants made evaluations of abstract paintings that were more extreme, either liking or disliking them to a greater extent. The real-world manifestations of these tendencies were pursued in a number of work employee samples. Participants with high EI were more certain as to whether particular personality statements described them or not (as defined by greater agreement or disagreement with the items) and their ratings of job satisfaction were also more polarized away from the job satisfaction midpoint (neutrality). It appears that emotionally intelligent individuals are more decisive with respect to the evaluations that they make, likely in part because they engage in evaluative processing more frequently.

EI researchers have spent the vast majority of their time developing tests and/or investigating whether such tests predict distal outcomes such as well-being or job performance.

As pointed out by Fiori and Ortony (2021), a much smaller body of research has sought to understand what ability EI is linked to from a process-oriented perspective (also see Gutiérrez-Cobo et al. 2016). By better understanding the processes involved in ability EI, we may better understand what these individual differences should predict. In agreement with Ybarra et al. (2014), we think that the processes involved in EI are dynamic rather than static in nature. For example, they appear to be linked to more positive evaluations of some stimuli, but more negative evaluations of other stimuli, depending on the nature of the stimuli involved. What these tests should predict, therefore, depends on current stimulus conditions or situations that are encountered.

We suggest that the processes involved in ability EI overlap with the processes ascribed to need to evaluate (Bizer et al. 2004; Jarvis and Petty 1996) or valence focus (Barrett 2006; Barrett and Niedenthal 2004), but these models are not perfect because they do not speak to abilities (nonetheless, it would be informative to know whether individuals with high ability EI would score higher in need to evaluate or valence focus). From an ability-related standpoint, EI seems to overlap with descriptions of emotional flexibility (Beshai et al. 2018) or psychological flexibility (Kashdan and Rottenberg 2010). These models suggest that psychological health can be defined, in part, in terms of situation-appropriate responding. For example, Waugh et al. (2011) found that resilient individuals, relative to non-resilient individuals, exhibited more pronounced emotional reactivity to both positive and negative stimuli. That is, their emotion systems were attuned to the stimuli that they encountered. It is very likely that emotionally intelligent individuals would exhibit the same pattern (Fiori and Ortony 2021). If so, our understanding of ability EI would be enhanced by a focus on the processes and attributes suggested by these models. Among other applications of these models, we might expect participants with high EI to be more comfortable with their emotions (Biron and van Veldhoven 2012), more capable of managing stressors (Gloster et al. 2017), and more committed to their values and actions (McCracken 2013).

A flexibility perspective on ability EI has important implications. One implication is that the attitudinal and emotional reactions of individuals with high EI may be more variable, particularly when that variability involves stimulus-appropriate responding (Hardy and Segerstrom 2017). In many cases, this variability would be linked to higher levels of distress or dissatisfaction, particularly when circumstances warrant such feelings (Matthews et al. 2006). Stated in other terms, the suggestion that high EI should support well-being (Goleman 1995) appears overly simplistic. It may support well-being under some circumstances but undermine well-being in others (Engelberg and Sjöberg 2004). Similarly, the suggestion that high EI should be linked to positive relationship behaviors (Goleman 1995) also appears simplistic. Under certain circumstances (e.g., being mistreated by one's partner), high ability individuals would likely criticize and confront their partners (Overall and McNulty 2017). Finally, the suggestion that high EI should support better performance (e.g., at work: Goleman 1995) may need to be qualified as well. If the workplace is a threatening or stressful place, high EI individuals may—because they are more affectively attuned—disengage and underperform. In all such cases, we agree with Ybarra et al. (2014), who suggest that ability EI is likely to function in dynamic rather than invariant terms. If so, it is crucial to understand momentary situational factors in making predictions about how ability EI operates (Moeller et al. 2014).

Related to these arguments, Fiori and Ortony (2021) contend that high ability individuals may be “hypersensitive” to affective information or valence-based cues. We would suggest, however, that the distinction between appropriate sensitivity and hypersensitivity is not an easy one to make and that being attuned to affective information has demonstrable benefits according to the affect and decision-making literature (Bechara 2004; Clore et al. 2001; Pham et al. 2001). For example, if the circumstances of one's job are either problematic or non-rewarding, it may make sense to seek other employment. Participants with higher EI levels appear to be more certain of whether they like or dislike their jobs (Irvin et al. 2023; Robinson et al. 2023) and this degree of evaluative certainty

should promote appropriate behavior, such as finding another job when one's current job is dissatisfying.

Consistent with the analysis of Fiori (2009), we see the need for further process-oriented research, and we highlight some directions that, on the basis of the present arguments and data, would seem to have merit. Chronometric paradigms should be used to determine whether participants with high EI have an easier time evaluating stimuli (Jarvis and Petty 1996) and/or are more sensitive to evaluative meaning in affective priming paradigms (Hermans et al. 2001). Sensitivity to affect is also thought to play an important role in performance monitoring and cognitive control (Teper et al. 2013) and paradigms of this type may offer valuable insights. For example, Wilkowski and Robinson (2008) found that participants with psychopathic traits were less likely to slow down following their errors in a choice reaction time task and this diminished sensitivity to error was associated with poorer performance. By contrast, we would suggest that participant with high EI would be more likely to notice and react to their errors, which should facilitate several forms of cognitive control. Performance monitoring can also be examined using EEG-related techniques, which may establish that individuals with higher EI are more "clued in" to cognitive conflicts or mistakes (Compton et al. 2008).

Affect is thought to play an important role in decision-making (Peters et al. 2006) and a number of decision-making paradigms suggest themselves. As an example, Caruso and Shafir (2006) asked participants whether they would prefer to watch a silly comedic movie or an intense, but acclaimed drama. Bringing attention to mood, which was achieved by asking participants about their mood before making a choice, was linked to higher preferences for the silly comedy, which would presumably be more enjoyable. If participants higher in EI are more sensitive to their affective states, they may be more likely to make choices that favor enjoyable experiences. Other paradigms of this type were developed by Robinson et al. (forthcoming a), who asked participants (for example) how willing they were to re-view affective images. Participants who attend to their emotions more habitually were less willing to re-view negative images and more willing to re-view positive images, in essence demonstrating greater guidance by the pleasure principle—i.e., approaching that which will elicit positive experiences and avoiding that which will elicit negative experiences (Elliot 2006). We are fairly certain that phenomena of this type would be more pronounced at higher levels of ability EI, but the relevant experiments have not been performed.

Irvin et al. (2023) found that affect–behavior and cognition–behavior relationships were stronger among participants with higher ability EI levels, but the paradigm was admittedly simplistic. We, therefore, need to know more about relationships of this type, preferably centering on consequential attitudes (such as toward health behaviors or political candidates) and their ability to predict later behaviors (Conner et al. Forthcoming). We suspect that the evaluations and attitudes of high EI participants would predict subsequent decision-making and behavior to a greater extent, but the relevant studies have not been performed. We also need more research of the type conducted by Moeller et al. (2014), who found that relationships between daily negative affect levels and social behavior were stronger at higher levels of ability EI. Generally speaking, attitude–behavior and affect–behavior relationships are likely to vary positively with ability EI levels and we encourage further research on this affect–behavior interface.

The present analysis would seem to relate to the emotion perception branch of EI to a greater extent than the management branch and we certainly believe that the evaluative expertise angle that we have pursued is not sufficient in covering all of the skills assessed by ability EI tests. On this point, considerable theorizing and some sources of data have suggested that it may be healthier to experience emotions of a given valence in a more "granular" or differentiated manner (Smidt and Suvak 2015). Interestingly enough, valence focus, which we emphasize in the present paper, tends to be associated with lower rather than higher levels of emotion differentiation (Barrett 1998) and ability EI too may be linked to lower levels of differentiation (MacCann et al. 2020a). Such findings provide some

support for emphasizing valence rather than discrete emotional states, as we have shown in this paper. Nonetheless, we reiterate the point that our analysis is relatively silent concerning a variety of abilities that fall within the emotional intelligence domain.

7. Conclusions

Both Fazio (2000) and Lewin (1935) highlighted the importance of affect to self-regulation and behavior. By affixing affective tags to objects in the environment, the person is spared from lengthy deliberation and has guidance concerning the choices that they should make (Fazio and Powell 1997). We suggest that many of these processes are likely to vary positively with ability EI, which can be profitably viewed in terms of individual differences in evaluative certainty and/or expertise

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Article

Ability Emotional Intelligence and Subjective Happiness in Adolescents: The Role of Positive and Negative Affect

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Abstract: Adolescence is an increasingly vulnerable period for the onset of affective disorders and other mental health issues that can significantly impact an individual's subjective well-being. This study aims to examine the relationship between emotional intelligence (ability EI), measured with a performance-based instrument, and Subjective Happiness in adolescents. It also explores the mediating role of positive (PA) and negative affect (NA) in this association and the moderating role of gender. The sample consisted of 333 first-year secondary school students from five centers in Spain, with an average age of 12.11 years (SD = 0.64), ranging from 11–14 years. Path analysis revealed an indirect effect (through NA and PA jointly) of Total Ability EI on Subjective Happiness and a positive direct effect that was observed only in females. Furthermore, this association was explored through various branches of ability EI. The results of this study suggest that interventions aimed at improving emotional abilities in adolescents while modulating the intensity of their emotions could significantly impact their overall well-being.

Keywords: emotional intelligence; positive affect; negative affect; subjective happiness; TIEFBA; PANAS; adolescence; ability EI; gender

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1. Introduction

According to UNICEF (2021), half of mental health disorders begin in middle adolescence, at around 14 years of age. In particular, in Spain, 15% of adolescents show “severe or moderately severe” symptoms of depression and 10.8% report suicidal ideation. Therefore, calls have been made for reinforcing the role of educational centers concerning issues related to affectivity, emotions, and mental health care (UNICEF 2022). This notion makes sense since emotional intervention appears to be a protective variable for well-being in adolescents (Castillo-Gualda et al. 2018; Durlak et al. 2022; Taylor et al. 2017). A recent meta-analysis of 41 articles has linked emotional intelligence (EI)—a set of abilities related to one's and others' emotions—with greater subjective well-being in adolescence (Llamas-Díaz et al. 2022). Moreover, a meta-analysis assessing the effectiveness of school-based social and emotional learning (SEL) programs for students from early childhood through to high school found that the mean effects were consistently significant across various outcomes. These outcomes included improvements in SEL skills, attitudes, prosocial behaviors, and academic achievement and reductions in behavioral problems and emotional distress (Durlak et al. 2022). Furthermore, the impact of emotional learning on adolescents has been demonstrated not only in academic contexts but also in clinical settings (Daros et al. 2021). Considering the indicated needs, our general objective is to explore the relationship between ability EI and subjective well-being in adolescent females and males.

1.1. Emotional Intelligence

EI was defined in 1997 as “the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth” (Mayer et al. 1997, p. 10). Since then, EI has grown in popularity, and many definitions and assessment methods have emerged. In this regard, trait and ability EI were the first categories created in this field (Petrides and Furnham 2000; Siegling et al. 2015). However, Joseph and Newman (2010) presented a more detailed distinction between three EI models: The self-report mixed model, the self-report ability model, and the performance-based ability model. These models are characterized according to how EI is conceptualized (ability vs. mixed) and the types of instruments used (self-report vs. performance-based). Given that prior studies have found weak convergent validity between the models (Brackett et al. 2006; Joseph and Newman 2010; Webb et al. 2013) and that the literature has produced inconsistent results regarding behavioral predictions (Gómez-Leal et al. 2018; Gong and Jiao 2019; Gutiérrez-Cobo et al. 2017; O’Boyle et al. 2011), it is crucial to take into account these variations when interpreting EI.

The self-report mixed model adopts a broader conceptualization of EI that includes motivations, mental abilities, interpersonal and intrapersonal skills, and personality traits (Mayer et al. 2008). This model makes use of instruments with subscales for various personality, social, and personal well-being traits (among many others). The *Bar-On Emotional Quotient Inventory* (EQ-I; Bar-On 1997) or the *Trait Emotional Intelligence Questionnaire* (TEIQue; Petrides et al. 2006) are representative tests of the self-report mixed model for both adults and adolescents.

The self-report ability model and the performance-based ability model understand EI as a set of emotion-related abilities, specifically those defined by Mayer and Salovey (1997). However, these two models differ in the instruments they use:

On the one hand, the self-report ability uses self-report instruments with no correct or incorrect answers (therefore, this model focuses on participants’ subjective perceptions). The *Trait Meta-Mood Scale* (TMMS; Salovey et al. 1995) is a typical test of this EI model used in adults and adolescents (Salguero et al. 2010). The relationship between gender and EI remains unclear when using self-reports. While some studies have indicated a positive correlation, others have reported a negative or non-existent relationship (Brackett et al. 2006; Cabello et al. 2016; Fernández-Berrocal et al. 2018).

On the other hand, the performance-based ability model applies instruments where participants must solve problems with correct and incorrect answers (Mayer et al. 2000). The most widely used performance test of this ability model is the *Mayer-Salovey-Caruso Emotional Intelligence Test* (MSCEIT; Mayer et al. 2002). However, this has routinely been used in adults as opposed to adolescent samples, in spite of there being a version designed for the latter (MSCEIT-YRV; Mayer et al. 2002). Given the need for more ability tests of this model, other performance tests have been created and validated for the adolescent population, such as the *Botín Foundation’s Emotional Intelligence Test for Adolescents* (TIEFBA; Fernández-Berrocal et al. 2011). The TIEFBA evaluates the actual performance level of EI abilities that each teenager possesses. This feature distinguishes the instrument from other measures of EI based on self-perceptions, which helps eliminate the biases that often affect self-report measures, such as response style or social desirability (Fernández-Berrocal 2015). In this article, our primary focus will be on performance-based ability, utilizing the TIEFBA. We have chosen this approach due to its advantages over self-report methods and the growing need in the adolescent literature for data obtained through performance-based assessments. Regarding gender differences, research suggests that females have higher total ability EI when measured using performance-based instruments (Extremera et al. 2006). However, when examining specific branches of EI, mixed results have been found. While some studies indicate that adult females outperform males in all dimensions of performance-based EI (Mayer et al. 2002; Palmer et al. 2005), another study found that

females excel in the branches of facilitating, understanding, and managing, but not in perceiving (Extremera et al. 2006). In the case of adolescents, inconclusive results have also been found. One study reported gender differences in performance-based EI in favor of females in all branches and areas (Fernández-Berrocal et al. 2018). However, another study found differences only in understanding and managing emotions (Zeidner et al. 2016). Despite these investigations, relatively few studies have extensively analyzed the role of gender in different branches of EI. As a result, the influence of gender on EI—particularly in adolescents—remains unclear.

1.2. *Subjective Well-Being: Subjective Happiness and Affect*

The most widely studied dimensions of well-being include affect and happiness (Diener et al. 2018; Lyubomirsky et al. 2005). Affect indicates people's positive and negative emotions (Diener et al. 1999) and is composed of Positive Affect (PA) or pleasant emotions, and Negative Affect (NA) or unpleasant emotions. The *Positive and Negative Affect Schedule* (PANAS; Watson et al. 1988) is one of the most widely used tests to evaluate these components. Individuals who experience PA generally feel content, connected, energized, confident, enthusiastic, and self-assured. In addition, they exhibit traits such as optimism, extroversion, and resilience. Conversely, individuals who experience NA may feel sadness, apathy, disinterest, shame, envy, and guilt. Such individuals may also have difficulty coping with stress, experience changes in physiological functioning, and have difficulties when faced with challenging environments (Crawford and Henry 2004). Meanwhile, happiness can be defined as a life with more pleasant than unpleasant experiences and a strong sense of life satisfaction (Schimmack et al. 2004) rather than an isolated pleasant feeling. For this study, we adopted a comprehensive definition of happiness that encompasses both emotional and cognitive aspects, as outlined in Lyubomirsky's approach (Lyubomirsky et al. 2005; Lyubomirsky and Lepper 1999) and we used the *Subjective Happiness Scale* (SHS; Lyubomirsky and Lepper 1999), which is a representative test of this conceptualization.

The literature reveals that PA, NA, and subjective happiness have been treated independently (Busseri and Sadava 2011; Cabello and Fernandez-Berrocal 2015; Diener et al. 2018). One of the reasons for this approach is that subjective happiness refers to a more global measure of subjective well-being, while affect has generally been interpreted as the intensity of a person's positive or negative emotions at a given moment (e.g., PANAS). Moreover, relationships between the components of affect and subjective happiness have been established. For instance, greater subjective happiness (assessed as an overall perception of subjective well-being) has been related to higher PA and lower NA (Bhutoria and Hooja 2018; Cheng and Furnham 2003; Gutiérrez-Cobo et al. 2021; Lyubomirsky et al. 2005; Singh and Jha 2008). Furthermore, existing experimental and cross-cultural research has provided support for the causal impact of affectivity on subjective well-being assessments (Kuppens et al. 2008; Schwarz and Clore 2007).

Concerning gender differences in the well-being of adolescents, some studies have shown females to have lower subjective well-being than males (Goldbeck et al. 2007; Moksnes and Espnes 2013), while others have reported no differences (e.g., Casas et al. 2007). However, these differences begin to emerge significantly at the age of 13–15 (Esteban-Gonzalo et al. 2020), confirming that subjective well-being might decrease as respondents reach late adolescence (Chui and Wong 2016). Nevertheless, more research is needed to clarify the relationship between gender and well-being.

1.3. *Relationship between EI and Well-Being in Adolescents*

An extensive body of evidence suggests that adolescents with higher EI present lower levels of depression and anxiety (Fernández-Berrocal et al. 2006; Gómez-Baya et al. 2017) and better psychosocial adjustment (Sanchez-Ruiz and Baaklini 2018; Inglés et al. 2014; Resurrección et al. 2014; Vega et al. 2022). Moreover, according to a systematic review examining EI and suicidal behaviors at various ages, a greater level of EI appears to play a substantial role in preventing suicidal behavior (Domínguez-García and Fernández-

Berrocal 2018). Previous studies have also specifically examined the relationship between EI and subjective well-being. In adults, Sánchez-Álvarez et al. (2016) found a positive association between EI and subjective well-being, including happiness, life satisfaction, and positive affect. Furthermore, MacCann et al. (2020) studied the relationship between affect and the four branches of EI within the performance-based model. Their findings demonstrated that all four branches of EI were linked to decreased NA, while only emotion management was connected to increased PA in adolescents. In addition, higher EI is generally linked to greater subjective well-being across all dimensions and conceptualizations (Llamas-Díaz et al. 2022). Furthermore, adolescents with higher EI report feeling happier (Abdollahi et al. 2015; Platsidou 2013; Tejada-Gallardo et al. 2022) and experience more PA and less NA (Gómez-Baya and Mendoza 2018; Zhao et al. 2020). These findings have been confirmed when EI is evaluated both in mixed and self-report ability models (Koydemir and Schütz 2012; Llamas-Díaz et al. 2022; Salovey and Mayer 1990; Sánchez-Álvarez et al. 2015). However, relatively few studies have utilized performance-based instruments to confirm these relationships within this model. In fact, according to the meta-analysis by Llamas-Díaz et al. 2022, only two cross-sectional studies with adolescents used the MSCEIT. Both studies had relatively small sample sizes ($N = 164$ and 205 , respectively), and their data revealed no significant relationship between EI and adolescent well-being. It is also relevant to note that these studies applied the adult version of the MSCEIT to their adolescent samples. Therefore, the relationship between EI measured with performance instruments and adolescent subjective well-being is unclear.

Concerning the mechanisms underlying the relationship between EI and components of subjective well-being, the literature has confirmed the mediating role of affectivity in the relationship between self-reported EI and subjective well-being (life satisfaction) in both undergraduate (Extremera and Rey 2016; Kong and Zhao 2013) and adolescent samples (Sánchez-Álvarez et al. 2015). It is important to highlight that life satisfaction and happiness are both measures of well-being that involve a cognitive assessment of how satisfied individuals are with their lives. These constructs are strongly correlated and often overlap in the literature (Diener et al. 2018).

Considering that EI is the mental capacity to process, analyze, and understand emotional information, when individuals enhance their emotional abilities, they can alter the overall balance of their emotional experiences (e.g., more pleasant than unpleasant), resulting in a more positive perception of their lives (Extremera and Rey 2016; Zeidner et al. 2012). Furthermore, several other studies have shown that affect mediates the relationship between EI and variables such as mind-wandering, aggression, or academic performance (Gutiérrez-Cobo et al. 2023a; Gutiérrez-Cobo et al. 2018; Martínez-Monteagudo et al. 2019; Megías et al. 2018; Salavera and Usán 2020). However, it is important to note that much of this information regarding the mediating role of affect is primarily based on self-report instruments, which do not directly assess individuals' emotional skills. Consequently, there is a possibility of introducing unrelated factors into the evaluation of emotional processing (Brackett et al. 2006).

Studying the relationship between EI and subjective happiness in adolescents is particularly important due to the ongoing cognitive and emotional development that takes place during this period. Adolescence presents unique challenges since not all emotional skills have yet been acquired, so it is crucial to identify which emotional skills contribute most significantly to happiness through changes in affect. Additionally, understanding the role of gender in this relationship is essential for gaining valuable insights into potential interventions aimed at improving the personal well-being of adolescents. The role of gender as a moderator between performance-based EI and subjective happiness has not been extensively studied, and the results remain unclear for both adults (Salguero et al. 2012) and adolescents (Llamas-Díaz et al. 2022). To our knowledge, this is the first study to explore the role of gender as a moderator between performance-based EI and subjective happiness in adolescents.

1.4. Objectives and Hypothesis

The relationship between subjective well-being and EI in adolescents is inconclusive when ability-performance tests are used since most of the results obtained from previous studies are based on samples that use self-report measures. Moreover, the objectives of this study are also prompted by the high rate of emotional disorders in adolescents and the potential for developing intervention strategies based on the relationship between ability EI and personal well-being in this group. The primary aim of this research was to examine the relationship between ability-based EI and subjective happiness, while also investigating the mediating role of PA and NA in this relationship. To provide a comprehensive analysis of this issue, we investigated the relationship between each of the TIEFBA branches (EI abilities) and Subjective Happiness. Moreover, given the gender disparities revealed by previous studies regarding our variables of interest, we explored the moderating role of gender in these relationships. We expected to find:

1. A positive relationship between Total Ability EI and Subjective Happiness.
2. A positive relationship between Total Ability EI and PA, and a negative relationship between Total Ability EI and NA.
3. A positive relationship between Subjective Happiness and PA, and a negative relationship between Subjective Happiness and NA.
4. Total Ability EI will have a positive indirect effect on Subjective Happiness via PA and NA and significant relationships will depend on the TIEFBA branches.
5. Gender will have a moderating effect on the relationship between the variables examined.

2. Method

2.1. Participants

The sample was recruited from a non-clinical, general population, and consisted of 333 first-year students from five Spanish secondary schools located in Santander and Madrid. Of the total sample, 171 (51.4%) were males and 162 (48.6%) were females. The mean age of the overall sample was 12.11 (SD = 0.64) with a range of 11–14 years. For males, the mean age was 12.15 years (SD = 0.64), and for females, it was 12.07 years (SD = 0.61).

2.2. Procedure

Parents gave their consent for the adolescents to participate. Parents and adolescents were informed about protecting the data collected (perseveration of confidentiality and anonymity), and all participants were treated following the Helsinki Declaration (Williams 2008). The Research Ethics Committee of the University of Málaga approved this research as part of the project “*Factores protectores del bienestar personal y escolar en la adolescencia. UMA18-FEDERJA-114*” (Approval Number: CEUMA: 38-2020-H).

Participants were asked to complete questionnaires that evaluated ability EI, PA, NA, and Subjective Happiness through the online platform Lime survey (<http://limesurvey.org>, accessed on 8 August 2023). Online questionnaires were completed during school hours in their classroom in a single session lasting 45 min. During the evaluation, adolescents were supervised by one researcher and their teacher. Throughout the session, the researcher was always available to answer questions and support participants with reading difficulties.

2.3. Instruments

Botín Foundation’s Emotional Intelligence Test for Adolescents (TIEFBA; Fernández-Berrocal et al. 2011). The TIEFBA measures how well adolescents can use their EI skills to solve various emotional problems in real-life situations. The instrument was developed using the Situational Judgment Test approach, which involved five stages to ensure ecological validity (for more information on validity, see Fernández-Berrocal et al. 2011). Drawing from recent research on related measures (MacCann and Roberts 2008), TIEFBA utilizes a single situation that evokes emotions, providing the basis for various emotional tasks assessing the four branches of the EI model. There are eight emotionally eliciting scenes

in the TIEFBA. Each scene contains two to three phrases that highlight the emotional component of an event involving one or more characters. Participants must complete four different scene activities to evaluate the four branches of the ability model of EI: Perceiving emotions, using emotions, understanding emotions, and managing emotions.

1. **Perceiving emotions task:** On a 5-point Likert scale (from 1 = “not at all” to 5 = “very much”), the adolescent is asked to evaluate the main protagonist’s facial expression. For example, how much anger, disgust, fear, happiness, sadness, and surprise does the character feel?
2. **Using emotions task:** On a 5-point Likert scale (from 1 = “not at all” to 5 = “very much”), the participant is asked to evaluate to what extent the main character’s mood would help them to perform three cognitive activities. This part assesses the participant’s understanding of how emotions are helpful in thinking and reasoning.
3. **Understanding emotions task:** On a 5-point Likert scale (from 1 = “not at all” to 5 = “very much”), the participant is asked to evaluate the extent to which four kinds of beliefs and thoughts are associated with the main character’s mood. This part rates the ability to link emotions with cognitive evaluations.
4. **Managing emotions task:** On a 5-point Likert scale (from 1 = “completely ineffective” to 5 = “completely effective”), the participant is asked to evaluate the efficacy of four alternative emotion-regulation strategies for reaching a specific goal. Based on four scenes, the participant must rate the effectiveness of the main characters’ emotional regulation strategies to achieve a goal (intrinsic regulation); then, in another four scenes, the participant must rate the efficacy of the strategies in which the main character regulates the emotion of other people to achieve a goal (extrinsic regulation).

The following seven scores are calculated by summing the participant’s performance on each activity across the eight scenes: A total score, which summarizes the participant’s performance across the four tasks; four scores corresponding to the four branches (Perceiving emotions, Using emotions, Understanding emotions, and Managing emotions); and two area scores corresponding to the experiential area (Perceiving and Using emotions tasks) and the strategic area (Understanding and Managing emotions task). However, we were only interested in the four branches for our study. The time taken to complete the test was 20–30 min. McDonald’s omega’s reliability coefficients in our sample were Perceiving = 0.83, Using = 0.80, Understanding = 0.73, Managing = 0.86, and Total Ability EI = 0.88. Contact *Fundación Botín* for further details on how to obtain the TIEFBA (<http://www.fundacionbotin.org/educacion-contenidos/test-inteligencia-emocional.html>, accessed on 8 August 2023).

Positive and Negative Affect Schedule (PANAS; Watson et al. 1988). This is a self-report instrument composed of 20 items scored on a 5-point scale (1 “not at all” to 5 “strongly”). The questionnaire is designed to evaluate two emotional experience dimensions: PA, the intensity of positive mood states (e.g., interested, excited, proud), and NA, the intensity of negative mood states (e.g., upset, alert, scared). For our study, the Spanish version of the PANAS was used (Sandín et al. 1999) and the questionnaire asked participants “to what extent do you generally experience the following emotional states.” The McDonald’s omega reliability coefficient in our sample was 0.79 for PA and 0.82 for NA.

Subjective Happiness Scale (SHS; Lyubomirsky and Lepper 1999). This 4-item Likert-scale measures global subjective happiness using statements with which participants either self-rate or compare themselves to others. The first item assesses the degree to which the respondent thinks they are happy (from 1 = not a very happy person to 7 = a very happy person). Item 2 assesses the person’s level of happiness in comparison to others (from 1 = less happy to 7 = happier). Item 3 assesses how frequently the person feels very happy, and Item 4 evaluates the opposite, that is, how frequently the person feels very unhappy (responses to both items ranging from 1 = not at all to 7 = a great deal). McDonald’s omega in our sample was 0.72.

2.4. *Data Analysis*

First, descriptive statistics were used to examine each measure, and *t*-tests were used to analyze gender differences. Second, Pearson’s correlations were computed to examine the association between the Total Ability EI, PA, NA, and Subjective Happiness scores. Third, a path analysis was conducted to determine the direct and indirect relationships between Total Ability EI and Subjective Happiness via PA and NA. Total Ability EI was included as a predictor, PA and NA as intermediary variables, and Subjective Happiness as the criterion. Prior to the path analysis, we used regression analysis to examine whether gender acted as a moderator in each of the relationships included in the model. In the case of significance, the interaction was introduced into the path model. Predictors involved in the interaction were mean-centered. Fourth, a more complex model was constructed, including the four branches of TIEFBA as predictor variables (the rest of the path model was similar to the previous model). The indirect effects of the path analysis were examined using bias-corrected bootstrapping with 5000 iterations and 95% confidence intervals (CIs). Descriptive statistics, *t*-tests, and correlations were conducted using JAMOVI 2.3.21, while IBM SPSS AMOS 26.0 software (IBM Corp., Armonk, NY, USA) was utilized for path analyses.

3. **Results**

Descriptive results and all Pearson’s correlations between all dimensions of the TIEFBA, Subjective Happiness, PA, and NA are presented in Tables 1 and 2, respectively. According to the aims of this study, we can highlight a number of significant relationships. Total Ability EI correlated positively with Subjective Happiness; Total Ability EI correlated positively with PA and negatively with NA, while Subjective Happiness correlated positively with PA and negatively with NA (all *p* > .05). Finally, regarding the EI branches, Perceiving correlated negatively with NA, and Managing correlated positively with PA (all *p* > .05). Student’s *t*-test (Table 1) revealed that females obtained higher scores than males on Total Ability EI and the branches of Perceiving, Using, and Managing (all *p* < 0.05). However, no gender differences were found for the Understanding EI branch, PA, NA, and Subjective Happiness (*p* > .05).

Table 1. Means, standard deviations (SD), minimum, maximum, and *t*-test for gender differences.

	Gender	Mean	SD	Minimum	Maximum	<i>t</i> -Test	Cohen’s d
Perceiving	M	98.68	14.85	48.05	121.82	−2.24 *	−0.25
	F	102.25	14.17	55.51	129.00		
Using	M	94.37	14.70	53.33	132.82	−2.02 *	−0.22
	F	97.73	15.66	59.45	132.47		
Understanding	M	96.13	13.45	65.15	140.43	−1.32	−0.15
	F	98.19	13.71	62.06	132.95		
Managing	M	97.12	13.64	65.15	128.65	−2.53 **	−0.28
	F	101.05	14.75	62.06	126.98		
Total Ability EI	M	95.71	13.41	58.23	135.21	−2.90 **	−0.32
	F	99.95	13.23	59.90	131.91		
Positive Affect	M	3.41	0.63	1.80	5.00	−0.68	−0.07
	F	3.46	0.64	1.80	4.80		
Negative Affect	M	1.97	0.65	1.00	5.00	−1.76	−0.19
	F	2.09	0.65	1.00	4.70		
Subjective Happiness	M	5.19	1.16	1.00	7.00	−0.44	−0.05
	F	5.25	1.27	1.00	7.00		

Note. M = Male (N = 171), F = Female (N = 162), SD = Standard Deviations. * *p* < .05, ** *p* < .001.

Table 2. Pearson’s correlations among the study variables.

	1	2	3	4	5	6	7	8
1. Perceiving	—							
2. Using	0.28 **	—						
3. Understanding	0.38 **	0.42 **	—					
4. Managing	0.30 **	0.28 **	0.49 **	—				
5. Total Ability EI	0.72 **	0.68 **	0.77 **	0.71 **	—			
6. Positive Affect	0.08 *	0.03 *	0.22 **	0.37 **	0.23 **	—		
7. Negative Affect	−0.26 **	−0.14 *	−0.13 *	−0.08 *	−0.22 **	−0.05 *	—	
8. Subjective Happiness	0.18 **	0.12 *	0.25 **	0.33 **	0.30 **	0.40 **	−0.37 **	—

Note. * $p < .05$, ** $p < .001$.

Prior to conducting the path analyses, and given the gender differences observed in EI, we decided to examine the moderating effect of gender on the relationships of interest to include in the path models. These analyses revealed that gender moderated the relationship between Total Ability EI and Subjective Happiness (interaction effect: $b = -0.03$, $\beta = -0.22$, 95% CI $[-0.049, -0.008]$), which was significant for females ($b = 0.04$, $\beta = 0.44$, 95% CI $[0.031, 0.063]$) but not for males (95% CI $[-0.001, 0.028]$). With respect to EI branches, gender moderated the relationship between Using and Subjective Happiness (interaction effect: $b = -0.02$, $\beta = -0.18$, 95% CI $[-0.039, -0.004]$), which was significant for females ($b = 0.02$, $\beta = 0.24$, 95% CI $[0.008, 0.030]$), but not for males (95% CI $[-0.013, 0.010]$). The remaining relationships of interest (others included in the proposed path models) were not significantly moderated by gender.

Next, we conducted the analysis for the simple path model (see Figure 1). Following the previous analyses, the moderating effect of gender on the relationship between Total Ability EI and Subjective Happiness was introduced in the model, as this was previously found to be significant. The path analysis revealed a positive direct effect of Total Ability EI on Subjective Happiness (direct effect: $b = 0.03$, $\beta = 0.31$, 95% CI $[0.013, 0.040]$), but the Gender X Total Ability EI interaction for Subjective Happiness was also significant (direct effect: $b = -0.03$, $\beta = -0.21$, 95% CI $[-0.042, -0.008]$). A follow-up analysis of this interaction revealed that the positive direct effect of Total Ability EI on Subjective Happiness was only observed in females (direct effect: $b = 0.03$, $\beta = 0.30$, 95% CI $[0.017, 0.045]$), but not in males (95% CI $[-0.015, 0.012]$). Concerning the indirect effects, the analysis revealed a positive total indirect effect (via NA and PA jointly) of Total Ability EI on Subjective Happiness (indirect effect: $b = 0.01$, $\beta = 0.15$, 95% CI $[0.010, 0.019]$). Breaking down the total indirect effect into specific indirect effects revealed that Subjective Happiness was predicted by a positive specific indirect effect of Total Ability EI via NA ($b = 0.01$, $\beta = 0.07$, 95% CI $[0.003, 0.010]$) and PA ($b = 0.01$, $\beta = 0.08$, 95% CI $[0.005, 0.012]$). This model explained 32% of the variance in Subjective Happiness.

Finally, we conducted the path model including EI branches (see Figure 2). The moderating effect of gender on the relationship between the Using branch and Subjective Happiness was included in the model, as this was significant. The analysis revealed a significant positive direct effect of Using and Managing on Subjective Happiness (Using: $b = 0.01$, $\beta = 0.13$, 95% CI $[0.001, 0.017]$; Managing: $b = 0.01$, $\beta = 0.18$, 95% CI $[0.008, 0.023]$) and a significant interaction between Gender and Using on Subjective Happiness ($b = -0.02$, $\beta = -0.20$, 95% CI $[-0.036, -0.010]$). Further analysis of this interaction revealed a positive direct effect of Using on Subjective Happiness in females (direct effect: $b = 0.01$, $\beta = 0.17$, 95% CI $[0.004, 0.022]$), but not in males (95% CI $[-0.015, 0.002]$). Regarding the indirect effects, the analysis revealed total positive indirect effects of Perceiving and Managing on Subjective Happiness via NA and PA jointly (Perceiving: $b = 0.01$, $\beta = 0.07$, 95% CI $[0.002, 0.010]$; Managing: $b = 0.01$, $\beta = 0.10$, 95% CI $[0.04, 0.012]$). For Perceiving, the analysis of specific indirect effects revealed a positive indirect effect via NA ($b = 0.01$, $\beta = 0.08$, 95% CI $[0.004, 0.010]$), but not via PA (95% CI $[-0.004, 0.002]$); while for Managing, a positive indirect effect was observed via PA ($b = 0.01$, $\beta = 0.11$, 95% CI $[0.006, 0.013]$), but not via NA

(95% CI [-0.003, 0.002]). None of the remaining direct and indirect effects were significant. The model explained 32% of the variance in Subjective Happiness.

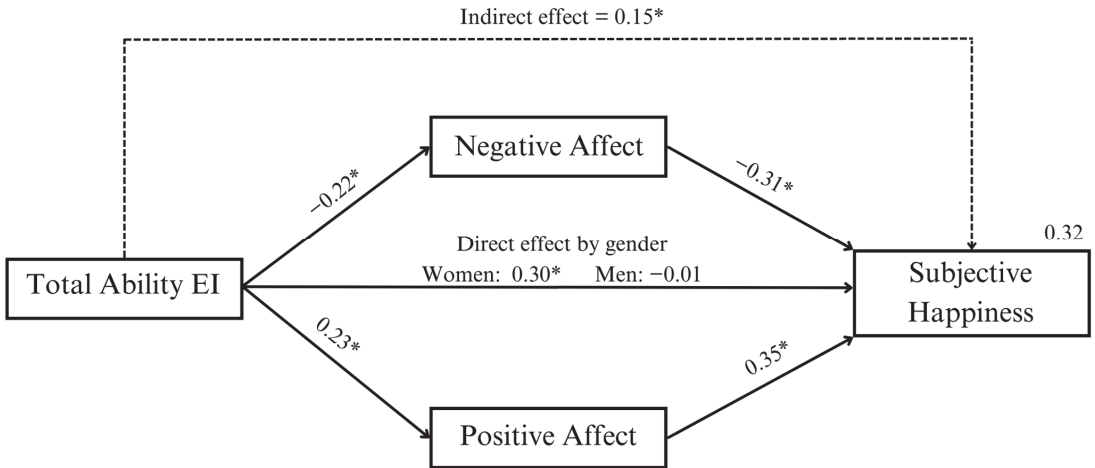


Figure 1. Graphical representation of the model analyzing EI as a total score, including standardized path coefficients and correlation coefficients. Note: An asterisk indicates significance at the $p < 0.05$ level.

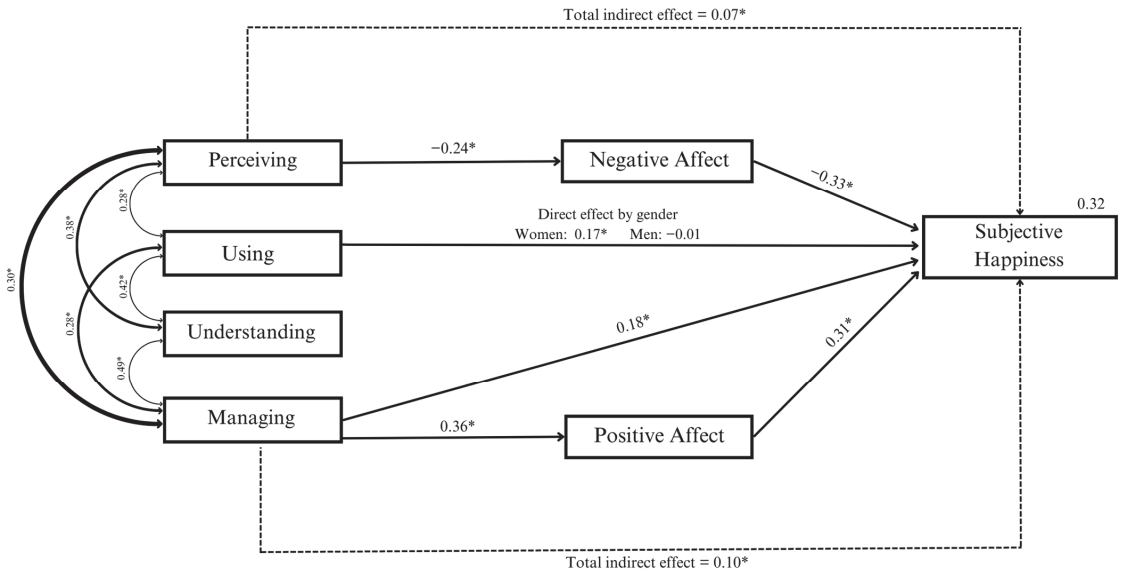


Figure 2. Graphical representation of the model analyzing the four EI branches, including standardized path coefficients and correlation coefficients. For easier interpretation of the results, only significant paths are shown. Note: An asterisk indicates significance at the $p < 0.05$ level.

4. Discussion

Adolescence has increasingly been shown to be a risk period for suffering affective disorders and other mental health problems that impact the individual’s subjective well-being. This study aimed to analyze the relationship between performance-based ability emotional intelligence (ability EI) and Subjective Happiness through the mediating role

of Positive (PA) and Negative Affect (NA) in adolescents. Furthermore, this association is explored through different dimensions of ability EI. This is the first study to measure this relationship in adolescents using a performance-ability EI instrument.

Concerning the descriptive results for gender, we found significant differences in EI scores but not in subjective well-being variables (PA, NA, and Subjective Happiness). In general, females scored higher on EI than males across all its dimensions (with Managing being the most notable) except for Understanding. These data are consistent with previous literature indicating that females score higher on EI measured with ability instruments (Fernández-Berrocal et al. 2018). Relating to subjective well-being, we found no significant gender differences. It appears that females begin to score lower on well-being from the age of 13 (Esteban-Gonzalo et al. 2020). Thus, our non-significant differences could be explained due to the age of our sample (12 years).

In line with our first hypothesis, we found a significant positive association between Total Ability EI and Subjective Happiness (Table 1), that is, adolescents that present higher EI perceive themselves as happier. These results are consistent with the findings of previous research (Abdollahi et al. 2015; Platsidou 2013; Tejada-Gallardo et al. 2022). In addition, it is known that happier people are less likely to have mental health problems or commit suicide (Domínguez-García and Fernández-Berrocal 2018; Fernández-Berrocal et al. 2006; Gómez-Baya et al. 2017). However, when we analyzed this relationship in the path model considering PA and NA, we found a direct effect of Total Ability EI on Subjective Happiness, which was only observed in females (Figure 1). While further research is still needed to establish clear relationships and draw firm conclusions, we can speculate about several factors that may contribute to the observed differences between females and males. Methodologically, females scored higher in Total Ability EI than males, which could potentially strengthen the association with Subjective Happiness. Another possible explanation is the influence of gender-based emotional socialization, where individuals are taught to approach their emotions differently based on their gender. Additionally, the distinct social demands and expectations placed on males and females may also be of relevance. For instance, females are often expected to display warmth, happiness, and emotional openness during social interactions (Keltner 1995; Smith et al. 2015). It has been observed that popular and well-liked girls often excel in verbal expression, possess an understanding of group dynamics, display lower levels of aggression, and show a keen interest in social relationships, particularly with boys (Brody 2000). It is likely that utilizing EI as a tool to navigate these social challenges directly influences their perception of happiness. To further investigate this relationship, future studies should continue using performance-based EI instruments and examining it across different age groups.

Concerning our second hypothesis, we found a significant relationship between Total Ability EI and affect components; specifically, this relationship was positive for PA and negative for NA. This indicates that emotionally intelligent adolescents have greater PA and less NA, as confirmed by various investigations (Gómez-Baya and Mendoza 2018; MacCann et al. 2020; Zhao et al. 2020). Since we used the PANAS instrument, this specifically means that students who scored lower on ability EI experienced a lower intensity of positive emotions and a greater intensity of negative emotions.

Regarding our third hypothesis, it was found that PA and NA were positively and negatively associated with happiness, respectively, so participants who experienced more PA and less NA perceived themselves as happier. These findings coincide with those of previous studies (Bhutoria and Hooja 2018; Cheng and Furnham 2003; Lyubomirsky et al. 2005; Singh and Jha 2008) and highlight how the intensity of the type of emotions experienced (pleasant or unpleasant) can impact the subjective happiness experienced by the individual.

Confirming hypothesis four, Total Ability EI had a positive indirect effect on Subjective Happiness via PA and NA jointly (Figure 1). Specifically, the most emotionally intelligent adolescents tend to perceive more intense positive and less intense negative emotions, which seems to be related to greater subjective happiness. This result could be taken to indi-

cate a protective role of EI in adolescents' subjective well-being by regulating the intensity of their pleasant or unpleasant emotions. This finding is consistent with previous research indicating that affectivity plays a significant role in shaping evaluations of life satisfaction (Extremera and Rey 2016; Kuppens et al. 2008, Schwarz and Clore 2007). According to the affect-as-information perspective, individuals commonly utilize their affective balance as a source of information when assessing their overall life satisfaction (Schwarz and Clore 2007). In summary, individuals with high EI may experience better subjective well-being by effectively utilizing their emotional strategies to modify the intensity of both pleasant and unpleasant emotions.

Related to hypothesis four, a more detailed analysis of TIEFBA branches (Figure 2), revealed that Perceiving, one of the earliest and most basic emotional abilities, showed a significant negative indirect effect on ability EI through NA but not PA. The greater the ability to perceive emotions, the lower the intensity of negative emotions, which positively impacts Subjective Happiness. This implies that sensitivity to emotional cues is important for negative but not positive affect. Perceiving our environment appropriately could prevent us from misinterpreting contextual situations, allowing us to identify and address them promptly before negative emotions increase (MacCann et al. 2020). Regarding Managing, we observed both direct and indirect effects on Subjective Happiness through PA (Quoidbach et al. 2010). EI comprises different dimensions that increase in difficulty and are interdependent. Managing emotions is the strategy that requires the most resources to be efficient and usually has the greatest impact on health variables (Hu et al. 2014), and at the same time, this is the strategy that is most susceptible to improvement by the individual. Adolescents who perceive themselves as happier tend to regulate their emotions to experience more intense positive emotions. In this sense, it is logical to suppose that even when an adolescent effectively manages their emotions and experiences happiness, they may still feel negative emotions to a certain extent. While adolescents sometimes have no control over the negative events that happen to them or around them, they may enhance their well-being by actively creating positive experiences and balancing these with negative experiences. These findings are consistent with those reported by MacCann et al. (2020), who concluded that all EI abilities may contribute to reducing the impact of negative affect (down-regulation), while management specifically contributes to enhancing positive affect (up-regulation). Understanding this direct and indirect relationship is important because it provides insights into which EI abilities should be targeted for improving the subjective well-being of adolescents. Finally, gender moderated the relationship between Using and Subjective Happiness, which was significant for females but not males. In this study, female adolescents showed three direct effects regarding the relationship with Subjective Happiness (Total Ability EI, Using, and Managing). It appears that for females, the influence of ability EI on their Subjective Happiness is stronger and does not necessarily depend on the modulation of their affect. Further research is needed to deepen our understanding of how gender in adolescents interacts with various branches of ability EI in relation to well-being.

While this study helps to understand the mechanisms underlying adolescents' subjective well-being through performance EI measures, it is not exempt from limitations. The average age of our sample is 12 years, and studies on the behavior of these variables should be conducted with a range of ages throughout adolescence. Moreover, because the nature of the study is cross-sectional and correlational, causal mechanisms cannot be established. Future research should use experimental and longitudinal methods to examine the causal relationship between our target variables and adolescents' happiness. In addition, longitudinal and experimental studies should examine the effects of EI training on adolescent well-being to inform the development of improved programs and to apply our findings to a more real-world context (Morrish et al. 2018). More research is also needed to provide consistent data on how various EI abilities could differ according to gender or other variables such as ethnicity or socioeconomic and socio-educational level (Gutiérrez-Cobo

et al. 2023b). Finally, it would be useful to conduct similar studies using different samples, such as those recruited from clinical populations.

In conclusion, it appears that EI—through PA and NA—can play an important role in how happy adolescents perceive themselves. Given the most recent data on suicide, depression, and other affective disorders, our findings emphasize the potential of using EI training as an intervention and prevention tool for adolescent well-being, which is currently an essential global priority. While the adolescent environment cannot be controlled to manipulate how many positive or negative emotions they experience daily, there is a tool at our disposal that can mitigate or improve the intensity of these feelings to positively affect their happiness. However, when designing an intervention, it is crucial to understand the specific needs of the targeted individuals and determine how to address them effectively. In this regard, this study offers valuable insights for developing programs aimed at adolescents. For instance, training in perception ability could lead to a reduction in negative affect, making it beneficial for interventions aimed at alleviating stress and social anxiety. On the other hand, emotion management training can help to increase the intensity of positive emotions, thus contributing to interventions focused on positive well-being (MacCann et al. 2020). Therefore, it is important to emphasize the inclusion of performance-based instruments, in addition to self-report measures, in interventions. This approach will help to accurately identify the specific abilities that require attention in adolescents. Additionally, it is crucial to consider gender differences when designing and implementing such interventions.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Study data are available upon request from correspondence author Rosario Cabello (rcabello@uma.es).

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Essay

Reconceptualizing Emotion Recognition Ability

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Abstract: Emotion decoding accuracy (EDA) plays a central role within the emotional intelligence (EI) ability model. The EI-ability perspective typically assumes personality antecedents and social outcomes of EI abilities, yet, traditionally, there has been very limited research to support this contention. The present paper argues that the way in which EDA has been conceptualized and operationalized in EI research has ignored developments in social perception theory and research. These developments point, on one hand, to the importance of embedding emotion expressions in a social context and, on the other, to reformulating the definitions of emotion decoding accuracy. The present paper outlines the importance of context in the framework of a truth and bias model of the social perception of emotions (Assessment of Contextualized Emotions, ACE) for EI abilities.

Keywords: EI abilities; emotion perception; accuracy; bias

“Imagine a situation in which a young man visits a friend in the hospital who has been in a car accident. The first area of emotional intelligence involves perceiving emotions. As the young man surveys the hospital room, the visiting relatives, and his unconscious friend, he may wonder, ‘What is each family member feeling?’ Perhaps he perceives the worry and anxiety in their faces. Feelings are complex; also emerging from within him may be fear of his own mortality, and a guilty relief—with a surge in energy—in response to being spared the accident himself and remaining unharmed.”

(Mayer et al. 2008, *American Psychologist*, p. 506)

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1. Introduction

As the opening statement indicates, perceiving emotions is key to many aspects of our everyday social life. Most interactions—even trivial ones—are tinged by emotion. Whether it is a salesperson who tries to convey their enthusiasm for a product, a loved one who is complaining about their problems, or a person who is visiting a friend in the hospital, emotions have an important role in everyday human communication. Therefore, emotion decoding accuracy (EDA), the accurate identification of emotions, plays a vital role in regulating personal and social relationships (Manstead et al. 1999). It facilitates coordination with others, enhances communication in general, and serves as a crucial element of the “affective glue” that binds individuals in dyadic interactions (Feldman et al. 1991; Niedenthal and Brauer 2012). Emotions can manifest through various channels, including voice, body posture, gestures (e.g., Bänziger et al. 2009), and tactile cues (Hertenstein et al. 2006). However, facial expressions are among the most extensively researched sources of emotional communication.

In this vein, the ability to perceive and understand the (facial) emotion expressions of others is a core social skill in the emotional intelligence framework (Salovey and Mayer 1989–1990). Emotional intelligence (EI) is conceptualized as a set of cognitive abilities involved in monitoring one’s own and others’ emotions, cognitively discriminating among emotions, and using emotions in thinking and behavior (Mayer et al. 2008). The concept of

emotional intelligence, initially broadly popularized (Goleman 1995), has captivated the scientific imagination of social scientists for more than three decades since its inception (Salovey and Mayer 1989–1990). At the theoretical level, EI reflects the extent to which a person attends to, processes, and acts on information of an emotional nature, intrapersonally and interpersonally. As such, a key facet of the EI concept has been its social dimension.

EI theorists (see Matthews et al. 2007) generally cite Thorndike as one among the first to acknowledge the existence of a form of social intelligence, specifically, “the ability to understand and manage men and women, boys and girls—to act wisely in human relations” (Thorndike 1920, p. 228). However, with notable exceptions (e.g., Lopes et al. 2004; Moeller et al. 2014), this theoretical conjecture remained largely untested as the EI literature has taken a predominantly intraindividual differences approach while downplaying the interpersonal and social dimensions of EI abilities. As we will explain later, this criticism applies more than anything else to EDA and emotion recognition abilities, which is the focus of this article.

The present paper reviews the current approach to the study of emotion perception within the EI-related literature. We argue that the way that EDA has been conceptualized and operationalized within EI abilities research has downplayed the social dimension and social functions of EDA and related EI abilities and ignored developments in social perception theory and research. These developments point, on one hand, to the importance of showing emotion expressions in a social context and, on the other, to the need to reformulate the definitions of emotion decoding accuracy and inaccuracy. The present paper outlines the relevance of context in the framework of a truth and bias model of EDA. In doing so, we will emphasize research on facial expressions of emotions in humans. However, it should be noted that the basic points we are making regarding a contextualized assessment of emotion expressions are presumed by us to be equally applicable to other emotion communication channels.

2. Emotion Perception as Part of EI Abilities Set

Emotion perception is a fundamental human capacity for at least one additional, theoretical, reason. It is the key emotional ability upon which other emotional abilities (those under the emotional intelligence remit (emotion facilitation, understanding, and management) are thought to be built (Joseph and Newman 2010; Mayer and Salovey 1997). Emotion perception is generally defined as the ability to attend to and cognitively process the emotion expressed by another person verbally, facially, with the body, or by using a combination of these modalities (Elfenbein and MacCann 2017; Olderbak and Wilhelm 2017). Emotion perception ability has been suggested to have evolutionary roots and affinities with empathic and emotion communication processes (e.g., Buck 1984) and has been described as the most basic of the skills that constitute emotional intelligence (Salovey and Grewal 2005). As defined by Mayer and Salovey’s (1997) ability model, emotion perception refers to “the ability to identify emotions in oneself and others, as well as in other stimuli, including voices, stories, music, and works of art” (Brackett et al. 2006, p. 781).

Although the EI ability model takes a broader stance on emotion perception by including the basic ability of registering emotional stimuli in self and others (Joseph and Newman 2010), in this article we will focus on the part of emotion perception ability that concerns the facial emotion expressions of others. As such, EDA is related to, although distinct from, cognate but broader constructs such as interpersonal sensitivity, defined as “accuracy in noticing and recalling another’s nonverbal cues, speech content, or physical appearance” (Hall et al. 2009, p. 150), emotional competence (Saarni 1999) or affective social competence, the sending and receiving of affective messages and experiencing affect (Halberstadt et al. 2001), or social intelligence more broadly (Weis and Süß 2007).

As an ability, EDA is a specific skill, part of a broader set of social cognitive abilities related to inferring psychological states from social perception.¹ Elfenbein and MacCann (2017) point to Carroll’s (1993, p. 4) definition of an ability as “some kind of performance, or potential for performance with a clear end performance criterion.” Applying Carroll’s

definition to EDA, it is crucial to clarify what the performance criterion is in each case. In most assessments of EDA, such as the Faces parts of the Diagnostic Assessment of Non-Verbal Abilities (DANVA, Nowicki and Duke 2001), the Profile of Nonverbal Sensitivity (PONS, Rosenthal et al. 1979), the Multi-modal Emotion Recognition Test (MERT, Bänziger et al. 2009), the Geneva Emotion Recognition Test (GERT, Schlegel et al. 2014), and the Japanese and Caucasian Brief Affect Recognition test (JACBART, Matsumoto et al. 2000), or the Reading the Mind in the Eyes Test (Baron-Cohen et al. 2001), there is a pre-determined ‘ground truth’ criterion. In the case of the Mayer—Salovey—Caruso Emotional Intelligence Test (MSCEIT, Mayer et al. 2003) Faces Perception Test the criterion is either an ‘expert judgment’ or a culture-level consensual agreement within a stimulus set.

For these and other assessments of EDA, participants are usually presented with contextless, prototypical facial expressions drawn from standardized sets of facial expressions (PAF, Ekman and Friesen 1976; KDEF, Lundqvist et al. 1998; ERI, Scherer and Scherer 2011), or with (facial) recognition tasks (DANVA, Nowicki and Duke 2001; JACBART, Matsumoto et al. 2000; PONS, Rosenthal et al. 1979; GER [faces], Schlegel and Mortillaro 2019); MSCEIT [faces], Mayer et al. 2003). Typically, participants are required to select from a list of emotion labels the one that best describes the depicted emotional expression. The label is considered accurate when it matches with the researcher-determined label. That is, decoding accuracy is usually defined as the ability to associate one (correct) label with a single emotion expression shown without social context. Notably, the MSCEIT [faces] part allows for multiple emotions to be indicated.

As such, the typical measurement procedure does not engage participants’ social competences and ignores the important impact of context for emotion recognition (Barrett et al. 2011; Hess and Hareli 2016). A second important drawback of this approach is that the underlying definition of what constitutes accuracy in decoding emotion is limited. In what follows we will outline the importance of these two aspects—the inclusion of context and the definition of accuracy for a conceptualization of EDA that is useful for the prediction of real-life social outcomes.

3. Two Ways to Decode Emotions

In our view, the fundamental problem with traditional approaches to measuring EDA is the (often implicit) assumption regarding how people decode expressions. Specifically, the tests assume that pattern matching is the only relevant underlying process. Pattern matching associates specific features of the expression with specific emotions (Buck 1984). For example, upturned corners of the mouth or lowered eyebrows are recognized as smiles or frowns, respectively, and a perceiver can, thus, conclude that the individual is happy or angry. This assumption then justifies that participants are presented with contextless faces, often even with hairlines removed, to better show-cast these informative elements. The perceiver’s task is to match a label to a perceived constellation of features without consideration of the context and expresser. This process can be conceived of as a cognitive task that does not rely on the perceiver’s wider social knowledge but only on knowledge about specific facial configurations, similar to the approach used by facial expression recognition software.

Specifically, there is a second process, which is based on the perceiver’s social knowledge: perspective taking. Perspective taking can be used to justify an observed expression after the fact, such as when we try to explain to ourselves why a friend flew into a rage at a seemingly innocuous comment but can also be used to deduce the likely expression of someone who experiences an event. For example, learning that someone received good news allows the prediction that the person is now happy rather than disappointed. Another source of information is the social group membership of the expresser. People hold stereotypes about members of different groups and these stereotypes can inform emotion perception (Kirouac and Hess 1999). We propose that, in most situations, observers use this form of perspective taking and their accumulated emotion knowledge to actively make sense of the expression in its context. Such a process involves social knowledge

engagement. That is, to be able to use pattern matching to deduce emotional states based on facial expressive information in context, participants engage in social cognition and use theory of mind.

In this vein, a recent study (Antypa et al. 2023) demonstrated that emotion expressions that are presented in a social context, together with the use of scalar judgments, activated brain regions associated with theory of mind and social information processing, whereas the process of applying single labels to contextless stimuli did not. Notably, the target of the task was always the same person, showing the same expression; what differed was the presence of others in the image and the type of rating task. Only the perception of expressions in a group-embedded setting was associated with extended brain activations, in accordance with evidence from social cognition research (Arioli et al. 2021).

We do not claim that people never use the cognitive puzzle approach in real life—they very much do, for example, when pointing out expressive features in a picture, such as a sympathetic smile or an ironic look; however, we claim that perspective taking is ubiquitous in everyday social contexts.

4. What Is Emotion Decoding Accuracy? A Truth and Bias Model

Accepting that there are two different processes involved in EDA (pattern matching and perspective taking) leads to a second important issue—how to define accuracy. This question seems simple and straightforward at first glance, but how one defines accuracy has far reaching consequences for the conclusions one can draw (Funder 1995; Kruglanski 1989; Zaki and Ochsner 2011). The general problem with any performance-based measure is the establishment of the correct answer or ground truth (Funder 1995). For emotion expressions there are several options. For example, a label can be derived from the expressive parameters for a given prototypical emotion described by Ekman and Friesen (1976). Alternatively, a label could be derived from the emotion the expresser felt during the expression (Levenson et al. 1991). The MSCEIT proposes two criteria to establish the correct answer: judgments by experts and the consensus of participants from a given culture (see also Mayer et al. 2003). However, in all these cases accuracy is based on the notion that there is one and only one correct answer. That is, emotion expression is presumed to reflect a single “pure” emotion within a given cultural context (even if the specific label may vary by culture) and that the decoders are accurate when they are able to decode that given expression.

We contend that the assumption that a single emotion label adequately describes an emotion expression is problematic. First, it is not certain that in the abovementioned methods the portrayed expressions are “pure” representations of a given emotional state. Second, even if one assumes that a test succeeds in capturing “pure” emotions, there is good evidence that these “pure emotion” stimuli would not be perceived as such. Specifically, observers tend to perceive multiple emotions even when judging emotional expressions considered to be “pure” (Russell and Fehr 1987; Yrizarry et al. 1998). These mixed perceptions may be based on different sources such as facial morphology. For example, Hess et al. (2012) showed that, amongst other factors, the wrinkles and folds in older faces add to the mixed perception of “pure” expressions. Another source of mixed perception is linked to personality. For example, individuals with more insecure attachment tend to over-attribute negative affect to peoples’ facial displays (Magai et al. 2000). Therefore, it is unlikely that a single label adequately captures perception even when “pure” emotion expressions are used in emotion recognition tests. This is even more of an issue in everyday interactions in which more subtle and ambiguous expressions are used that are more open to interpretation (Ekman 2003; Motley and Camden 1988) and, consequently, require more sense-making efforts.

Moreover, when people choose only one label out of several, only one form of inaccuracy can be assessed: mistaking one emotion for another. This approach has been criticized by Lyusin and Ovsyannikova (2016) who suggest the use of a multidimensional response format or scalar rating scales where participants are asked to indicate all the emotions they

can discern in an expression (see also, Matsumoto 2005). Scalar rating scales can better capture the actual perception process by allowing the observers to describe emotions as mixed rather than pure. Unlike the misclassification of emotions in a constrained choice task, this type of inaccuracy does not inevitably lead to a tradeoff where greater accuracy equates to reduced inaccuracy.

We argue that the ability to accurately perceive “secondary” emotions, which we refer to as “bias”, is theoretically independent from the ability to accurately perceive the target emotion. That is, the fact that someone perceives some level of sadness in an expression that is primarily considered to express anger does not have to influence the perception of anger. However, in this case, the fact that sadness is also identified is very relevant as there are good reasons why this tendency should show a link to individual differences as we will outline below.

We interpret accuracy and bias as defined above, in line with the truth and bias model of social perception (West and Kenny 2011). This model posits accuracy and bias in social perception as two theoretically distinct processes; bias is considered to arise from systematic factors that influence perception and is distinct from error. Furthermore, both bias and accuracy serve a social purpose. Thus, bias, the perception of secondary emotions, is not simply the opposite of making accurate judgments about the target emotion. Instead, biased perception (secondary emotions) and accurate perception of the main emotion signal can be seen as two dimensions that coexist and impact emotion perception (Kenny 2011).

5. How ‘Social’ Is EI—Emotion Perception Ability?

The second important issue in traditional EDA approaches has been the neglect of social context. Critically, the EI ability approach has considered emotion perception from an intraindividual perspective, neglecting the social context in which emotion perception takes place. We contend that this neglect of context explains why the evidence base for the social correlates of EDA from an abilities perspective is thin.

Notably, even though some studies that take a broader, personality-based approach around trait or mixed models of EI (Petrides and Furnham 2003) find that self-reported emotion perception ability is related to more socially supportive relationships with friends and family members (e.g., Ciarrochi et al. 2001), for the most part the evidence that emotion perception ability has real-world consequences is far from overwhelming.

Much of the supporting evidence for social correlates of EDA comes from the organizational behavior literature and mostly using methods related to but distinct from the emotion perception task of the MSCEIT. Rubin et al. (2005) found leaders’ performance on the DANVA predicted transformational leadership behavior at a moderate level. In a negotiation study simulating undergraduate buyers and sellers (Elfenbein et al. 2007), emotion perception accuracy was measured using the Singapore Picture Scale, a test similar to the JACBART (Matsumoto et al. 2000). Better emotion perception on the part of sellers increased the amount of money gained overall by the negotiating pair and was marginally related to the proportion of money received by the seller individually. Buyers’ emotional perception showed no effect. Further, emotion recognition capacity measured using a version of the GERT (Schlegel et al. 2014) was positively related with both peer status and friendship quality in Chinese primary school children (Wang et al. 2019), thereby providing evidence of its interrelatedness with the interpersonal interactions of children.

Further, evidence for a relationship between emotion recognition ability and personality traits with presumed relevance for social interaction skills is very sparse. Agreeableness, a prosocial personality trait, was associated with employees’ higher scores on the MSCEIT faces scale, especially for persons with higher power (Côté et al. 2011, study 3). Prosocial traits, such as Social Value Orientation (SVA, Murphy et al. 2011) showed a limited, non-significant association with an EDA task, the identification of emotion expression from composite faces (Kaltwasser et al. 2017). The poverty of this research record, given not only the theoretical arguments but also the definite face validity of the notion that EDA

should be somehow related to social outcomes, is a clear sign of a problem in measuring the underlying concepts.

6. The Role of Context

As noted above, we posit that in most everyday situations people use perspective taking to understand the emotions of others. This process depends on rich stimuli that allow people to perceive the expresser in a social context. Although it is widely understood that emotion perception rarely works context-free in real life (Barrett and Kensinger 2010; Hess and Hareli 2018), emotion perception research has typically used context-free facial expressions as stimuli. Even more surprisingly, emotion research has largely ignored the most common form of context we experience in everyday life: other people (Matsumoto and Sung Hwang 2010). Because emotions usually occur in social (real or imagined) interactions, the presence of other people is a feature that is common to many emotion-provoking eliciting contexts. Yet, the presence of other people has mainly been considered from a cultural perspective (e.g., Kafetsios and Hess 2015; Masuda et al. 2008), when in fact it is a ubiquitous element of everyday interaction. The facial expressions of bystanders to an event can influence how the event itself is perceived (Hess and Hareli 2018), and the facial reactions of recipients of an expression can affect the meaning attributed to the expression (Hareli and David 2017).

Presenting participants with emotion expressions shown by a group of individuals provides an important and very relevant “social framing” for the EDA task. This social framing promotes the use of perspective taking which, in turn, infuses the perception process with “biases” that reflect the personality and values of the perceiver. In this sense, “biases” are not to be equated with errors as they constitute an expression of the perceiver’s social cognition and personality. This point will be discussed in more detail below.

7. A Social Cognitive Model of Decoding Emotion Expressions

To summarize, we contend that emotion perception is based on multiple sources of information, including the expression displayed, contextual cues, and the observer’s social schemas (Hess and Hareli 2016). In real-life situations, the perception of emotions rarely occurs in isolation from contextual factors (Hess and Hareli 2016). In complex situations where the social perception of more than one emotion is plausible, we can expect people to also perceive more than one emotion. In traditional EDA research these additional emotions are considered to be “noise”—the use of context-free minimalistic expressions devoid of even hairline was an effort to reduce this “noise”. However, we argue that the tendency to inaccurately perceive bias in the form of “secondary” emotions is theoretically independent of the accurate perception of the signal, which is the target emotion (West and Kenny 2011). Both accuracy and bias can have independent and meaningful implications for interpersonal interactions (Kenny and Acitelli 2001). For example, a person with low signal perception may misinterpret the emotional state of the other person, leading to inappropriate reactions that irritate the angry person. In contrast, a person who shows both high accuracy and high bias may correctly perceive the anger but also perceive it to be influenced by additional emotions such as sadness or disgust, and in reacting to these perceived emotions may create a somewhat strained and uncomfortable interaction.

The truth and bias model (West and Kenny 2011) highlights the importance of considering both accuracy and bias in research on emotion perception. This model suggests that bias results from systematic factors that influence perception and both bias and accuracy have social functionality that can be empirically tested. Based on these considerations we propose the Assessment of Contextualized Emotion (ACE, Hess et al. 2016; Kafetsios and Hess 2013, 2015, 2022) as new approach to EDA. We contend that this approach can establish deeper connections between social cognition and accuracy processes, as proposed over ten years ago by Zaki and Ochsner (2011).

8. The ACE Model for EDA

The Assessment of Contextualized Emotion (ACE) situates expressers within the context of other individuals. Specifically, participants see a central expresser surrounded by two other individuals who were filmed during an interaction. Their task was to narrate an event that elicited a given emotion (anger, happiness, sadness, disgust) and which they had experienced together. This type of activity typically elicits the narrated emotion (Rimé 2009). From these interactions, still frames were selected from groups that reported having felt the emotion during the narration.

The stills were modified such that two individuals in the periphery express congruent or incongruent emotions with respect to the central person's expressions that are to be decoded. Typically, the presence of others is a common contextual element that primes social processing modes. Observers rate the intensity of those expressions on an emotion profile, using several dimensional scales to indicate the intensity of a series of emotions, some of which do not correspond to the depicted emotions by the central character (see Figure 1). ACE accuracy is the average rated intensity of emotion shown by the central person, whereas bias is the average intensity of all other emotion scales (see Figure 2). Perceived intensity is a valid indicator of accuracy and the low-to-mid intensity expressions selected correspond well to spontaneous real-life expressions (Hess et al. 1997).

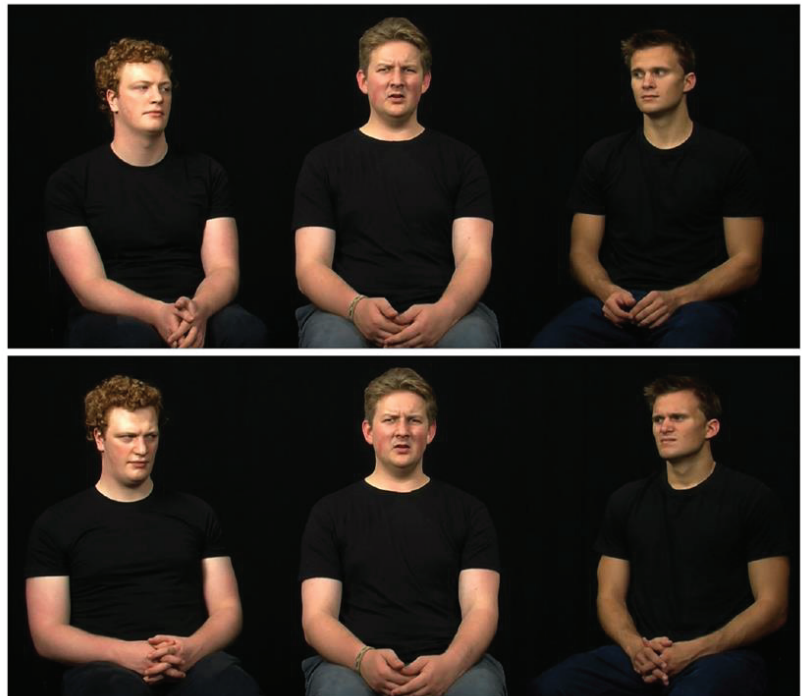


Figure 1. Example from the ACE stimuli set.

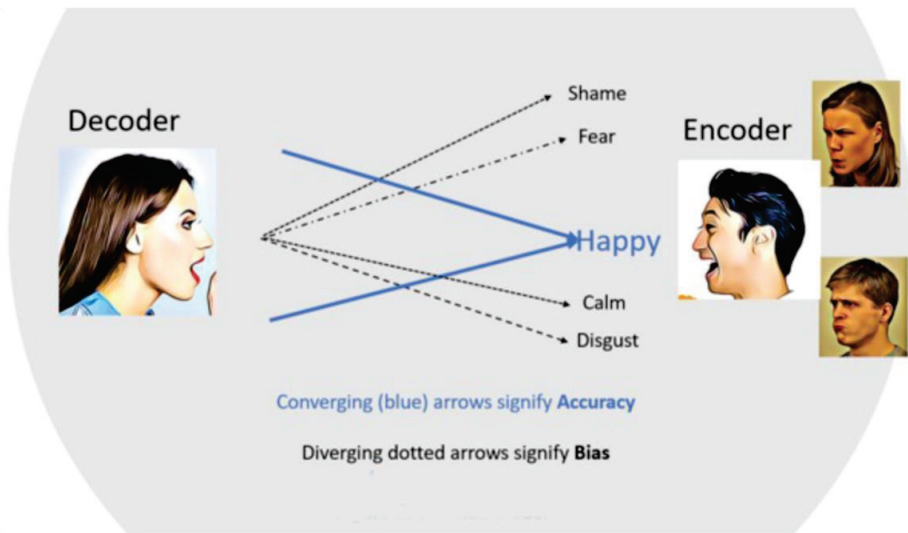


Figure 2. Graphical depiction of the ACE model.

Thus, the ACE method creates an assessment context that permits the differentiation between accurate evaluation of the presented focal emotions (accuracy) and the simultaneous evaluation of nonpresented, secondary emotions (bias). As is demonstrated in the next section, accuracy and bias can be considered as largely independent EDA dimensions. Additional information about the ACE model and stimuli can be found in Hess and Kafetsios (2021) and Kafetsios and Hess (2022), and the ACE stimuli can be obtained upon request from the authors.

9. Contextualized Emotion Perception and Its Social, Personality, and Cultural Correlates

Several studies from our laboratories have shown that ACE accuracy and bias have unique, measurable, and meaningful effects for social interaction. A first set of three studies, two conducted in Greece and one in Germany (Hess et al. 2016), provided initial evidence for a link between ACE measures and indices of everyday social interaction quality. Participants completed the ACE task in the laboratory and then participated in an event sampling study focused on all meaningful dyadic interactions over a 10-day period. ACE accuracy and bias predicted self-reported parameters of interaction quality, whereas MSCEIT faces (Mayer et al. 2003) did not. Specifically, ACE accuracy in Greece was associated with higher social interaction quality indicators for interactions with close others (partners, close friends, or family), whereas ACE bias was associated with lower social interaction quality, especially within close relationships. In Germany, higher ACE accuracy was associated with all social interaction quality indicators across levels of intimacy (Hess et al. 2016). Importantly, ACE accuracy and bias were unique predictors of social interaction quality. The unique effects of ACE accuracy and bias on social interaction quality imply that one can be simultaneously both accurate and biased, which is in line with the truth and bias model of social perception (West and Kenny 2011).

In a more recent study (Kafetsios and Hess 2019), ACE bias was associated with alexithymia, the difficulty in identifying and describing emotions, and both alexithymia and ACE bias contributed to problems in everyday dyadic interactions and relationships. Participants completed the Toronto Alexithymia Scale (TAS) and the ACE task in a laboratory session, followed by a 10-day event sampling study on the quality of their naturally occurring social interactions. The Difficulties in Identifying Feelings (DIF) subscale of the TAS was negatively related to all indices of quality of social interaction, and DIF was

positively and moderately strongly correlated with bias. Importantly, ACE bias was found to mediate the effects of DIF on social interaction outcomes.

These results suggest that bias as measured in the ACE task can tap into the lack of attunement in dyadic social interactions observed in people with alexithymia. Such a lack of attunement in everyday social interactions should also influence wellbeing. Indeed, Kafetsios et al. (2023a) have documented in two studies that ACE accuracy contributes to overall wellbeing through the quality of social interaction. These findings highlight the importance of considering contextualized measures of emotional functioning in understanding social interaction and wellbeing.

Incidentally, several of the above studies, which used different versions of the ACE task, have provided consistent evidence that the standard way to assess emotion perception ability in the EI framework, the MSCEIT face part, is negatively related to ACE bias and not related to ACE accuracy. In three studies, two in Greece and one in Germany, the MSCEIT face part was inversely related to ACE cartoons and ACE faces bias ($r(165) = -.44$, $p < .01$; $r(84) = -.50$, $p < .001$; $r(122) = -.48$, $p < .001$, respectively; Hess et al. 2016 studies 1, 2, and 3). In a larger study with Greek participants (Kafetsios and Hess 2022, Study 7), the MSCEIT faces part was negatively associated with bias assessed by a short version of the ACE faces, $\beta = -.71$, $p < .001$. In none of these studies were the MSCEIT faces scores significantly related to the ACE accuracy scores. MSCEIT faces scores also failed to predict the quality of social interaction (Hess et al. 2016) as well as prosocial personality traits (Kafetsios and Hess 2022).

This is a remarkably consistent pattern of results that largely informs our understanding of the nature of the ACE model. It stands to reason that the MSCEIT faces and the ACE bias tap into more stereotypical, culturally shared biases in emotion decoding. A big part of EI and emotion perception is based on emotional knowledge (Izard 2001) and this emotional knowledge can vary as a result of culture or personality differences.

Another set of studies looked at the prosocial personality characteristics associated with ACE accuracy and bias. In seven studies conducted in two laboratories in Greece and Germany (Kafetsios and Hess 2022), we tested relationships between the ACE and personality traits that tap into the social domain. ACE accuracy was associated with more emotion reappraisal, less emotion suppression, less loneliness, and higher wellbeing. In turn, ACE bias was associated with less emotion reappraisal, more insecure attachment, and a more interdependent self-construal. Importantly, a traditional hit rates approach (associating one correct label to a single emotion expression) did not show the same associations.

The results for insecure attachment were partly replicated in a large sample of 2240 participants from 12 different cultures (Kafetsios et al. 2023b) who completed the short version of the ACE and the Experiences in Close Relationships (Fraley et al. 2000), a standard self-report measure of adult attachment organization. Anxious attachment was associated with both more accuracy and more bias, whereas avoidant attachment was associated with less accuracy and more bias. Importantly, neither avoidance nor anxiety were associated with EDA assessed via classic hit rates. That is, associating one correct label to a single emotion expression did not provide the same information as the contextualized assessment of emotions in terms of accuracy and bias. These results speak to the independence of accuracy and bias in line with the truth and bias model (West and Kenny 2011).

Lastly, using an early version of the ACE task, results from two experimental studies in Greece (Kafetsios and Hess 2013, 2015) suggest that chronic and temporarily raised independent self-construal increased accuracy in the ACE task. This effect is primarily understood in social-cognitive terms: because independent self-construal (chronic or naturally varying) is associated less with interdependent self-construal with more attention to context (Masuda et al. 2008), more interdependent observers are more likely to integrate perceptions of the surrounding faces into their judgment and, thereby, increase bias.

Based on the above, we also expected that higher social class will be associated with higher accuracy in the ACE task because higher SES is associated with a more independent self-construal (Miyamoto et al. 2018). This is because higher social class individuals are

considered to focus more on the self, whereas lower class individuals tend to pay more attention to the social context. In the aforementioned recent multicultural study (12 cultures $N = 2440$, Kafetsios et al. 2023a) in Europe, Northern America, and Southern and Eastern Asia participants completed a self-construal scale (Singelis 1994), and the MacArthur Subjective Social Status Scale (SSS, Kafetsios et al. 2023a). SSS was found to be associated with higher accuracy in decoding emotions (but not less bias) and this association was mediated by independent self-construal. Parental education level, an objective index of social class, was associated with less bias.

10. Conclusions

In this article, we present a critique of the standard ability approach to emotion decoding accuracy (EDA). This approach, which relies on tests that use prototypical faces out of context, fails to capture the nuances of everyday social interaction skills. We argue that the conceptualization and operationalization of EDA in emotional intelligence research have not kept pace with advancements in social perception theory and research. These advancements highlight the significance of social context in assessing EDA and redefine the meaning of accuracy and bias in EDA within the framework of a truth and bias model of the social perception of emotions. This approach emphasizes the usefulness of accuracy in social emotion perception and its adaptive social value, as demonstrated by ACE accuracy and bias's ability to predict various social functionality correlates. As such, we consider the ACE to be a better-suited alternative to the use of the MSCEIT faces for EI research interested in the interpersonal sequelae of emotion recognition ability.

In the above cited research, we have started to address links between ACE assessed EDA and personality on one hand and some aspects of social interaction quality on the other. However, much of this research involved simple questionnaires and cross-sectional samples. Additionally, the developmental aspect of EDA was completely neglected. This implies a rich field for future research that considers assessments of personality through peer ratings and longitudinal assessments. Conversely, the use of state measures of personality and of observed interactions in the laboratory can allow for a more fine-grained analysis of the relationship between personality, EDA, and interaction behavior. Furthermore, the ACE focuses only on facial expressions and uses still frames. Future versions should use dynamic (video) stimuli and the inclusion of other channels. In short, using the ACE model to develop more refined tests and applying these to the wide field of social interactions opens a rich avenue of potential research.

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Note

- ¹ The evidence for the internal consistency across emotion perception abilities is mixed. On the one hand, as Elfenbein and MacCann (2017) note, different emotion perception tasks positively relate to other facets of EI, such as emotion understanding (see Ferguson and Austin 2010; Libbrecht and Lievens 2012; Vonk et al. 2015). On the other hand, Joseph and Newman's (2010) meta-analysis found only moderate evidence for a link between emotion perception and intelligence ($\rho = .10$). Yet, this link is one of Mayer and Salovey's (1997) criteria for justifying EI as an intelligence.

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Review

Embracing the Emotion in Emotional Intelligence Measurement: Insights from Emotion Theory and Research

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Abstract: Emotional intelligence (EI) has gained significant popularity as a scientific construct over the past three decades, yet its conceptualization and measurement still face limitations. Applied EI research often overlooks its components, treating it as a global characteristic, and there are few widely used performance-based tests for assessing ability EI. The present paper proposes avenues for advancing ability EI measurement by connecting the main EI components to models and theories from the emotion science literature and related fields. For emotion understanding and emotion recognition, we discuss the implications of basic emotion theory, dimensional models, and appraisal models of emotion for creating stimuli, scenarios, and response options. For the regulation and management of one's own and others' emotions, we discuss how the process model of emotion regulation and its extensions to interpersonal processes can inform the creation of situational judgment items. In addition, we emphasize the importance of incorporating context, cross-cultural variability, and attentional and motivational factors into future models and measures of ability EI. We hope this article will foster exchange among scholars in the fields of ability EI, basic emotion science, social cognition, and emotion regulation, leading to an enhanced understanding of the individual differences in successful emotional functioning and communication.

Keywords: emotion theory; emotional intelligence; ability EI; EI measurement; emotion regulation; emotion recognition ability; interpersonal emotion regulation; emotion understanding; emotion management

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1. Introduction

Over the past three decades, emotional intelligence (EI) has gained significant popularity as a scientific construct. It has entered the lexicon of everyday conversations to describe people who demonstrate adeptness or struggle when navigating emotionally charged encounters with others. Despite “rumors of the death” of EI in its early years due to problems with its conceptualization and measurement (Ashkanasy and Daus 2005), research in the field continues to thrive (e.g., Dasborough et al. 2022). However, the conceptualization and measurement of EI still face limitations, with many early criticisms (e.g., Locke 2005) remaining relevant today (Dasborough et al. 2022). For example, problems with defining objective scoring criteria and establishing construct validity in performance-based EI tests have already been discussed by Brody (2004), Geher and Renstrom (2004), Matthews et al. (2002), or Pérez et al. (2005).

In the present paper, we argue that this problem is still present and partly stems from a lack of theoretical foundation within existing EI tests. We propose avenues for future advancements in EI measurement by connecting some of the main EI components to models and theories from the broader emotion literature and by suggesting ways in which this literature can inform the development of novel and improved measures of EI.

Specifically, the present paper focuses on the assessment of ability EI, which is one of the two dominant EI approaches (see Fiori and Vesely-Maillefer 2018 for a review). Ability

EI refers to a set of cognitive skills related to emotions, including “the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth” (Mayer and Salovey 1997, p. 5). Measuring such skills requires performance-based tests and emotion-related tasks with correct and incorrect (or more and less effective or adaptive) responses to capture “maximal performance.” For example, typical ability EI measures include judging which emotion was expressed in a picture or what action would best reduce one’s anxiety in a particular situation (situational judgment approach).

In contrast, the second dominant EI approach refers to self-perceptions of emotional skills. Trait EI “essentially concerns people’s perceptions of their emotional world” and is rooted in personality research (Petrides et al. 2016, p. 335). Trait EI models vary substantially in the number and skills they consider and, therefore, each requires specific self-report instruments with items reflecting the skills included in the model. Nevertheless, all trait EI instruments target the test-takers’ propensity to behave in a certain way (“typical performance”, Sarrionandia and Mikolajczak 2020). This conceptualization requires self-report measures that present general context-free statements asking about people’s subjective self-perceptions.

Though both trait and ability EI conceptualizations have advantages and limitations, researchers have highlighted that ability EI aligns more closely with the term EI (e.g., Cherniss 2010; Roberts et al. 2010). It maintains a narrower focus on emotions than the broader trait EI approach, which encompasses other concepts from positive psychology, including well-being and optimism. Additionally, ability EI is associated with intelligence, whereas trait EI is not (Roberts et al. 2010). Nevertheless, after three decades of research, only a limited number of scientifically validated ability EI tests exist.

The most widely used test is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer et al. 2003), in which participants judge the appropriateness or effectiveness of actions or emotion labels in pictures or vignettes describing emotional situations. Other widely used tests are the Situational Test of Emotional Understanding (STEU) and the Situational Test of Emotion Management (STEM; MacCann and Roberts 2008). Like the MSCEIT, they use a situational judgment approach where participants choose an emotion label to describe an emotional situation (STEU) or an effective action for regulating an emotion in a vignette (STEM). Though several other ability EI tests exist, such as the Test of Emotional Intelligence (TIE; Śmieja et al. 2014), the Audiovisual Test of Emotional Intelligence (AVEI; Zysberg et al. 2011), and the Test of Emotional Intelligence (TEMINT; Bickle et al. 2011), they are notably less utilized (see review by Bru-Luna et al. 2021). More recently, the Geneva Emotional Competence Test for the Workplace (GECO; Schlegel and Mortillaro 2019) has been developed.

The most common EI components across these tests are emotion perception/emotion recognition (the ability to identify and differentiate between emotions in oneself and others), emotion understanding (the ability to comprehend complex emotional states, transitions, and the causes and consequences of emotions), and emotion regulation/management (the ability to manage and respond to emotions in oneself and others effectively). These are the central ability EI components across different conceptualizations and taxonomies (e.g., Elfenbein and MacCann 2017; Mayer et al. 2016; Schlegel and Mortillaro 2019; Vesely Maillefer et al. 2018).

As we will show in this article, a vast amount of the literature exists outside of the EI domain for each of these components, and the general emotion science literature can be readily linked to them. However, the ability EI conceptualization, research, and assessment developed independently from the general emotion science literature. Though this may sound surprising, we can suggest some reasons for this separation: different research methods (laboratory studies vs. testing), different goals (basic research vs. applied research), and a critical approach toward the concept of EI in the emotion literature.

Nevertheless, this is probably one of the most surprising and unjustified separations between bodies of literature in psychology. Besides a few notable attempts (Fontaine 2016; MacCann and Roberts 2008; Peña-Sarrionandia et al. 2015), most empirical studies on EI and the measures they use refer only to other EI studies, with very little integration of the emotion literature despite that this problem was already pointed out more than twenty years ago (Matthews et al. 2002). With this paper, we would like to indicate how research on emotions and related fields can and should be the foundation of future EI assessments for each of these specific EI components.

2. Emotion Understanding

Emotion understanding competence refers to the ability to reason about the antecedents of the emotional experience and its implications for the person's behavior. According to Mayer and colleagues (2016), emotion understanding is a higher-order competence that groups several areas of reasoning; among others, we can list labeling emotions and recognizing relationships among them, as well as appraising the eliciting situation, predicting how a person might feel in certain conditions, and recognizing cultural differences in the evaluation of emotions.

2.1. How Definitions of Emotion Can Inform the Assessment of Emotion Understanding

Modeling emotion understanding and its measurement requires a clear and coherent theoretical framework that defines emotions, their components, and their implications. Unfortunately, this theoretical reasoning is often left implicit by researchers whose primary focus is creating a psychometrically sound measure. For example, in MSCEIT subtests for emotion understanding, the authors did not refer to any theoretical model to justify how they created the items and response options and how the correct response was defined. Concerning this last point, they relied on "expert scoring", which is undoubtedly meaningful, but has several shortcomings, especially when experts are difficult to define or they disagree with each other (Barchard and Russell 2006). For these reasons, we think that theoretical grounding should be critical for building and scoring emotion understanding tests (see also Hellwig and Schulze 2021).

The emotion literature suggests three main theoretical views that can help define and measure emotion understanding. First, basic emotion theory (Ekman 1999; Keltner et al. 2019) is the approach used by most studies in emotion psychology and can be considered the standard in emotion recognition measurement, even in instruments that do not explicitly adopt this view. In a nutshell, according to this view, emotions are distinct categories, and it is possible to attribute a precise label to a specific emotional state. This conceptualization is implicit whenever one asks to label a scenario or an expression by choosing one particular emotion label. It is crucial, though, to understand that for many researchers, this is not an endorsement of the idea that emotions are universal and discrete, but a pragmatic way to access the knowledge about when emotions are experienced and how they are expressed.

Second, dimensional theories of emotions propose that emotions can be understood and classified based on a small number of underlying dimensions. Russell (1980) introduced the circumplex model, which posits two primary dimensions in the emotional space: valence and arousal. Valence refers to the pleasantness or unpleasantness of an emotion, whereas arousal represents the level of activation or energy associated with it. Russell's model suggests that a wide range of emotions can be mapped onto a circular space defined by these two dimensions. For instance, joy and love are located in the positive valence region, whereas fear and anger occupy the negative valence region. This model provides a foundation for understanding emotional experiences in a structured manner, but, to our knowledge, has never been used explicitly to assess emotion understanding. Still, it is not difficult to imagine researchers using this approach to build valid instruments. They could ask respondents to identify the valence and activation that one person may experience in the situation described in the item instead of asking to attribute an emotion label. A similar measure of emotion understanding may be simpler than the emotion labeling approach

and valuable for clinical populations, young children, and in general in all those cases when labeling could be problematic (e.g., language difficulties, cultural variability).

Third, appraisal theory describes emotion as the result of a set of subjective cognitive evaluations that happen with or without awareness (Moors et al. 2013; Roseman 1996; Scherer 2001). In other words, it is not the events or the objects per se that elicit the emotion, but how one person appraises them. This subjectivity explains individual differences in emotional reactions, but also provides the basic framework to find commonalities between even very diverse experiences of one emotion. For example, anger can be characterized by an event appraised as goal-obstructive and unpleasant, likely caused by somebody (e.g., not casual, and due to chance), and for which the angry person has a high sense of coping. Given its flexibility and detail in explaining emotional experience, we think appraisal theory is the best candidate to model emotion understanding.

2.2. Using Appraisal Theory to Assess Emotion Understanding

A few authors have used appraisal theory to create emotion understanding tests. MacCann and Roberts (2008) chose Roseman's appraisal theory (Roseman 1996) for developing their Situational Test of Emotion Understanding (STEU). Roseman's theory defines the appraisal profiles of seventeen emotions. Based on these theoretically predefined profiles, the authors created vignettes of emotional situations that became the items of the test. Answers are defined as correct or wrong depending on the theoretical pattern predicted by the theory.

Similarly, the emotion understanding subtest of the Geneva Emotional Competence test is grounded in appraisal theory (Schlegel and Mortillaro 2019). In this case, the authors used the Component Process Model (CPM) of emotion (Grandjean and Scherer 2008; Scherer 2001, 2009). Like other appraisal models, the CPM identifies a set of appraisal dimensions that guide evaluating events and situations and generate specific emotional responses (Scherer 2001). These dimensions do not fully overlap with other models (e.g., Roseman's), directly affecting how to develop the scenarios. In the GECo emotion understanding test, the items describe scenarios that reflect the collection of appraisals that characterize an emotion according to the CPM. For example, one scenario describes "John" attending an interesting presentation and being repeatedly disturbed by his neighbor who asks him questions. Regarding appraisals, the situation is moderately relevant, the other person's behavior is obstructive but not intentionally harmful, and John has the potential to cope with the situation. This set of appraisals characterizes an experience of irritation.

This way of measuring emotion understanding implies that emotion understanding involves perspective-taking and considering all the appraisals involved. Instead of directly attributing an emotional meaning to the event or situation, a person skilled in emotion understanding should be able to infer the likely appraisal process of the other person (Mortillaro et al. 2011). Is it something unexpected for them? Is it goal-conducive or goal-obstructive? Do they think that somebody else is responsible for it? Do they feel that they can cope with the situation? Being able to make these judgments accurately shows a high level of emotion understanding and would be a possibility for phrasing emotion understanding items.

Emotion understanding in the sense of knowledge can also be measured for emotion components other than appraisals (Scherer 2009), including (1) physiological reactions that occur during emotional experiences; for instance, fear may be accompanied by increased heart rate and sweating; (2) expressive behavior, that is, the outward display of emotions through facial expressions, vocalizations, and body language; (3) action tendencies, that is, the behavioral inclinations or urges associated with specific emotions; for instance, fear may prompt a person to flee or avoid a threatening situation; (4) the subjective experience component, that is, the subjective and consciously "felt" aspect of emotions; for example, when feeling happy, an individual experiences a positive, pleasant subjective state. It is important to note that these components are interactive and interdependent, forming a

dynamic system within the emotional experience. They influence and modulate each other, resulting in a coherent emotional response.

Two recent measures demonstrated the feasibility of assessing knowledge about these four components in standard emotion understanding tests. First, the Geneva Emotion Knowledge Test (GEMOK; Schlegel and Scherer 2018) includes a subtest on measuring an accurate understanding of emotion blends through vignettes that systematically include information on all five emotion components (appraisal, expression, physiology, action tendencies, subjective feeling). It also includes a subtest that measures respondents' accuracy in judging the likelihood of features (representing all five components) to occur when a specific emotion is experienced. Similarly, Fontaine and colleagues (Huyghe et al. 2022; Sekwena and Fontaine 2018) developed the Components of Emotional Understanding Test (CEUT), which consists of scenarios built based on the CPM and cross-cultural linguistic studies (Fontaine et al. 2007; Fontaine et al. 2013). For each scenario, participants rate the likelihood of several emotions, appraisals, action tendencies, bodily reactions, expressions, and subjective feelings. In the CEUT and GEMOK, participants must reason about the whole emotion process, making them excellent examples of how emotion theory can offer innovative ways to conceptualize and assess EI skills. This approach can be used to measure other under-assessed aspects of emotion understanding, such as knowledge about cultural differences (particularly in the expression component) and accuracy in predicting future emotions (affective forecasting) or emotion trajectories (Mayer et al. 2016).

Recently, one more theoretical framework has been suggested for modeling and measuring emotion understanding: the empathic agent paradigm, consisting of two phases (Hellwig et al. 2020). In the first phase, test-takers learn about the emotion-related contingencies of a target person, that is, emotions, events, and actions. After this acquisition phase, the test takers apply this new knowledge to a novel situation involving the target person. This allows for objective scoring without assuming an absolute correct behavior, but only a more likely one based on contingencies. This approach tries to circumvent the problem of choosing a theoretical framework explicitly and, at the same time, not adopting a consensus-scoring approach. However, expecting an almost invariant behavior across similar situations for the same person implicitly assumes an appraisal approach (what matters is not the situation per se, but how the person appraises it).

3. Emotion Recognition

The ability to accurately recognize what another person is feeling from nonverbal cues (emotion recognition ability; ERA) is central to most ability-based theories, models, and taxonomies of EI (e.g., Mayer et al. 2016; Elfenbein and MacCann 2017; Vesely Maillefer et al. 2018). Specifically, ERA is assumed to contribute to the accurate understanding of the causes and implications of emotional situations (see previous section) and to the ability to influence what another person is feeling (see the section on emotion management). Perhaps because individual differences in ERA are assumed to be crucial for successfully navigating social interactions (for an overview, see Palese and Mast 2020), research on ERA and its assessment have had a long tradition dating back to the 1970s (e.g., Hall 1978).

Despite the theoretical integration of ERA in EI models, the two constructs continue to be studied relatively independently. Research on ERA is scattered across different fields of psychology and comes with various and inconsistently used labels (e.g., emotion decoding, theory of mind, emotion perception, cognitive empathy). Other fields also tend to use different ERA measures (with their respective construct labels), and there have been only a few efforts to map the terrain of ERA assessment across domains. However, such integration is necessary for at least two reasons. First, ERA tests typically have low intercorrelations and, thus, do not measure one single skill (Schlegel et al. 2017). Second, most ERA tests have been constructed in a rather atheoretical fashion and reviewing them within the context of emotion and social perception theories can benefit the creation of new and improved assessment tools.

3.1. The Dominance of Basic Emotion Theory in ERA Measurement

Within the ability EI literature, the most common assessment of ERA is the MSCEIT Faces subtest¹, in which participants rate the presence of several emotions in a series of photos of facial expressions. Most other standard ERA tests, however, use a forced choice format in which participants choose, out of a predefined set of emotion words, the option that best describes an emotional expression (typically, in a static picture of a face; for an overview, see Bänziger 2016). The expressions used in the MSCEIT and other tests are often posed by actors and limited to a few emotions. As a notable exception, the GERT consists of 14 emotions expressed by actors in videos with sound (Schlegel et al. 2014).

The widespread use of discrete emotion categories to create the stimuli and present the response options makes basic emotion theory (BET) the predominant theoretical framework for measuring individual differences in emotion recognition, that is, it is (implicitly) assumed that (facial) emotional expressions are readouts of discrete emotions with a fixed meaning and that emotions are decoded by matching sensory inputs of nonverbal cues with internal representations of distinct emotion categories, leading to the selection of the most likely emotion label (Dricu and Frühholz 2016). This approach also implies that individuals can have selective impairments in recognizing specific emotions—an idea widely studied in clinical research (e.g., Dalili et al. 2015). From a psychometric perspective, the BET approach to ERA testing has the advantage that the correct response for each item can be easily defined (it usually corresponds to the emotion the actor intended to portray). Additionally, a forced choice paradigm makes it easy to calculate ERA scores as the sum of correct choices and reduces testing time compared to rating scale items. However, the reliance on few emotion categories in terms of the stimuli and the dominance of the forced choice format have also sparked some criticism.

3.2. Going beyond a Small Set of Basic Emotions and the Forced Choice Paradigm

Concerning the stimuli and emotions used, several scholars argued that in real life, people experience and express many more than just six or seven emotions and that naturalistic expressions rarely correspond to the prototypical portrayals used in standard stimulus sets (e.g., Matsumoto and Hwang 2017). In addition, using only a few response options makes some tests very easy, restricting the measurement of ERA in the higher ability range (Kenny 2013).

Recent research on emotional expressions in the BET tradition provides a lot of potential for broadening the scope of ERA tests and increasing ecological validity. Several large-scale and cross-cultural studies have shown that perceivers can reliably distinguish 20 or more discrete emotions based on facial, vocal, and bodily expressions (e.g., Cordaro et al. 2020; Cowen et al. 2019; Cowen and Keltner, 2020). For example, Cowen and Keltner (2020) found that naturalistic facial–bodily expressions can reliably signal 28 distinct emotion categories. Although these studies do not focus on individual differences, their stimulus databases can likely be used to build new ERA assessments for different sensory modalities and a wide range of emotions.

In a different attempt to go beyond prototypical emotional expressions, Israelashvili et al. (2021) created the Emotional Accuracy Test (EAT), which consists of four videos in which a young woman talks about an emotional life event. Test-takers rate each video on ten emotions, and ERA performance is calculated as the absolute difference between the participant's and the target's own ratings on each emotion. The EAT has demonstrated strong correlations with established ERA tests, showing that using naturalistic expressions with verbal content without defining a single correct answer is a viable approach to ERA measurement.

Using emotion rating scales like in the EAT has also been suggested by others as an alternative to forced-choice testing (Fontaine et al. 2022; Hess and Kafetsios 2021). One obvious advantage is that it allows assessing accuracy in perceiving blends and complex affective states. In addition, Kafetsios and Hess (2023, in this special issue) have argued that even for “classic” pictures of discrete facial expressions, rating scales yield meaningful

psychological information beyond the traditional “percent correct” score. Specifically, this format allows distinguishing “accuracy” (intensity of target emotion) from “bias” (intensity ratings on all non-target emotions) in line with the truth and bias model of person perception by West and Kenny (2011). According to this approach, participants can be both “accurate” in detecting a target emotion and have a “bias” towards perceiving emotions not present in the stimulus. An open question is whether this model and scoring format yields meaningful information when applied to more naturalistic expressions where no clear-cut target or “correct” emotion is present.

3.3. *Going beyond Emotion Words*

Nevertheless, like more traditional ERA assessments, the EAT and other tests using emotion rating scales face another potential limitation of BET—the reliance on emotion categories. One problem with using emotion words is that their underlying meaning may differ between cultures, languages, or even age groups (Barrett et al. 2007; Hoemann et al. 2021). For example, in the GERT, English, French, and German speakers vary in their accuracy rates for sadness, despair, and anger, which might reflect cultural differences in the expression of emotions or differences in the meaning of the respective words (response options) in each language (Schlegel 2013).

According to the circumplex model of emotion (Russell 1980) and appraisal models (e.g., Scherer 2001), it would, therefore, be more appropriate to measure ERA in terms of accurate evaluations of underlying emotional dimensions (valence, arousal) and appraisals (goal conduciveness, coping potential, novelty, etc.) of the event preceding an emotional expression. According to the CPM (Scherer 2001; see also Fontaine 2016), it would also be meaningful to include ratings of action tendencies or physiological variables associated with nonverbal expressions (Mortillaro et al. 2011).

Many studies have examined the meaning dimensions underlying emotion words and nonverbal expressions (e.g., Fontaine et al. 2013; Laukka et al. 2005; Mortillaro et al. 2011; Shuman et al. 2017) and the results have been successfully implemented in the measurement of emotion understanding (CEUT and GEMOK; see previous section). Still, standard ERA assessments have not yet adopted dimensional or appraisal theories of emotion. One reason against adopting this strategy might be that emotion categories seem to have more explanatory value than appraisal dimensions for large sets of naturalistic expressions, contradicting dimensional emotion theories. For example, Cowen and colleagues (Cowen et al. 2019; Cowen and Keltner 2020) found that appraisal dimensions captured less variance in categorical judgments of facial, bodily, and vocal emotion expressions than emotion labels.

However, appraisal dimensions and other emotion components might be more readily inferred and gain explanatory power when the emotional expressions presented are more complex and embedded in a social context. One future avenue worth exploring would be to ask participants to rate appraisal dimensions underlying the emotional experience using naturalistic videos with affective content.

In addition, when naturalistic videos are used, participants could also be asked to make more complex inferences about the stimuli, for example, about what is happening in the situation or about the relationships among the individuals in the situation (Keltner et al. 2019). In fact, such assessments would be similar to tests that are already used in the clinical social cognition literature, e.g., the Movie for the Assessment of Social Cognition (MASC; Dziobek et al. 2006) or the Reading the Mind in Films Task (Golan et al. 2006). Another recent video-based test asking participants to make complex inferences about the characteristics, causes, and implications of affective situations was developed by Dael et al. (2022) in the interpersonal accuracy field (Workplace Interpersonal Perception Skill test, WIPS).

However, even though ERA tests with more diverse and complex response scales, including appraisals and other dimensions, would arguably capture emotion perception

more ecologically, the definition of what precisely they measure may become blurred (e.g., can ERA be distinguished from emotion understanding?).

3.4. (Re)Defining the Scope of ERA Tests?

Recent theoretical approaches vary widely in the role attributed to social context during emotion perception, which has important implications for measuring individual differences in ERA. For example, in their theory of constructed emotion (TCE), Gendron and Barrett (2018) propose that the stimulus-driven process of perceiving and categorizing nonverbal expressions (see Dricu and Frühholz 2016) is far less critical in real-life communication than the prediction of upcoming sensory input based on the shared situational environment of interaction partners. According to these authors, emotion perception should (only) be studied in settings where conceptual systems of emotion expressers and perceivers dynamically interact.

The empathic accuracy paradigm developed decades ago by Ickes (e.g., Ickes 2001) fits within this theoretical approach. In this paradigm, two interaction partners freely label their felt emotions when viewing a recording of their interaction. Then, they label their partner's emotions while viewing the recording a second time. The degree of correspondence between self and partner ratings is used to measure empathic accuracy. However, this procedure is very time-consuming and cannot be used as a standard test in which all participants are exposed to the same items. Thus, in this form, the TCE seems incompatible with measuring individual differences in standardized assessments.

In a more moderate approach, Kafetsios and Hess (2023, this issue; also, Hess and Kafetsios 2021) have also criticized current ERA tasks for not containing social context because stimuli usually show only one individual without situational information. In their view, existing tests lack validity because they capture cognitive rather than social perception skills. Indeed, context is an influential variable shaping emotion perception and judgment (e.g., Hassin et al. 2013). In order to "infuse" social context into ERA measurement, Kafetsios and Hess (2023) developed the Assessment of Contextual Emotions (ACE), in which participants rate the presence of several emotions in a still picture of a target person who is surrounded by two other individuals also showing an emotional facial expression. In the future, this approach could be extended to cover more emotions (the ACE stimuli are based on four emotions) and multimodal stimuli to enhance ecological validity.

In a contrasting view, Fiori and colleagues (e.g., Fiori and Vesely-Maillefer 2018) emphasized the need to develop more measures of context-free "fluid" emotion information processing skills, such as the ability to make fine-grained discriminations among emotions presented in blends (Gillioz et al. 2023). These authors have presented the first evidence that context-free basic nonverbal processing skills might have incremental validity in explaining real-life outcomes above more knowledge-based facets of EI and emotion perception (Fiori et al. 2022).

The above discussion highlights how theories of emotion and social perception can inform how ERA is conceptualized and measured beyond the EI literature. For example, depending on the adopted framework, ERA may be conceived as a set of basic emotion-processing abilities or complex language-dependent and prediction-based communication skills. Future developments in assessing ERA should be explicitly embedded in these frameworks, which will help identify the facets of emotion perception for which standard tests are missing (e.g., tests including social context). In addition, researchers using current ERA tests should be aware that most of them are implicitly based on BET and acknowledge the implications when interpreting their findings.

4. (Intrapersonal) Emotion Regulation

A necessary clarification should be made about the terminology that we use here. In the original ability EI model, emotion management refers to both interpersonal and intrapersonal emotion management (Mayer and Salovey 1997). However, the literature outside EI uses the term emotion regulation rather than emotion management, which can

lead to confusion. Furthermore, we think that intrapersonal and interpersonal emotion management should be considered as two independent components. We suggest using the term “emotion regulation” for the ability to regulate emotions in the self, and “emotion management” for the ability to regulate emotions in others (Schlegel and Mortillaro 2019). This distinction is already apparent in the literature, where research on emotion regulation predominantly refers to internal cognitive processes, such as reappraisal or suppression, as strategies for self-regulation (for example, McRae 2016; Ochsner and Gross 2008). In contrast, emotion management in others (or interpersonal emotion regulation) primarily involves behavioral strategies that necessitate anticipating others’ behaviors and engaging in interactive processes. Though it is common for emotion regulation and emotion management to be required simultaneously in real-life situations, it seems preferable to consider the two forms as separate abilities and measure them separately. Recent studies show that these two competencies have low correlations, empirically supporting the conceptual distinction (Schlegel and Mortillaro 2019; Simonet et al. 2021; Völker et al. 2023).

4.1. *The Process Model of Emotion Regulation*

Emotion regulation is considered one of the most critical EI skills, and hundreds of empirical studies contribute meaningful evidence supporting its relevance for well-being, positive life outcomes, and even health (Gross 2013; McRae and Gross 2020). Therefore, one would expect this literature to be crucial for studies focused on multi-branch EI models. Unfortunately, research on emotion regulation remained largely separated from general EI research, as discussed in recent work by Peña-Sarrionandia and colleagues (Peña-Sarrionandia et al. 2015). These authors made a remarkable effort to reconcile these two bodies of literature and highlighted the need for theoretically grounded instruments.

The Process Model of Emotion Regulation is currently the most largely supported model of emotion regulation (Gross 2013; McRae and Gross 2020; Ochsner and Gross 2008). This model postulates that individuals employ various strategies to influence their emotions’ intensity, duration, and expression. It identifies different moments when regulation strategies can be applied: focused on the antecedent or the response. Antecedent-focused strategies involve modifying the initial emotional response, whereas response-focused strategies aim to regulate emotions after they have already been experienced. Five strategies are part of this model: (1) *Situation Selection*: at this initial step, individuals can regulate their emotions by selectively choosing or avoiding certain situations or environments. For example, if someone is aware that a situation consistently triggers negative emotions, they may proactively avoid it to prevent emotional distress. (2) *Situation Modification*: in this step, individuals modify the specific features of a situation to regulate their emotions. It may involve altering the environment, adjusting the timing of an event, or changing the nature of the interaction to create a more desirable emotional experience. For instance, someone might request a change in their work schedule to reduce stress or modify the physical environment to enhance positive emotions. (3) *Attentional Deployment*: during this step, individuals, by focusing on specific aspects of a situation, can influence their emotional responses. For example, consciously shifting attention toward positive aspects of a situation or away from negative images can reduce the intensity of an unpleasant state. (4) *Cognitive Change* is related to the appraisal process and implies the ability to modify the interpretation or evaluation of a situation. This step involves cognitive reappraisal, where individuals reinterpret the meaning of an event to alter their emotional responses. For instance, perceiving a challenging task as an opportunity for growth rather than a threat can lead to a more positive emotional experience. (5) *Response Modulation* focuses on strategies to regulate emotions after they have been experienced, for example, by suppressing the outward expression of emotions.

It is essential to mention that the effectiveness of each strategy can vary depending on the situational demands and individual characteristics, and this variability can be the basis for assessing individual differences in emotion regulation competence (Gross and John 2003; Webb et al. 2012).

4.2. *Current Measures of Emotion Regulation*

Some self-report questionnaires originated from the process model of emotion regulation. This group includes the Emotion Regulation Questionnaire that investigated the last two strategies of the model—reappraisal, for cognitive change, and suppression, for response modulation (Gross and John 2003)—and the Cognitive Emotion Regulation Questionnaires that focuses on adaptive and maladaptive cognitive strategies used to regulate negative emotions (Garnefski et al. 2001; see below for a description of the strategies). Until recently, though, not even self-report questionnaires mapped all possible strategies suggested in the theoretical model discussed above. Recent examples are moving in this direction; this is the case of the Process Model of Emotion Regulation Questionnaire (PMERQ), which investigates ten strategies covering all steps of the process model (Olderbak et al. 2022).

If we turn to performance-based tests, we typically find emotion regulation only as part of multi-branch assessments. The relative absence of stand-alone emotion regulation performance tests can be partly related to the difficulty of assessing what is mainly an intrapersonal skill through tests that ask about overt behaviors. This difficulty is evident if we look at the few available examples. In the “emotion management task²” of the MSCEIT, test-takers read a story about a person experiencing an emotion and decide how effective different behaviors are for regulating the emotion toward reaching a specific goal, e.g., reducing anger or prolonging joy (Mayer et al. 2003). The stories described in the items are varied, and it is possible to relate the response options to specific stages of the process model of emotion regulation described above; however, this is only a post-hoc interpretation, and there is no systematic application of the model in creating the response options (see also a similar post-hoc analysis of regulation strategies in Allen et al. 2015). A similar approach is used in the Ability Emotional Intelligence Measure (AEIM), another multi-branch performance test that includes subscales targeting emotion regulation (Warwick et al. 2010). Although the AEIM has been withdrawn from use by the authors because of methodological problems involved in its validation, it used an original approach. Specifically, respondents read four scenarios and evaluate how effective three possible actions are to increase, decrease, or maintain a specific emotion. Though both the MSCEIT and the AEIM use consensus scoring to determine the effectiveness of each proposed action, the AEIM additionally measures confidence with the selected choices. AEIM confidence ratings were weakly positively correlated with performance, intelligence, and empathy, leading the authors to conclude that such ratings may capture a separate factor, that is, individuals with higher confidence scores may be better able to regulate their emotions during emotion-related decision making, and, hence, measuring such scores can complement consensus-derived knowledge-focused scores (Warwick et al. 2010). Confidence ratings in ability EI assessments may also provide a link with trait EI, as trait EI measures often encompass self-evaluations of one’s performance and self-efficacy in dealing with emotions (Joseph et al. 2015). All in all, confidence ratings can be a useful addition to ability assessments, especially when responses are scored in a binary (correct/incorrect) format, but further investigation is needed.

4.3. *A Proposal for Future Performance Measures of Emotion Regulation*

In most current measures, the authors’ expertise and consensus or expert rating fully guided the item construction and scoring procedure. However, ignoring theories and evidence from emotion regulation research is a missed opportunity for ability EI; this reasoning motivated a different approach in the subtest of emotion regulation of the GEC_o (Schlegel and Mortillaro 2019). Here, the focus is explicitly on one specific stage of the process, cognitive change, the one most directly linked to the quality of the emotional experience. As discussed before, indeed, appraisals are the main determinants of emotions, and from the perspective of emotion regulation, reappraisal is one of the most effective and beneficial ways to regulate emotions (McRae and Gross 2020; Uusberg et al. 2019; Uusberg et al. 2023).

In line with other performance measures, the GECO uses scenarios and asks respondents to choose the option they consider most appropriate to reduce negative emotions. In contrast to other questionnaires, the GECO asks participants to select the two cognitive strategies they would most likely use in the scenario presented in the item. Critically, the test asks about “thoughts” instead of “behaviors”. The response options were systematically created based on the cognitive emotion regulation strategies framework proposed by Garnefski and colleagues (Garnefski et al. 2001). This theory informed the creation of two adaptive and two maladaptive options, as defined in this model. The respondents choose two options, and their responses are correct if they pick the adaptive ones. Across items, the test includes five adaptive emotion regulation strategies (*acceptance*, acknowledging and accepting the situation and one’s emotions without judgment or suppression; *positive refocusing*, deliberately redirecting one’s attention toward positive or neutral aspects of the situation; *putting into perspective*, gaining a broader perspective on the situation; *refocus on planning*, developing a plan of action; *positive reappraisal*, actively reframing or reinterpreting a situation to find positive or beneficial aspects within it) and four maladaptive strategies (*self-blame*, attributing responsibility solely to oneself; *other-blame*, attributing responsibility solely to others; *ruminating*, repetitive and passive dwelling on negative thoughts; *catastrophizing*, magnifying or exaggerating the negative aspects of a situation).

This approach allowed scoring the items based on theoretical assumptions without relying on consensus and experts (although these two criteria were used during the validation process). Similarly, in their Emotion Regulation Profile Revised questionnaire (ERP-R), Nelis and colleagues (2011)³ present 15 vignettes and ask respondents to choose one or several of eight strategies considered more or less adaptive to achieve the regulation goal. Adaptive strategies include the behavioral display of positive emotions, mindfully savoring the moment, capitalization, and positive mental time travel, and maladaptive strategies include the inhibition of emotion expression, fault finding, inattention, and external attribution/nostalgia. Interestingly, the regulation goals covered in this questionnaire are both reducing negative emotions and enhancing positive emotions. This choice is linked to the emerging literature on the positive role of strategies like “savoring” (see the section on emotion management below). Although the ERP-R strategies refer to different stages of the emotion regulation process, they do not systematically map them as the PMERQ does.

Based on the advantages and limitations of the measures discussed above, we suggest that a performance-based measure of emotion regulation should ideally fully cover the process model of emotion regulation. It should include items for the different stages and response options that reflect engagement and disengagement strategies. The PMERQ is a recent example of a more comprehensive and theory-grounded measure of self-reported emotion regulation, and performance measures should take the same direction. Furthermore, future tests should consider that the effectiveness of regulation strategies can vary depending on the context (Ladis et al. 2022).

5. Emotion Management or Interpersonal Emotion Regulation

As stated above, existing ability EI tests (except the GECO) typically do not distinguish between the ability to regulate one’s own and others’ emotions. In the MSCEIT, emotion management is measured through vignettes of situations in which a person is experiencing a positive or negative emotion. Test-takers are then asked to rate, for each of several possible reactions, how helpful it would be for the person. The reactions combine various thoughts and behaviors and cannot be mapped onto a specific theoretical framework. Only a few vignettes describe situations in which someone else is experiencing an emotion that can be managed. As such, the MSCEIT focuses primarily on knowledge about successful emotion regulation in the self. The STEM uses the same approach.

In contrast, the GECO contains a subtest in which test-takers explicitly identify the most appropriate action to manage someone else’s emotions (e.g., a colleague’s sadness when missing a promotion). These actions were created to represent the five strategies of conflict management theory (Thomas 1992), including avoidance, accommodation,

collaboration, compromise, and competing. Importantly, based on the situational features of the scenario (available resources, time, expected future events, etc.), each of the five strategies was defined as the correct one in some of the scenarios, rather than always defining collaboration or compromise as the “best” strategy. This theoretical framework is particularly suitable for workplace settings that the GECo targets, but, obviously, many more strategies for influencing what another person is feeling can be imagined. It would be desirable for future assessments to capture the breadth of available emotion management styles to help generalize findings beyond the narrow set included in the GECo. The goal of this section is, thus, to review how theories and research outside the EI field can be harnessed to create new measures of the ability to manage others’ emotions.

5.1. *Extending the Process Model of Emotion Regulation to Interpersonal Emotion Regulation*

As a straightforward extension of the previous chapter on intrapersonal emotion regulation, the model by Gross and John (2003) can also be adapted to the management of others’ emotions (Little et al. 2012). Specifically, the emotional experience of others, such as work colleagues or subordinates, can be influenced by interpersonal situation selection (e.g., creating an external environment to prevent stressful situations for others, e.g., by adjusting deadlines, delegating tasks differently), situation modification (e.g., alleviating the impact of stressors for others by offering assistance for meeting a deadline), attentional deployment (e.g., helping a disappointed colleague to focus their attention on a positive achievement), cognitive change (e.g., guiding a person to reframe negative thoughts or beliefs), and response modulation (e.g., comforting another person through appropriate nonverbal expressions). As for emotion regulation in oneself, emotion management strategies used in each of the five stages can be engagement- or disengagement-oriented, with engagement-oriented strategies expected to be more effective (Olderbak et al. 2022).

Though Little et al. (2012) developed a self-report questionnaire of people’s tendencies to manage others’ emotions in the workplace at each stage (Interpersonal Emotion Management Scale, IEMS), this model could also be used for creating standard assessments to measure the ability to choose the most effective strategy in a given context. A promising way would be to create vignettes of emotional situations with specific situational characteristics that are theoretically well suited to each of the five regulation stages, similar to the approach taken for the emotion management subtest in the GECo (see above; Schlegel and Mortillaro 2019). This would accommodate the increasing evidence that many emotion regulation strategies are not uniformly “good” or “bad” across all situations (e.g., Brockman et al. 2017).

5.2. *Co-Enhancing and Co-Dampening as Adaptive and Maladaptive Emotion Management Styles*

Though the process model of emotion regulation is typically applied to negative emotions, a different line of research has coined the terms “enhancing” or “savoring” and “dampening” for regulatory responses to positive affect. *Enhancing* involves intentionally amplifying and prolonging one’s own positive emotions, whereas *dampening* downgrades or diminishes the positive experience, for example, by minimizing its importance (Feldman et al. 2008; Quoidbach et al. 2010). Generally, enhancing is positively associated with well-being, while dampening has been linked to lower well-being and depression (Quoidbach et al. 2010). Whereas most research has focused on these constructs in relation to one’s own emotions, Bastin et al. (2018) have examined them within the context of dyadic peer relationships. Specifically, they defined co-enhancing as jointly elaborating on and celebrating each other’s positive emotions within a relationship, fostering shared joy and deepening the emotional bond.

In contrast, they defined co-dampening as downgrading discussions of positive emotions in a dyadic relationship, potentially undermining the positive impact of shared experiences and relationship satisfaction for both individuals involved. Bastin et al. (2018) also developed the Co-Dampening and Co-Enhancing Questionnaire (CoDEQ), which asks about the frequency with which dyad members engage in specific behaviors associated with the two styles when one of them feels happy (e.g., “we talk about how proud the

person who is happy can be”, “we remind each other that happy feelings don’t last”). Given that (co-)enhancing and (co-)dampening are conceptualized as adaptive and maladaptive, respectively, these styles and the specific behaviors in which they manifest (see also Quoidbach et al. 2010) could be used to measure emotion management ability specifically in response to positive situations. For example, similar to the GECO emotion regulation subtest, two behaviors reflecting each style could be used as response options in vignettes, and participants could be asked to choose the two options that best reflect what they would do. Each selected behavior corresponding to co-enhancing would be scored with one point.

5.3. *Other Strategies for Influencing People’s Emotions*

Various other strategies for influencing what others are feeling have been examined in different fields of psychology, although these efforts remain to be integrated (e.g., Niven et al. 2009; Nozaki and Mikolajczak 2020). Recently, Xiao et al. (2022) have examined high- and low-engagement strategies for managing others’ emotions (labeled “extrinsic emotion regulation”). These include downward comparison, expressive suppression, humor, distraction, direct action, reappraisal, receptive listening, and valuing. Some of these strategies, although without the systematic distinction between high and low engagement, have also been included in a widely used self-report questionnaire measuring the regulation of one’s own and others’ emotions, labeled intrinsic and extrinsic emotion regulation (Emotion Regulation of Others and Self (EROS) scale; Niven et al. 2011). With a newly developed questionnaire, Xiao and colleagues (2022) showed that the MSCEIT positively correlated with three high-engagement processes (reappraisal, receptive listening, and valuing) and negatively correlated with two low-engagement processes (downward comparison and expressive suppression). These results suggest that high-ability EI individuals are willing to engage in effortful emotion management processes. As this research allows distinguishing between more and less adaptive management strategies (adaptive in the context of enhancing well-being and relationship quality; MacCann et al. 2023), it could also be used to create and score situational judgment response options in ability EI measures.

Going beyond the use of single emotion management strategies, some authors have also examined the perceived quality of different strategy sequences. For example, Feng (2009) found that emotion management efforts were perceived as more effective when they followed a sequential pattern of problem inquiry, problem analysis, emotional support, and advice giving than when they did not follow this order. Future EI tests could thus probe test-takers’ knowledge and use of such patterns.

Though the emotion management/interpersonal emotion regulation literature typically focuses on strategies involving verbal behavior (e.g., humor) and complex actions (e.g., modifying a situation), a person’s emotions can also be influenced through nonverbal behaviors such as facial and vocal expressions and touch (e.g., Debrot et al. 2021). To date, individual differences in using such nonverbal behaviors have not yet been examined within the context of EI and emotion management. Therefore, a promising future avenue would be to develop predictions about more and less “adaptive” nonverbal behaviors within emotional encounters and incorporate them in video-based responses to situational vignettes. These responses, depicting people’s attempts at managing another person’s emotion, could differ only in their nonverbal, but not their verbal, content. Test-takers would then be asked to select the most effective response.

5.4. *Focusing on Different Preferences of the “Target”*

Whereas the above literature assumes that some regulation strategies are generally more adaptive than others, other research highlights that the “target” individuals in the management process can differ in the strategies they prefer others to use. For example, Liu et al. (2021) examined the perceived helpfulness of 13 emotion management strategies in romantic partners which were classified as problem-oriented (e.g., reappraisal, problem-solving, and blaming) versus emotion-oriented (e.g., encouraging sharing, affection, emotion invalidation) and as supportive versus unsupportive. Their results showed that people differ in the strategies they

prefer their partner to use in different situations. Similarly, Williams et al. (2018) showed that people differ in their tendency to seek social support in response to emotional events and in the extent to which they perceive social support as helpful.

Therefore, future emotion management tests could consider incorporating information about the target person’s strategy preferences to measure test-takers’ sensitivity in identifying and flexibly applying different management strategies. Similarly, the behavioral adaptability model suggests that emotionally intelligent individuals should be able to adapt their behaviors to the different needs and traits of the interaction partner (Carrard and Mast 2015; Palese and Mast 2022). Supporting the need to include behavioral flexibility and adaptability when managing others’ emotions in standard EI assessments, this group of researchers found that individuals with higher ERA displayed higher behavioral adaptability to subordinates’ preferences when in the role of a leader (Schmid Mast and Hall 2018).

6. Summary and Discussion

The aim of this article was to connect multiple fields and research lines within the broad domain of emotional functioning that rarely “talk” to each other and cite their respective works. As we discussed here, the creation of future ability EI assessments and the field of EI in general can benefit from the vast literature and recent developments in research on emotion, emotion regulation, and social cognition. The main recommendations and possibilities for ability EI test development addressed in this paper are summarized in Table 1.

Table 1. Avenues for the development of future ability EI assessments.

Emotion Understanding and Recognition	Relevant Citations
Incorporate knowledge about cultural differences (e.g., display rules)	(Mayer et al. 2016)
Assess understanding/recognition of emotion blends and transitions	(Schlegel and Scherer 2018)
Assess understanding/inferences about emotion components such as physiology or action tendencies and how they unfold in a target person	(Scherer 2009; Fontaine 2016)
Incorporate varying contexts and differences in target person’s characteristics; assess learning of new emotion-person contingencies rather than general knowledge	(Hellwig et al. 2020)
Use rating scales (e.g., for appraisal dimensions or for emotion labels) instead of forced choice format	(Fontaine et al. 2022)
For emotion recognition specifically:	
Use a wider range of emotion categories	(Cowen and Keltner 2020)
Use multimodal and/or naturalistic emotion expressions	(Schlegel et al. 2014; Israelashvili et al. 2021)
Incorporate social context into stimuli	(Hess and Kafetsios 2021)
Emotion regulation and management	
Apply strategies like the following to the regulation of own and others’ emotions; use them to create and score response options in situational judgment items:	
<ul style="list-style-type: none"> • Situation selection/modification; attentional deployment; cognitive reappraisal; response modulation • Engagement- and disengagement-oriented (or high- and low-engagement) strategies • Acceptance, positive refocusing, putting into perspective, refocusing on planning, other-blame, self-blame, rumination, catastrophizing • Savoring, capitalization, mental time travel, inhibition, inattention, external attribution • Enhancing and dampening of positive emotions • Problem-oriented and emotion-oriented strategies 	(Gross and John 2003)
Assess regulation ability by emotion component (e.g., ability to regulate expressions, action tendencies, appraisals)	(Olderbak et al. 2022; Xiao et al. 2022)
Assess sequences of regulation strategies, e.g., combine regulation of own and management of others’ emotions in one scenario	(Garnefski et al. 2001)
Assess and compare maximal performance (“which option is the best”) and typical performance (“what would you do”)	(Nelis et al. 2011)
Vary effectiveness of regulation strategies by context and different needs/preferences of the target	(Quoidbach et al. 2010)
Assess behavioral adaptability (flexibility in strategy selection and application)	(Liu et al. 2021)
	(Fontaine 2016)
	(Schlegel and Mortillaro 2019)
	(Ladis et al. 2022)
	(Palese and Mast 2022)

With respect to emotion understanding and emotion recognition ability (ERA), the review focused on the three prevailing paradigms in emotion science (basic emotion theory, dimensional/constructivist models, and appraisal models). Substantial progress has been made in assessing emotion understanding in recent years, with various authors proposing innovative approaches rooted in theory. As we look to the future, a promising next step would involve integrating the componential approach within a more contextualized framework that seeks to evaluate the process of understanding emotions, their evolution, and the intricate interplay between different emotional states. It is crucial to acknowledge the role of cross-cultural variability in future tests of emotion understanding, particularly when considering a constructivist or appraisal perspective. For example, behaviors deemed norm violations in one culture, likely triggering anger, may be acceptable in another cultural (or organizational) contexts and fail to elicit any emotion. Incorporating cross-cultural factors is also imperative for the development and validation of new ERA tests. Despite support for modern BET, there is also clear evidence for nonverbal dialect theory (Elfenbein 2013), indicating that emotion expressions are more challenging to decode when the target and perceiver come from different cultures.

Turning to emotion regulation and emotion management, our review encompasses the process model of emotion regulation and its extensions to interpersonal regulation processes. Furthermore, we explored recent research aimed at identifying and measuring specific adaptive and maladaptive regulation strategies, such as engagement versus disengagement-focused strategies, and how these findings can inform the development of performance-based tasks. Advancements in the field highlight the need for new tasks that explicitly consider contextual factors, which can be easily manipulated within situational judgment items. In the case of emotion management, it is also crucial to account for differences in target characteristics, such as individual preferences, to achieve a comprehensive assessment.

Though the present article focused on each of the four components separately, the measurement of ability EI would, ultimately, also benefit from theoretical efforts to connect the single competencies. Although with the cascading model of EI (Joseph and Newman 2010), a starting point has been made to connect the ability EI branches, the most recent version of the ability EI model, as well as other ability EI conceptualizations (e.g., Elfenbein and MacCann 2017; Fiori et al. 2022), focus on a taxonomy of skills and do not specify the process through which they are potentially linked.

A process model of EI should also examine the motivational and attentional aspects of emotionally intelligent behavior, which are likely to determine whether and how individuals use their maximal performance (which is what ability EI tests usually measure) in real-life settings. For example, some individuals with ERA scores may not pay much attention to others' nonverbal behavior in everyday life and will, thus, not be able to fully use their ERA skill. Research on individual differences in "emotional attunement" is still in its infancy (Schlegel 2020). Further, there has been evidence for "motivated inaccuracy" in recognizing others' emotions when accurate perception might harm a relationship (Simpson et al. 2003). Finally, a process model of EI should consider the mental effort required for emotionally intelligent behavior. For instance, Niven (2017) emphasized that managing others' emotions may be depleting to perform and that some strategies tend to be particularly costly in terms of resources (cf. the distinction between high- and low-engagement strategies above; MacCann et al. 2023).

Future research should, therefore, examine individual differences in the perceived levels of effort involved in each of the steps of the emotional communication process—paying attention to one's own and others' emotions, decoding emotional information, and engaging in different regulation and management strategies. Perceived effort, in combination with context-dependent motivational factors, may help explain the discrepancies between maximal and typical performance (Freudenthaler and Neubauer 2007).

Future ability EI assessments should also consider culture's role in shaping emotionally intelligent behavior when using tasks like the ones we described for emotion

understanding. Assuming that we can confidently say that an intentional goal-obstructive behavior by somebody should likely elicit anger in individualistic cultures, this may differ in collectivistic cultures where the cost of social conflict may be higher.

Though situational judgment tests became a standard for ability EI measures, future measures should consider the specific social context in which they will be used. Several authors have argued that EI is not invariant across situations, for example, if we compare behavior in a family context to that in a work context (Jordan et al. 2002; Michinov and Michinov 2022). First, we can expect that the strategies employed for emotion regulation and management will differ depending on whether a person interacts with their supervisor or a six-year-old child. Second, we are likely better at handling the emotions of people we know better. One can more easily anticipate a close relative's emotional reaction than a stranger's in the same situation. Third, there is increasing evidence that most emotion regulation strategies are not inherently good or bad, but vary in their adaptiveness across situations, contexts, and people (Brockman et al. 2017).

Last but not least, technological innovation could become an important asset for future assessments. To our knowledge, for example, no performance test can measure emotion expression and rate the extent of a successful "suppression" strategy or the ability to deliver a chosen emotion management strategy effectively (but see Olderbak et al. 2021). With the rise of AI technology, future assessments might also consider recording participants' written or video-recorded reactions to emotional scenarios and automatically scoring these for emotion understanding or management (e.g., Schlegel et al. n.d.).

Towards a Chaos of Measures? A Glimpse into the Future of Ability EI Testing

Though existing ability EI tests will continue to be useful and have generated a large knowledge base about EI, many scholars emphasized the necessity for new measurement tools (for a discussion, see Dasborough et al. 2022). If our knowledge about ability EI is based on only a few tests, it will remain unclear whether the findings are due to the construct or the instruments (Roberts et al. 2010).

We see at least two complementary strategies to develop new ability EI instruments in a systematic fashion. First, new tests might be developed for facets of EI branches that have been neglected by existing tests, such as the aptitude for expressing emotions or the understanding of cultural variations in emotion expressions and display rules. This approach would allow measuring the theoretical domain of EI more comprehensively, facilitating an exploration into which facets or branches are most predictive of central life outcomes or behavioral patterns.

The second strategy might focus on creating batteries of tests for all EI branches rather than focusing on single branches and their subfacets. Though this second approach would likely aim for a unidimensional structure within each branch/subtest to facilitate the scoring and interpretation of the test scores, it would be advisable to base the item creation within each branch on more than one theory to cover each branch more broadly. For example, a new subtest to measure emotion management/interpersonal emotion regulation could cover the strategies from Gross' (Gross and John 2003) model, as well as the high- and low-engagement strategies proposed by Xiao et al. (2022) and other strategies based on nonverbal behavior, as discussed above.

The two approaches could collectively streamline research into the factorial structure of EI, as exemplified by Simonet et al. (2021) or MacCann et al. (2014). Drawing parallels from the history of cognitive ability testing, this process is likely to trigger several cycles of creating new test generations, evaluating their intercorrelations and structure, testing their validity, and refining or developing new tests. Although it will take time, we believe that this process is necessary to move the field forward.

If we venture a glimpse into the future of ability EI testing, it is conceivable that increased efforts to build new tests (especially for under-assessed facets like expressivity) will result in the fractionation of EI. Although new tests like the GECO and GEMOK correlate highly with established tests (Schlegel and Mortillaro 2019; Schlegel and Scherer 2018), we

know that measures within the emotion recognition branch show low intercorrelations (Schlegel et al. 2017), and for the intra- and interpersonal emotion regulation branches, the internal structure is still unknown, as there are only very few existing tests. Thus, we think that Elfenbein and MacCann's (2017) description of ability EI as an umbrella term for a set of related, but distinct, skills may be fitting in the future when more tests are available. It is also likely that the different branches or subfacets differentially predict outcomes. For example, the literature already suggests that emotion management predicts wellbeing (MacCann et al. 2020), whereas this does not seem the case for emotion recognition (Schlegel 2020).

But will a fractionation into more branches and subfacets with many tests and potentially different areas of predictive relevance be problematic for the field? We think that having a larger set of branches and/or subfacets under the broad ability EI umbrella need not result in chaos, provided there is a comprehensive theoretical framework to scaffold them, and assuming researchers reference the overarching construct, as well as the branch/facet labels they examine in their research to avoid ambiguity (for a similar discussion on the empathy construct, see Hall and Schwartz 2019). We also urge ability EI researchers to reference research from related domains as described above, and vice versa. Although the literature of individual EI domains like ERA or emotion regulation possesses distinct traditions and theories, we advocate that there is merit in unifying them under a broader EI label to better understand the entire process of emotional communication including its motivational and contextual aspects.

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Notes

- ¹ The MSCEIT also includes a subtest to measure emotion perception in artwork—a skill which is rarely studied in the ERA literature and will, therefore, not be discussed here.
- ² Despite the name «emotion management» (which here we use to refer to interpersonal emotion regulation), this task deals only with intrapersonal emotion regulation.
- ³ One may argue that expert scoring and theory-based scoring should give the same results. However, we think that at least two factors could lead to differing scoring keys: (1) most likely, experts make their judgment based on multiple theories and personal expertise/experience, making it difficult to know exactly why one answer should be considered correct; this is valuable, but it is not the same as theory-driven scoring for which there is a high degree of control; (2) theory makes one specific prediction, whereas within a sample of experts, one gets a varying degree of agreement and a binary (1/0) scoring key is less defensible.

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Article

The Meso-Expression Test (MET): A Novel Assessment of Emotion Perception

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Abstract: Emotion perception is a primary facet of Emotional Intelligence (EI) and the underpinning of interpersonal communication. In this study, we examined meso-expressions—the everyday, moderate-intensity emotions communicated through the face, voice, and body. We theoretically distinguished meso-expressions from other well-known emotion research paradigms (i.e., macro-expression and micro-expressions). In Study 1, we demonstrated that people can reliably discriminate between meso-expressions, and we created a corpus of 914 unique video displays of meso-expressions across a race- and gender-diverse set of expressors. In Study 2, we developed a novel video-based assessment of emotion perception ability: The Meso-Expression Test (MET). In this study, we found that the MET is psychometrically valid and demonstrated measurement equivalence across Asian, Black, Hispanic, and White perceiver groups and across men and women. In Study 3, we examined the construct validity of the MET and showed that it converged with other well-known measures of emotion perception and diverged from cognitive ability. Finally, in Study 4, we showed that the MET is positively related to important psychosocial outcomes, including social well-being, social connectedness, and empathic concern and is negatively related to alexithymia, stress, depression, anxiety, and adverse social interactions. We conclude with a discussion focused on the implications of our findings for EI ability research and the practical applications of the MET.

Keywords: emotion; emotional intelligence; assessment; EI

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1. Introduction

1.1. Emotion Perception as the Primary Facet of Emotional Intelligence

Emotional Intelligence (EI) is defined as the ability to perceive, understand, use, and regulate emotions in both the self and others (Salovey and Mayer 1990). In their seminal work, Salovey and Mayer (1990), coined the term EI and helped spark an affective revolution (Barsade et al. 2003) that centered emotions and emotion-related abilities as a central domain in psychology. In the three decades since then, EI research and the assessment of EI rapidly increased.

While EI consists of multiple facets, prior research has demonstrated that emotion perception demonstrates primacy and is key to the function of other emotion abilities (Joseph and Newman 2010). That is, accurately perceiving emotion facilitates emotion understanding, use, or regulation (Joseph and Newman 2010; Gregory et al. 2020). The ability to perceive emotions is so important that it occurs across cultures (Cordaro et al. 2018; Ekman et al. 1987, 1969; cf. Matsumoto 1992), and is the underpinning of interpersonal communication (Fischer and Manstead 2016; Mehrabian 1971; Mehrabian and Ferris 1967) because it conveys fitness enhancing messages (Tracy and Robins 2008a). Some scholars have even gone as far to say that most information is communicated non-verbally through facial expressions and body language (Mehrabian 1971, 2017). That said, the ability to accurately perceive emotions predicts a broad array of life, work, and social outcomes

(Mayer et al. 2008). Emotion perception ability is positively associated with healthy supportive social relationships and relationship quality (Brackett et al. 2006; Brazeau 2021; Hall et al. 2009). Emotion perception is also associated with well-being and life satisfaction (Brackett et al. 2006), academic and workplace performance (Hall et al. 2009; MacCann et al. 2020), and psychological adaptation (e.g., cultural adjustment when moving to a new country; Hall et al. 2009). Given the importance for communicating effectively and building relationships, emotion perception is the EI ability we focus on in the current study.

In this research, we sought to develop a novel assessment of emotion perception: the Meso-Expression Test (MET). This study aims to improve upon prior emotion perception assessments by focusing on meso-expressions, which we theorize are the moderate-intensity, consciously expressed, ecologically valid emotion expressions of everyday life. We ground this meso-expression paradigm in the componential theory of emotions, which views them in terms of their shared characteristics and components (e.g., appraisals, feelings, expressions, physiological patterns, and action tendencies/behaviors; Dael et al. 2012; Shaver et al. 1987).

We address prior measurement shortcomings as well by using racially diverse expressors in our stimuli, and racially diverse perceivers in our validation studies—and applying robust analyses of measurement bias (i.e., measurement equivalence; Vandenberg and Lance 2000) in the MET. Finally, our study also addresses several methodological critiques of ability EI assessments, including the methods used to elicit emotion displays, as well as the methods used to label emotions and judge correctness. The MET advances EI research by helping researchers better measure how people perceive emotions in daily life, with more ecological validity and less intergroup bias. Below, we define what meso-expressions are and why they are important, and we elaborate on the theoretical and practical advancements this paper aims to fulfill in developing the MET.

1.2. *Meso-Expressions*

We coin the term *meso-expression* to describe moderate-intensity, conscious, everyday expressions of emotion. Prior literature and assessments of emotion¹ have focused primarily on prototypical *macro-expressions* (Matsumoto and Hwang 2014), or virtually undetectable *micro-expressions* (Ekman 2009; Matsumoto and Hwang 2011) and we begin by contextualizing meso-expressions within this body of prior literature.

Macro-expressions are prototypical displays of emotion that are high in emotional intensity, may last several seconds, are often consciously displayed in order to convey feelings, and are easy to identify (Ekman 2003). A substantial portion of prior emotion perception research and assessments has focused on such expressions, likely because they are more readily recognized across diverse sets of perceivers, and the high recognizability of emotional macro-expressions has been used as evidence of emotion universality (Ekman 2003; Ekman et al. 1987, 1969). Several scholars have critiqued the validity of using macro-expressions in research on emotion perception, as macro-expressions are confounded by artificiality and they suffer from a lack of ecological validity (Barrett 2017a; Buck et al. 2017). That is, while macro-expressions certainly are a part of the construct space of emotions, they are less common expressions; therefore, the focus on examining macro-expression does not adequately capture or represent the spectrum of emotions people must perceive in everyday life.

Micro-expressions by comparison are brief, low-intensity expressions that are difficult to reliably perceive and interpret (Ekman 2009; Matsumoto and Hwang 2011; Yan et al. 2013). Micro-expressions also occur involuntarily and may be activated by separate neural pathways in comparison to macro-expressions (Rinn 1984; Tamietto and De Gelder 2010). Research on micro-expressions has focused on naturally occurring and unconscious displays of emotion as a way to perceive unconscious emotion states and even detect lies (Ekman 2009). Putatively, this approach may confer greater ecological validity than posed macro-expressions. That said, because micro-expressions are displayed outside of conscious awareness, research has framed the perception of micro-expressions as a form

of psychological eavesdropping (Elfenbein and Ambady 2002b), and demonstrated that, somewhat counterintuitively, the ability to perceive micro-expressions may be negatively related to adaptive social functioning (if at all) (Blanck et al. 1981; Elfenbein and Ambady 2002a; Puccinelli and Tickle-Degnen 2004). Relatedly, training to detect micro-expressions has not been found to improve the ability to detect lies in others (Jordan et al. 2019; Warren et al. 2009) despite the popular appeal of using micro-expressions for this purpose (Ekman 2009) and scholars have noted their limited utility (Matsumoto and Hwang 2011). As such, micro-expression emotion perception measurement paradigms confer limited predictive validity, specifically when it comes to the purported range of social and psychological benefits enjoyed by those skilled at emotion perception (e.g., Mayer et al. 2016).

In the present research, we focus on an unexamined form of emotion display we coin *meso-expressions* which we theoretically distinguish from macro-expressions and micro-expressions. Meso-expressions are less intense (see also subtle emotions: Matsumoto and Hwang 2011, 2014; Warren et al. 2009) and less transparent than macro-expressions (and are therefore more nuanced and common to everyday experience), but they are more intense and last longer than micro-expressions (and therefore may be more reliably detected and employed as predictive measures of emotion perception ability). Furthermore, we define meso-expression as typically occurring within the awareness of expressor (i.e., expression occurs consciously), which is important since, as noted above, eavesdropping on unconscious micro-expressions is not a reliable indicator of social-emotional functioning. Meso-expressions may not follow the regimented activation patterns associated with macro-expressions (i.e., they are not emotion prototypes), and therefore, they may be more nuanced and naturalistic (i.e., they better match the diversity of emotion we perceive in everyday life). Research shows that expression prototypicality and intensity are linearly related to recognition rates (Matsumoto and Hwang 2014). Thus, meso-expressions may be harder to detect and challenge emotion perception ability more than macro-expressions. Finally, given that meso-expressions may more closely represent the types of emotion displays we see in everyday life (Matsumoto and Hwang 2011, 2014), we argue that assessing the ability to perceive meso-expressions is a more ecologically valid test of emotion perception ability.

1.3. Emotions Are a ‘Fuzzy Set’

In the present work, when we refer to ‘emotions,’ we are referring to interrelated and continuous concepts of emotion which are considered a ‘fuzzy set’ (Cowen and Keltner 2017). The idea of emotions as a fuzzy set has long been theorized in the literature and, more recently, empirically demonstrated. Early research consistently demonstrated that emotion concepts describe highly inter-related phenomena and that the experience and features of emotion words are highly correlated (Dael et al. 2012; Russell 1980; Shaver et al. 1987; Watson et al. 1988)—which means one cannot describe emotions as independent fingerprints (cf. Barrett 2017a, 2017b). Furthermore, some scholars have argued that no two emotion instances may be the same (Barrett 2017a). For example, even the most common visible cues of fear, such as sweating (25% of individuals), trembling (30% of individuals), or screaming (23% of individuals), occur in less than a third of individuals as a typical expression (Shaver et al. 1987).

More recent work has empirically demonstrated that emotions are ‘fuzzy’. Cowen and Keltner (2017) demonstrated that emotions are better modeled as having smooth gradients of relatedness that are mapped into a semantic space. A semantic space maps emotion terms along “their distinct varieties of reported experience” (p. 7906). In this critical study, they demonstrate that “the boundaries between many distinct emotions categories are fuzzy rather than discrete” (p. 7093). In fact, their study finds that most emotion categories share fuzzy boundaries with one or two categories of emotion, and may form fuzzy ‘chains’ of related experience (i.e., emotion families). For example, they find smooth boundaries that relate calmness to aesthetic appreciation which in turn shares a boundary with awe (URL Accessed 1 July 2023 <https://s3-us-west-1.amazonaws.com/emogifs/map.html>).

As another example, the emotion concept of love shares some similarities and overlap with the emotion concept of sympathy (Cowen and Keltner 2020), and one could describe sympathy as a ‘shade’ on the gradient of love or vice-versa. Large-scale empirical research by the same researchers has also utilized deep neural networks to categorize millions of emotional responses and has found reliable patterns of interlinked emotion concepts (Cowen and Keltner 2021). This research directly supports the view that emotions are a fuzzy set without sharp boundaries or distinctions across a wide range of cultures around the world, but categories of emotion nevertheless exist and can be distinguished. Finally, research in human cognition also shows that modeling using fuzzy approaches to emotion classification may be adaptive as they result in higher emotion perception accuracy rates. For example, studies training computer models to use fuzzy approaches can result in accuracy of classification of emotion above 90% (Liliana et al. 2019, p. 391). Some have theorized that fuzzy logic results in better perception accuracy because fuzzy systems can handle ‘partial truth’ where there are degrees of difference between emotion categories. That is, emotions are complex, and each unique expression holds a degree or probability of ‘truth’ to every emotion label, and fuzzy logic is able to capture this variability (Liliana et al. 2019, p. 393; Zadeh 1965).

Based on the consistent evidence of the inter-relatedness of emotion concepts and variation within and between emotion concepts, we take the view that emotions are a *fuzzy set* (Cowen and Keltner 2017; Shaver et al. 1987) which means that emotions are separated by “vague rather than sharp boundaries” (Shaver et al. 1987, p. 1062). The consequences of viewing emotions as a fuzzy set are fourfold. First, componential emotion theory (Dael et al. 2012) posits the existence of many potential emotional states, and so we seek not only to measure the perception of putative ‘basic emotions,’ but also to measure the perception of a variety of additional emotions. Specifically, we constructed our novel test of emotion perception to capture displays of: amusement, anger, anxiety, awe, boredom, contempt, content, disgust, embarrassment, fear, joy, pride, relief, sadness, shame, surprise, and sympathy. All of these emotions have expressions with demonstrated recognizable features across cultures (Cordaro 2014; Cordaro et al. 2020; Cowen et al. 2021; Ekman and Friesen 1971, 1986; Izard 1971; Keltner 1995; Perkins et al. 2012; Tracy and Robins 2008b). That said, we treat the emotions included in the MET not as basic emotion fingerprints, but instead as a complex set of interrelated emotion family members that exist on gradients (i.e., fuzzy sets of emotion concepts: Cowen and Keltner 2021; Shaver et al. 1987). Therefore, when we refer to emotion perception, we are referring to distinguishing between and among emotions with emotions defined as fuzzy sets.

The second consequence of viewing emotions as fuzzy sets is that it is important to capture the broad array of non-verbal behaviors that coincide with each emotion. As such, we employed a multimodal approach which uses audio and video recordings of emotion expressions to capture vocal, facial, and bodily components of each emotion. Prior work taking the basic emotion view has primarily focused on facial movements. Consistent with more recent approaches (Cowen and Keltner 2017, 2020, 2021; Cowen et al. 2021), we also examine expression of emotion through bodily movement and through vocal expression (Dael et al. 2012; Laukka and Elfenbein 2012; Shaver et al. 1987). We aimed to capture multiple channels through which individuals may convey emotions, which is more consistent with the multi-faceted richness that characterizes the phenomenon of emotion perception in the real world. This approach helps to address the critique that tests of emotion perception may not adequately capture the nuance, complexity, and correspondent authenticity of emotion expression because of the narrow focus on facial movements alone (Dael et al. 2012; Elfenbein and Ambady 2002a).

Third, due to viewing emotions as a fuzzy set, there are many possible patterns of activation that may constitute and/or be used to reliably express an emotion. As such, in the creation of the MET stimuli, we elicited emotion displays using autobiographical recall, as opposed to enforcing a fixed pattern of action units (cf. Ekman et al. 1987). Autobiographical recall is a form of method acting in which an individual takes time to

recall and imagine being back in a moment when they distinctively experienced a particular emotion state (Stanislavski 1989). Recalling one’s memory of an emotion event simulates the autonomic nervous system activity, and phenomenology associated with that emotion (i.e., memory of an emotion activates that emotion: Coan and Allen 2007; Levenson et al. 1991) can result in spontaneous displays of the recalled emotion (Ekman 2003; El Haj et al. 2016) and captures the natural variability of emotion expressions. This approach helps to address the artificiality of using posed displays from individuals who may not be experiencing the emotions they are expressing (Barrett 2017a; Buck et al. 2017), which some have argued do not actually measure emotion perception accuracy because the expresser does not actually feel the emotion (Buck et al. 2017).

Finally, viewing emotions as a fuzzy set within the componential theory of emotion also means that ‘labels’ assigned to consciously identify emotions may overlap, as they may reflect shared phenomenology, appraisal features, action tendencies, and/or expressive features (Cowen and Keltner 2017, 2021; Ekman 1997; Laukka and Elfenbein 2012; Scherer and Ellgring 2007; see also Vigliocco et al. 2014), and so we examine the relationships among emotion labels in the MET. As an example, disgust and anger are both considered high-activation negative emotions (Russell 1980; Cowen and Keltner 2017) whose action tendencies generally include the furrowing of the brow and tightening of the eyelids (Cordaro 2014; Cordaro et al. 2020). As these two emotions also share phenomenological similarities, they may be confused with one another (i.e., disgust may share enough similarities with anger that perceivers may reasonably confuse a disgust display for an anger display). Notably, selecting ‘anger’ for a disgust display still demonstrates higher emotion perception ability than selecting ‘amusement’ (an emotion that shares few if any characteristics with anger). Labels considered ‘incorrect’ may provide valuable information about the emotion perception ability of perceivers when emotions are viewed as a fuzzy set. Prior research supports this perspective and has also shown that emotion expressions may convey more than one emotion (Ekman et al. 1987; Barrett et al. 2019; Cowen and Keltner 2020, 2021). Emotion displays may be blended, for example, or may simply have multiple concurrent emotions where one expression is more salient than the others. For example, displays of disgust are often blended with contempt, whereas displays of fear are often blended with surprise (Ekman et al. 1987), and such blends are consistent across cultures (Ekman et al. 1987, p. 715). Notably, confusions between emotion categories which are closely related carry important information and meaningfully distinguish emotions among their interrelated emotion gradients (Cowen and Keltner 2020, 2021). Because of these shared features of emotion and because emotion displays may convey more than one emotion, we take the perspective that there are degrees of correctness for every potential emotion label rather than a single correct answer. We apply a theoretically appropriate Graded Response Model (GRM; Samejima 1969), which we elaborate on in Study 1.

1.4. *Concealed Emotions*

Prior research has investigated the ability to eavesdrop on micro-expressions (Blank et al. 1981; Elfenbein and Ambady 2002a; Puccinelli and Tickle-Degnen 2004); what is less understood, however, is how well people can pick up on *consciously* hidden emotions—which we refer to as *concealed emotions* (see also emotion masking: Ekman et al. 1990; Porter and Ten Brinke 2008). Scholars have noted that regulating one’s emotion expressions to suit a desired state or social situation constitutes a form of ‘emotion labor’ (Grandey and Melloy 2017; Hochschild 1983). As such, the ability to conceal one emotion with another might serve important social functions (e.g., parents mask their negative emotions with neutral or positive expressions to avoid upsetting their young children, though this may ultimately backfire: Le and Impett 2016; Waters et al. 2020).

Research on the conscious concealment of emotions has found that observers can, at the very least, detect when an expression is authentic or not (i.e., deception)—although seemingly not with a high degree of accuracy (observers only correctly identify that a deceptive facial expression has occurred around 59% of the time; Porter and Ten Brinke

2008). As such, this research indicates that emotional concealment can be signaled by specific deception cues, such as excessive blinking (Porter and Ten Brinke 2008). However, prior work largely does not address whether or not perceivers can accurately label what emotion is being concealed. Initial work in this area suggests that detection of concealed emotions is difficult, with perceivers detecting the specific concealed emotion less than 20% of the time even among close friends (Sternglanz and DePaulo 2004). In this study, to advance the field we also examine the extent to which individuals can detect emotional states purposefully concealed by other emotional expressions meant to mask their true (underlying) emotion, and whether this perception ability is positively or negatively related to healthy social-emotional functioning.

1.5. Reducing Bias in Emotion Perception Assessments

Prior research has demonstrated that emotion perception accuracy is influenced by in-group advantage (Dovidio and Gluszek 2012; Elfenbein and Ambady 2002a; Laukka and Elfenbein 2021). Perceivers are quicker and more accurate at labeling emotions when the expressor belongs to the same social group, and they are slower and less accurate at labeling emotions when the expressor belongs to a different social group. There is both an in-group advantage as well as an out-group disadvantage. Groups can be defined and delineated by a range of factors, including demographic characteristics. One pattern is that the race of the expressor and perceiver may interact to affect response latency and accuracy (Bijlstra et al. 2010; Gitter et al. 1972; Hugenberg 2005; Young et al. 2012). When expressor and perceiver are the same race, there is an advantage that reduces response latency and increases labeling accuracy, whereas when expressor and perceiver are of different races, response times increase and accuracy decreases. This pattern also holds true across majority and minority groups in general, and findings show that majority group members are significantly worse at judging the expressions of minoritized group members (Elfenbein and Ambady 2002a). Additionally, racial minorities may be particularly susceptible to the potential harms of these biases with findings showing, for example, that teachers consistently misperceive the expressions of black children to be angrier than those of white children (Halberstadt et al. 2020). This research points to the importance of socio-cognitive accounts of racial bias in emotion perception where scholars have discussed the potential importance of in-group and out-group social dynamics that might motivate emotion misperception. This includes the potential that majority groups may simply disregard emotion expressions of outgroup members and instead process stereotypic information about a social outgroup (Young et al. 2012).

Racial in-group advantage presents a substantial unaddressed challenge to measuring emotion perception. Prior assessments of emotion perception have typically focused on either a single race group (e.g., only using White expressors: Mayer 2002; Schlegel et al. 2014) or a comparison of two groups (e.g., comparing Asian and White expressors; Matsumoto et al. 2000). Research suggests that measures only containing White stimuli, for example, may unfairly advantage White perceivers through an own-race-bias advantage (Elfenbein and Ambady 2003; Young et al. 2012). Given the important role race plays in the accuracy of perceiving emotions, in this study we use a racially diverse group of White, Black, Hispanic, and Asian expressors.

Furthermore, prior research also demonstrates that gender is an important demographic moderator for emotion perception ability. Across studies, women tend to outperform men on emotion perception ability (Brackett et al. 2004; Brody and Hall 2008; Joseph and Newman 2010; Olderbak et al. 2019). Therefore, in this study we also examine emotion expression across gender and use a balanced number of male and female expressors.

To assess the extent to which group advantages may exist in the MET for perceivers, we apply a measurement equivalence approach. Measurement equivalence quantifies the extent to which a test measures the same construct in the same way across sub-populations (LaPalme et al. 2016; Vandenberg and Lance 2000). Finding measurement equivalence across racial and gender sub-groups is important because tests are only fair when scores have the

same meaning across target populations. If scores cannot be equated across sub-groups, this threatens the validity of score interpretation (American Educational Research Association et al. 2014) and of the construct of emotion perception itself. Moreover, as emotion skills become of increasing interest in business and education as targets of assessment and development—it is important to develop and use race and gender fair measures to inform decision making (Council of National Psychological Associations for the Advancement of Ethnic Minority Interests 2016). Accordingly, in our creation of the MET, we validated racially and gender-balanced stimuli on a racially and gender-balanced sample to permit the testing of measurement equivalence.

1.6. Reducing Methodological Bias

In this section, we discuss and address the use of forced-choice labeling as a methodological bias that may undermine the rigorous study of emotion perception. Scholars have debated the use of paradigms where one must choose an emotion label from a short list of options as compared to freely labeling what they perceive (Barrett 2017a; Gendron et al. 2018). The primary critiques of the forced-choice paradigm are that it inflates the accuracy of emotion perception by providing the perceiver with the emotion concepts necessary to label the emotion, and by enabling more accurate emotion labeling through educated guessing between choices—issues which would not be present in an open-ended response format. In particular, the use of forced-choice paradigms may make correct answers more obvious when incorrect options are implausible. For example, a cackling display of amusement may be unlikely to be confused with anger, sadness, or boredom. Asking someone to answer by choosing among these labels, “amusement”, “anger”, “sadness”, or “boredom”, may make it more apparent that the answer is amusement as compared to a free-labeling approach.

In this research, consistent with a fuzzy set view of emotion, we present emotion labels as a set of interrelated emotion concepts, and we purposely select distractor responses that vary on correctness and are plausible alternative responses. For example, a display of amusement might be paired with the plausible positive emotion distractors of joy, pride, and content. We based the plausibility of distractor items in our test not only on the documented and shared characteristics of emotions (Campos et al. 2013; Cowen and Keltner 2017, 2020, 2021; Shaver et al. 1987), but also on data indicating endorsements for these emotion labels as plausible (using a ‘confusion matrix’ statistical methodology, explained in Study 1 below). Accordingly, in the MET, we examine the extent to which individuals can distinguish among a diverse array of emotion expressions using an interrelated but distinct set of emotion concepts as labels for those expressions. Taken together, presenting multiple related emotion concepts does not inflate accuracy, but rather challenges individuals to choose the *most correct* label amidst a suite of options where discernment requires high levels of emotion perception ability.

2. The Present Research

Across four studies, we develop, refine, and validate a new measure of emotion perception ability, called the MET. In Study 1, we develop the raw emotion stimuli from which our test is built and demonstrate that these emotional expressions are reliably recognized in a large race- and gender-balanced U.S. sample. In Study 2, we select a subset of our emotion stimuli and develop our measure of emotion perception by demonstrating its reliability, unidimensionality, and measurement equivalence (across race and gender). In Study 3, we show that the MET demonstrates convergent validity with prior validated measures of emotion perception ability and divergent validity from measures of cognitive ability. Finally, in Study 4, we report the predictive validity of the MET, specifically the MET’s relationship to a range of healthy life outcomes, including greater psychological well-being and empathic concern, caring interpersonal relationships, and higher self-awareness of thoughts and feelings, while showing that it is inversely related to depression, anxiety, and stress. We describe the rationale, methodologies, and results from all four

studies below. The studies in this paper were not pre-registered. Data, syntax, and materials for all studies are available at this OSF link: (URL accessed on 1 July 2023 https://osf.io/7czyp/?view_only=ba134383e47d4bdbb5da2da40298d5a5).

3. Study 1

In Study 1, we generated novel, ecologically valid meso-expression stimuli to be used in the development of the MET (Study 2) using a racially and gender-balanced² group of actors.

3.1. Methods

3.1.1. Expressers/Actors

Professional actors were recruited both from local drama departments and online advertisements on social media. Actor applicants who responded to our call were emailed an autobiographical recall prompt to recall a time they experienced awe, fear, sadness, or sympathy (emotions included in our study). Applicants were then allowed to submit short sample clips of the displays they produced via method acting to the researchers. We note that the autobiographical recall procedure we used is not only a validated mood induction in the literature, but is also a common method acting exercise in the Stanislavsky Method (which nearly all actors would be familiar with). We included two male and two female Asian actors, two male and two female Black actors, two male and two female Hispanic/Latinx actors, and two male and two female White actors. All actors were between the ages of 20 and 40.

3.1.2. Emotion Induction

Consistent with prior research using autobiographical recall emotion induction techniques (Coan and Allen 2007; Joseph et al. 2020; Salovey 1992) and with method acting (i.e., Stanislavski 1989), actors were asked to recall in vivid detail a time they felt each emotion. Prior to the filming, each actor received a pre-filming instruction packet that described the themes of each of the emotions (amusement, anger, anxiety, awe, boredom, contempt, content, disgust, embarrassment, fear, joy, pride, relief, sadness, shame, surprise, sympathy; see Supplemental Method and Results). They were then asked to recall two examples of times when they felt each of the emotions, including a time they felt a small amount of the emotion and a time they felt a moderate amount of the emotion. The actors were asked to follow an autobiographical emotion induction prompt adapted from Salovey (1992), which can be found in the Supplemental Methods and Results (URL accessed on 1 July 2023 https://osf.io/7czyp/?view_only=ba134383e47d4bdbb5da2da40298d5a5).

In addition to each of the 17 emotions, actors were also asked to recall times when they had to conceal their emotions. Actors were prompted in the pre-filming packet to recall times they felt anger but displayed contentedness, felt contented but displayed anger, felt sadness but displayed joy, and felt joy but displayed sadness (we refer to these as ‘concealed’ emotion stimuli). We specifically selected these patterns of concealed emotions because: (1) prior studies have noted that people often try to mask an emotion with one of opposing valence (e.g., a parent concealing negative emotions with positive emotions: Le and Impett 2016), so these patterns are consistent with how emotion concealment occurs in real life; and (2) prior research suggests that when the concealed emotions are incongruent in valence and arousal, it causes more emotional leakage (Porter and Ten Brinke 2008), which increases the signal of the concealed emotion and the opportunity for perceivers to pick up on it.

3.1.3. Recording and Technical Procedures

Actors were filmed using three high-definition studio cameras and the audio was recorded using an overhead boom microphone. Actors were instructed to review the instruction packet before the filming to ensure their emotion-laden stories would be readily recalled during the filming. During the filming, the director instructed each actor to recall

the emotional experiences before each emotion display using a method acting prompt (see Supplemental Method and Results).

For each emotion, the actor was asked to give an emotion display both without using words and while speaking a predetermined sentence. Nonverbal displays included facial expressions, body movements, and nonverbal utterances (e.g., sighing for boredom). Verbal displays included vocal tone in the statement/question, “Hello. How are you?”. For the concealed emotion displays, actors were asked to recall times they felt anger but displayed contentedness, felt contented but displayed anger, felt sadness but displayed joy, and felt joy but displayed sadness. Finally, we asked each actor to give a neutral display (where no emotion was felt) because prior research on emotion perception has advocated for including neutral as an option when determining whether emotion stimuli are recognized above chance (Bänziger et al. 2012; Laukka et al. 2016), as it helps to prevent forcing perceivers to choose an emotion label when they believe none is expressed. All affective information conveyed by expressors was the result of their natural expressions in response to the prompts provided—no specific instructions about the ‘correct’ way to convey each emotion—whether through facial expressions, body movements, and/or nonverbal utterances—were given. This approach afforded us with more naturalistic, ecologically valid stimuli while retaining emotion specificity.

3.1.4. Validation of Stimuli

Using the procedures described above, we produced 914 unique displays (504 non-verbal displays, 313 verbal displays, and 97 concealed emotion displays). Each display lasted approximately 5–7 s. To determine the quality of these displays and to reduce the total number of stimuli to a more manageable set, we conducted a validation study (described below).

3.1.5. Participants

Three thousand participants were recruited using an online panel. Because we were interested in ensuring that our racially diverse stimuli were validated in a fair manner, we used a racially diverse set of perceivers. We aimed to sample 750 Caucasian, 750 African-American, 750 Asian, and 750 Hispanic participants. Participants were citizens or permanent residents of the United States, 18 years of age or older, and fluent in English. Our final sample contained 1025 Asian (512 males and 513 female), 855 Black (342 male and 513 female), 840 Hispanic (327 male 513 female), and 1025 White (512 male, 513 female) participants for a total of 3745 participants. The average age of participants was 44.39 years old (SD = 13.93). Data were collected in the Fall of 2018 through the Spring of 2019.

3.1.6. Procedures

Participants were randomly assigned 32 stimuli to rate (16 non-verbal stimuli, 12 verbal stimuli, and four concealed emotion stimuli). Randomization occurred within stimuli type and within racial group of the expresser and actor.³ This was done to ensure that stimuli from expressors of each racial group were judged by perceivers of each racial group (e.g., Hispanic/Latinx stimuli were rated by Asian, Black, Hispanic/Latinx, and White perceivers). The randomly selected stimuli were also presented in randomized order to reduce the possibility of order effects. Finally, participants were prompted to answer four attention check questions at random intervals during the survey.

3.1.7. Ratings

After viewing each stimulus, participants provided several ratings. Participants first indicated which of the emotions the actor was trying to express using a multiple-choice response format. Each question had 17 potential emotion labels and the option to select neutral, and only one option was allowed to be selected. The inclusion of both neutral stimuli and the option to label a display as neutral helps to avoid forcing participants to label an emotion when they believe none is present. Additionally, by providing a wide

range of possible answers, some of which are similar emotion concepts, we reduce the risk of answers resulting from the process of elimination. Participants then indicated how intense the expression was on a five-point scale from 1 (very slight) to 5 (very strong). Finally, participants indicated how authentic the emotion expression was on a five-point scale from 1 (not at all believable) to 5 (very believable). These measures served as our manipulation checks to ensure that our stimuli were in fact meso-expressions (i.e., moderate in intensity) and that they were perceived as believable expressions (rather than contrived or posed displays).

For concealed emotion displays, participants were first asked to indicate what emotion the actor was trying to express and then they were asked to indicate which emotion the actor was trying to hide. Both questions presented all 17 emotions (plus neutral stimuli) in a multiple-choice response format, and only one option was allowed to be selected for each question. Afterward, participants were asked to rate the intensity of the expression and the believability of the expression using the same five-point scales described above. The concealed emotion displays were presented in a separate trial.

3.1.8. Analyses

Using multiple choice responses, we calculated the proportion of participants who selected the intended target emotion for each stimulus (hereafter referred to as the *hit rate*). Across emotions, we also calculated a confusion matrix (see Tables 1 and 2). Confusion matrices are a widely used test development tool that have been applied in previous emotion test development research (Laukka et al. 2016). Primarily, a confusion matrix shows the proportion of respondents who choose the intended emotion on the diagonal of the matrix (i.e., how often the target emotion was recognized), and the proportion of respondents that choose any of the candidate ‘distractors’ on the off-diagonal.

To make our hit rates easier to understand, we converted all raw hit rates to a proportion index based on the total number of response options (i.e., 17 emotions plus neutral). This proportion index (π_i ; Hall et al. 2009; Rosenthal and Rubin 1989) represents our hit rates as if the judgement was made dichotomously; thus, the chance level of accuracy is 0.50.

Table 1. Confusion Matrix for Nonverbal Stimuli.

	Amu	Ang	Anx	Awe	Bor	Cmp	Con	Dis	Emb	Fea	Joy	Neu	Pri	Rel	Sad	Sha	Sup	Sym
Amusement (Amu)	0.92	0.03	0.12	0.26	0.06	0.27	0.63	0.07	0.30	0.05	0.88	0.33	0.39	0.39	0.02	0.09	0.21	0.09
Anger (Ang)	0.04	0.93	0.31	0.07	0.33	0.74	0.21	0.69	0.13	0.41	0.04	0.59	0.09	0.15	0.49	0.36	0.04	0.11
Anxiety (Anx)	0.03	0.42	0.85	0.12	0.38	0.41	0.16	0.50	0.59	0.74	0.06	0.60	0.08	0.25	0.66	0.65	0.23	0.18
Awe	0.49	0.06	0.51	0.76	0.24	0.35	0.43	0.26	0.23	0.51	0.49	0.75	0.24	0.60	0.23	0.18	0.80	0.20
Boredom (Bor)	0.03	0.34	0.39	0.10	0.90	0.62	0.17	0.60	0.39	0.20	0.05	0.65	0.07	0.35	0.65	0.59	0.13	0.21
Contempt (Cmp)	0.05	0.85	0.35	0.09	0.47	0.77	0.28	0.80	0.25	0.33	0.04	0.65	0.14	0.15	0.47	0.48	0.10	0.16
Content (Con)	0.57	0.05	0.23	0.27	0.59	0.50	0.82	0.24	0.18	0.06	0.66	0.80	0.41	0.69	0.21	0.14	0.08	0.30
Disgust (Dis)	0.03	0.67	0.46	0.18	0.31	0.70	0.18	0.91	0.27	0.47	0.03	0.58	0.08	0.10	0.56	0.41	0.24	0.14
Embarrassment (Emb)	0.70	0.09	0.62	0.27	0.27	0.38	0.43	0.40	0.80	0.41	0.49	0.48	0.29	0.49	0.41	0.71	0.32	0.32
Fear (Fea)	0.03	0.48	0.78	0.26	0.19	0.35	0.10	0.49	0.31	0.89	0.05	0.58	0.04	0.20	0.57	0.31	0.65	0.17
Joy	0.82	0.02	0.22	0.34	0.09	0.29	0.74	0.06	0.22	0.09	0.89	0.55	0.49	0.54	0.03	0.03	0.19	0.11
Neutral (Neu)	0.01	0.46	0.26	0.14	0.67	0.54	0.35	0.32	0.04	0.26	0.06	0.96	0.12	0.13	0.35	0.14	0.18	0.12
Pride (Pri)	0.72	0.11	0.35	0.31	0.17	0.42	0.78	0.12	0.24	0.19	0.69	0.66	0.78	0.68	0.05	0.07	0.20	0.18
Relief (Rel)	0.11	0.09	0.51	0.16	0.72	0.43	0.38	0.47	0.22	0.30	0.14	0.56	0.10	0.92	0.50	0.34	0.14	0.31
Sadness (Sad)	0.03	0.19	0.49	0.12	0.43	0.39	0.17	0.45	0.33	0.54	0.08	0.71	0.04	0.15	0.92	0.63	0.11	0.42
Shame (Sha)	0.03	0.30	0.49	0.04	0.32	0.40	0.12	0.54	0.68	0.46	0.07	0.47	0.03	0.08	0.84	0.87	0.11	0.30
Surprise (Sup)	0.45	0.02	0.39	0.71	0.22	0.24	0.37	0.21	0.23	0.48	0.49	0.51	0.10	0.70	0.13	0.09	0.91	0.13
Sympathy (Sym)	0.04	0.16	0.53	0.15	0.55	0.47	0.30	0.40	0.38	0.50	0.05	0.70	0.04	0.34	0.83	0.62	0.13	0.77

Notes: The table above contains the π_i values for each intended emotion across all stimuli. The rows show the intended emotion while each column shows the π_i value for each of the possible emotion labels. The diagonal of the matrix (shaded in grey) shows the hit rate for each intended emotion category, while values off-diagonal represent confusions (i.e., false positives). π_i values on the diagonal above 0.50 are considered to be recognized above chance. On average, each intended emotion category was recognized above chance across the nonverbal stimuli.

Table 2. Confusion Matrix for Verbal Stimuli.

	Amu	Ang	Anx	Awe	Bor	Cmp	Con	Dis	Emb	Fea	Joy	Neu	Pri	Rel	Sad	Sha	Sup	Sym
Amusement (Amu)	0.78	0.08	0.33	0.26	0.36	0.30	0.56	0.17	0.28	0.27	0.82	0.80	0.32	0.41	0.49	0.13	0.49	0.19
Anger (Ang)	0.20	0.59	0.38	0.13	0.66	0.63	0.53	0.45	0.22	0.27	0.33	0.89	0.40	0.31	0.50	0.25	0.13	0.40
Anxiety (Anx)	0.17	0.09	0.79	0.19	0.49	0.39	0.50	0.25	0.45	0.66	0.35	0.83	0.20	0.45	0.49	0.34	0.44	0.39
Awe	0.19	0.03	0.61	0.49	0.39	0.27	0.56	0.17	0.27	0.53	0.57	0.83	0.29	0.57	0.38	0.28	0.66	0.58
Boredom (Bor)	0.17	0.21	0.45	0.19	0.87	0.52	0.43	0.41	0.25	0.29	0.19	0.84	0.24	0.36	0.61	0.33	0.17	0.21
Contempt (Cmp)	0.18	0.27	0.42	0.22	0.73	0.56	0.59	0.43	0.20	0.29	0.34	0.88	0.26	0.35	0.57	0.28	0.34	0.42
Content (Con)	0.29	0.08	0.39	0.31	0.62	0.40	0.67	0.16	0.26	0.28	0.50	0.90	0.27	0.43	0.58	0.25	0.21	0.50
Disgust (Dis)	0.16	0.26	0.48	0.15	0.69	0.59	0.50	0.46	0.30	0.35	0.31	0.89	0.25	0.33	0.60	0.28	0.25	0.34
Embarrassment (Emb)	0.41	0.09	0.65	0.26	0.64	0.41	0.53	0.26	0.48	0.57	0.52	0.83	0.21	0.41	0.56	0.34	0.30	0.43
Fear (Fea)	0.18	0.09	0.77	0.25	0.43	0.22	0.44	0.15	0.37	0.77	0.31	0.81	0.19	0.48	0.62	0.33	0.38	0.43
Joy	0.67	0.06	0.40	0.23	0.39	0.31	0.63	0.13	0.19	0.21	0.80	0.85	0.40	0.39	0.35	0.17	0.45	0.39
Neutral (Neu)	0.23	0.18	0.18	0.19	0.58	0.42	0.68	0.26	0.13	0.08	0.48	0.94	0.39	0.34	0.40	0.14	0.18	0.36
Pride (Pri)	0.35	0.20	0.27	0.20	0.57	0.47	0.66	0.29	0.11	0.16	0.66	0.90	0.51	0.29	0.51	0.21	0.35	0.30
Relief (Rel)	0.31	0.15	0.59	0.29	0.69	0.47	0.50	0.38	0.31	0.45	0.51	0.75	0.26	0.73	0.54	0.30	0.31	0.47
Sadness (Sad)	0.07	0.09	0.63	0.14	0.60	0.35	0.35	0.21	0.34	0.70	0.18	0.82	0.12	0.30	0.81	0.48	0.20	0.51
Shame (Sha)	0.12	0.07	0.58	0.19	0.71	0.37	0.46	0.24	0.40	0.57	0.21	0.85	0.14	0.36	0.72	0.46	0.23	0.48
Surprise (Sup)	0.58	0.05	0.46	0.37	0.38	0.22	0.58	0.12	0.22	0.34	0.80	0.77	0.36	0.51	0.23	0.12	0.76	0.34
Sympathy (Sym)	0.17	0.06	0.45	0.25	0.53	0.37	0.59	0.19	0.29	0.53	0.42	0.86	0.18	0.45	0.64	0.33	0.36	0.70

Notes: The table above contains the *pi* values for each intended emotion across all stimuli. The rows show the intended emotion while each column shows the *pi* value for each of the possible emotion labels. The diagonal of the matrix (shaded in grey) shows the hit rate for each intended emotion category, while values off-diagonal represent confusions (i.e., false positives). *pi* values on the diagonal above 0.50 are considered to be recognized above chance. On average, each intended emotion category was recognized above chance across the stimuli.

The proportion index is calculated as:

$$pi = \frac{P(k - 1)}{1 + P(k - 2)}$$

where *P* is the observed hit rate and *k* is the number of response options (i.e., 18). The advantage of using *pi* is that our hit rates become comparable across judgements with differing number of options (e.g., our study can easily be compared to other interpersonal judgement studies: Hall et al. 2008; Juslin and Laukka 2003), and it makes determining if a stimuli was recognized above chance simple (i.e., any stimuli recognized more than *pi* = 0.50, or more than 50% of the time, is considered above chance).

We did not correct hit rates based on response biases.⁴ Finally, for each stimulus, we calculated the mean perceived intensity of the expression and mean perceived believability of the expression.

3.2. Results

For both the nonverbal and verbal stimuli, on average, all emotion categories were recognized above chance (see Tables 1 and 2). This indicates that, on average, perceivers could accurately determine the intended expressed emotion. For the nonverbal stimuli, the mean *pi* (i.e., the average hit rate across all 504 non-verbal stimuli) was 0.81 (*SD* = 0.18), while for the verbal stimuli the mean *pi* was 0.59 (*SD* = 0.25). Additionally, perceivers rated stimuli, on average, as being both moderate in intensity and believability (note ratings used a five-point scale). For nonverbal displays, the perceiver-rated mean intensity was 2.74 (*SD* = 0.27) and the mean believability was 3.14 (*SD* = 0.24). For verbal displays, the perceiver-rated mean intensity across emotions was 2.64 (*SD* = 0.19) and the mean believability was 3.06 (*SD* = 0.16).

For the concealed emotion stimuli, recall that perceivers had to label both the emotion that was expressed and the emotion that was concealed. For these stimuli, we considered a ‘hit’ to be when a perceiver correctly labeled both the expressed and concealed emotion. The mean *pi* (i.e., the average hit rate across all 97 concealed stimuli) was 0.54 (*SD* = 0.41). Mean hit rates were lower for the concealed stimuli because there were 324 total potential unique responses (i.e., 18 potential expressed emotions multiplied by 18 potential concealed emotions). Perceivers rated these stimuli as both moderate in intensity (*M* = 2.73, *SD* = 0.14), and as expected for these concealed displays, low in believability (*M* = 1.05, *SD* = 0.06).⁵ For

the concealed stimuli, we present confusion matrices for expressed and concealed emotions in Table 3.

Table 3. Confusion Matrix for Concealed Stimuli.

	Amu	Ang	Anx	Awe	Bor	Cmp	Con	Dis	Emb	Fea	Joy	Neu	Pri	Rel	Sad	Sha	Sup	Sym
Concealed emotion																		
Anger (Ang)	0.61	0.33	0.22	0.17	0.45	0.40	0.75	0.34	0.15	0.15	0.85	0.80	0.20	0.55	0.26	0.12	0.19	0.24
Content (Con)	0.38	0.81	0.29	0.16	0.50	0.62	0.50	0.58	0.19	0.21	0.56	0.82	0.20	0.37	0.33	0.22	0.37	0.26
Sadness (Sad)	0.71	0.10	0.15	0.18	0.22	0.22	0.71	0.13	0.17	0.11	0.92	0.65	0.15	0.49	0.40	0.15	0.17	0.29
Joy	0.44	0.26	0.36	0.15	0.47	0.37	0.61	0.31	0.33	0.34	0.70	0.85	0.17	0.38	0.72	0.34	0.27	0.39
Displayed emotion																		
Content (Con)	0.48	0.76	0.64	0.10	0.58	0.57	0.20	0.67	0.39	0.58	0.50	0.35	0.11	0.26	0.73	0.34	0.28	0.09
Anger (Ang)	0.62	0.82	0.51	0.14	0.48	0.58	0.27	0.66	0.32	0.56	0.63	0.40	0.11	0.26	0.52	0.29	0.43	0.07
Joy	0.50	0.32	0.64	0.09	0.55	0.35	0.24	0.41	0.49	0.55	0.56	0.36	0.11	0.28	0.89	0.47	0.24	0.14
Sadness (Sad)	0.67	0.33	0.56	0.19	0.38	0.27	0.30	0.44	0.47	0.66	0.70	0.43	0.15	0.23	0.83	0.47	0.35	0.17
Type of Concealed Expression												<i>Mean pi</i>						
Felt anger but displayed contentment												0.23						
Felt contentment but displayed anger												0.85						
Felt sadness but displayed joy												0.83						
Felt joy but displayed sadness												0.95						

Notes: The table above contains the *pi* values for each intended concealed and displayed emotion across all concealed stimuli. The rows show the intended concealed or displayed emotion while each column shows the *pi* value for each of the possible emotion labels. The values shaded in grey show the hit rate for each intended emotion category. Below the confusion matrix, we present the average *pi* values for selecting both the correct concealed and displayed emotion. Values above 0.50 are considered to be recognized above chance.

3.3. Discussion

This study demonstrated that it is possible to elicit and reliably measure nuanced, highly variable, and ecologically valid meso-expressions (as opposed to the dominant paradigms of macro-expressions and micro-expressions). Actors in our study recalled their own emotion circumstances, and produced spontaneous and authentic displays of emotion (with no coaching on which facial muscles to activate). We found consistent evidence that our method acting autobiographical recall emotion manipulation achieved the goal of eliciting meso-displays with moderate intensity (the mean intensity rating was 2.64 out of 5) that were, on the whole, considered believable (the mean believability rating was 3.14 out of 5).⁶ Furthermore, we found that these emotion expressions were consistently recognizable to a broad array of perceivers varying on race/ethnicity and gender. Moreover, we found additional evidence that emotion categories are a fuzzy set because participants consistently choose plausible distractors for expressed emotions. That is, answer patterns to emotion stimuli were clustered non-randomly based on degrees of shared features among emotion concepts (e.g., phenomenology, appraisals, action tendencies). For example, in Table 1, we find that fear is consistently confused with anxiety (another high-activation negative emotion), while sadness is consistently confused with shame (another low-activation negative emotion: Cowen and Keltner 2017, 2020, 2021; Figure 1). Employing stimuli developed in Study 1, we next construct a novel assessment of emotion perception ability in Study 2 called the MET.

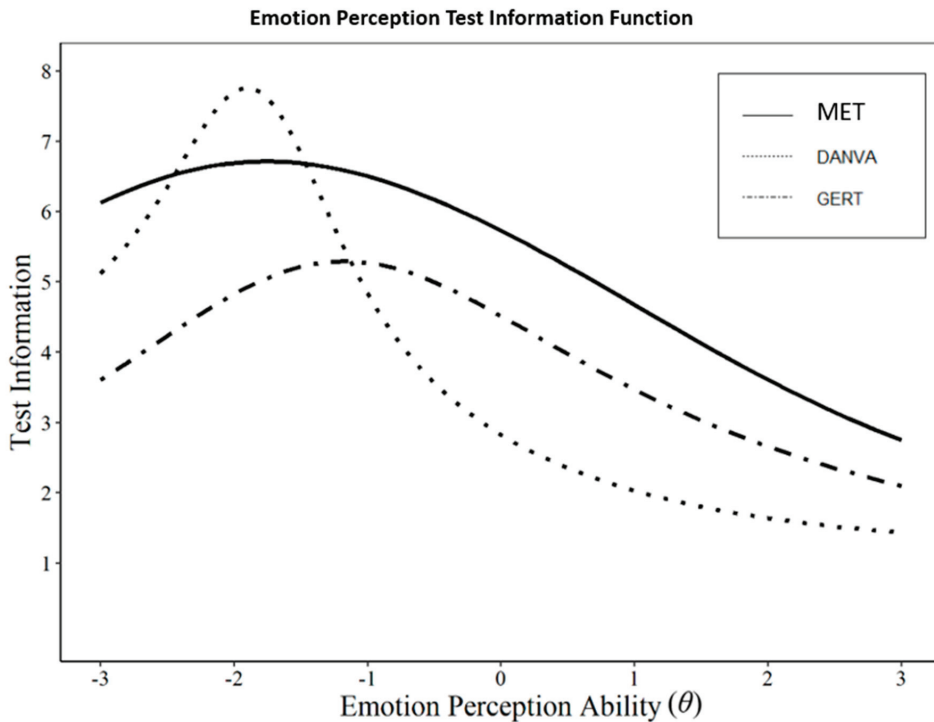


Figure 1. Test Information Function.

4. Study 2

In Study 2, we developed the Meso-Expression Test (MET) using a subset of the stimuli we validated in Study 1. To develop this test, we included displays of amusement, anger, boredom, contentment, disgust, embarrassment, fear, joy, relief, sadness, shame, surprise, and sympathy. We selected stimuli based on the quality of the display and only included displays that were recognized above chance in Study 1 to ensure they were valid emotion displays. For each given emotion, we selected at least one stimulus from each racial and gender subgroup that was recognized above chance, but that was also rated as moderately intense and at least moderately believable (see Study 1) to ensure it captured a meso-expression. As a result of this process, among the candidate stimuli, there was at least one male and one female expresser of each race (e.g., Asian, Black, Hispanic, and White) for each emotion. We selected a total of 104 non-verbal displays and 44 verbal displays to test.

Finally, for the concealed emotion stimuli, we selected displays where expressers felt anger but displayed contentment, felt contentment but displayed anger, felt joy but displayed sadness, and felt sadness but displayed joy. We specifically selected 20 stimuli and emphasized selecting displays that were recognized above chance in Study 1 and that were moderate in intensity (noting that believability was not a factor in selecting these stimuli, as concealed emotion displays appear less natural).

Thus, Study 2 focuses on the 168 stimuli above that we develop into a candidate item pool. In this study, we psychometrically validate these candidate items and cull items that do not meet our rigorous psychometrics standards outlined below.

4.1. Methods

4.1.1. Participants

We aimed to recruit a total of 4000 participants using an online panel. Participants were employed permanent residents or citizens of the United States who were 25 years of age or

older and were fluent in English. Furthermore, because we were interested in ensuring that our race- and gender-balanced stimuli were validated in a fair manner, we sampled a race- and gender-diverse set of perceivers. Using a purposeful sample balanced on race and gender allowed us to test for measurement equivalence across groups (described below).

Because of the large number of stimuli we needed to validate, we chose to examine each stimuli type (non-verbal, verbal, and concealed emotions) in separate sub-samples. Thus, Study 2 consisted of three sub-samples, each corresponding to a separate sub-test (nonverbal, verbal, and concealed emotion perception). Our sample consisted of 1598 participants balanced on race and gender for the nonverbal stimuli (802 women, 796 men, 399 Asian, 401 Black, 397 Hispanic, and 397 White participants; mean age was 47.15 $SD = 14.11$), 1196 participants balanced on race and gender for the verbal stimuli (598 women, 598 men, 299 Asian, 300 Black, 297 Hispanic, and 300 White participants; mean age was 44.39 $SD = 13.93$), and 1195 participants balanced on race and gender for the concealed stimuli (600 women, 595 men, 296 Asian, 299 Black, 300 Hispanic, and 300 White participants; mean age was 44.48 $SD = 14.10$). Data were collected in the Spring of 2019.

4.1.2. Selection of Distractor Items

Distractor response options are an important part of test development and the quality of distractors selected determines the difficulty and discrimination of items (Andrich and Styles 2011; Rodriguez 2005). We chose to select distractors at the item level based on the confusions of emotion labels from Study 1. We present the details of this method and the item-level confusion matrices (Tables S1 and S2) in a Supplemental Methods and Results (URL accessed 1 July 2023 https://osf.io/7czyp/?view_only=ba134383e47d4b4bb5da2da40298d5a5). For the verbal and nonverbal sub-tests, we retained the most correct answer and five additional distractors; participants were asked to select one answer. For each item, at least one of the distractors was a partially correct answer (i.e., it shared emotion concept features with the target emotion and had high rates of confusion with the target emotion; see Table S1). Any remaining answers were also plausible incorrect distractors (i.e., emotion labels that may be confused with the target emotion and may still share some common features with the target emotion).

The concealed emotion sub-test was designed such that participants had to discern both the expressed emotion and the emotion that was actually felt by the expressor (i.e., the concealed emotion). Compared to the nonverbal and verbal sub-tests, the concealed emotion sub-test was more difficult because it required perceivers to understand both the external and concealed internal states of the expressor. For this emotion sub-test, both the expressed emotion and the concealed emotion were paired with four distractor responses each; participants were asked to select one answer for each question. At least one of the distractors was a plausible partially correct answer (i.e., it had high rates of confusion with the target emotion and shared features with the target emotion), and any remaining answers were plausibly incorrect distractors (based on overlap in emotion concepts and families).

In Table S2, we show the item-level results from Study 2. Across items, we replicate results from Study 1 and find that correct emotion labels were all selected above chance. Additionally, we find that partially correct distractors were selected frequently and, in most cases, more so than the plausible incorrect distractors as expected.

4.1.3. IRT Scoring

We also chose to employ a Graded Response Model (GRM; Samejima 1969), given that many emotions share conceptual and phenomenological similarities (e.g., Cowen and Keltner 2017, 2020, 2021; Shaver et al. 1987). Given that many emotions may be confused based on their shared conceptual and phenomenological qualities, a GRM is appropriate because all item responses (the best response and the distractors) may be ordered in terms of their degree of correctness. For the verbal and nonverbal sub-tests, item responses were scored trichotomously as: 0 (inaccurate), 1 (partially correct), or 2 (correct). Responses were

scored as *correct* when the target emotion was selected, *partially correct* when a plausible distractor was selected, and *incorrect* otherwise. Prior cognitive ability research has used GRM approaches to effectively measure gradients in latent mental abilities (Sternberg et al. 2014), but it appears the MET is the first assessment of emotion perception ability to apply this methodological technique.

As each concealed display required two judgements, we scored these items using both the judgement of felt and expressed emotion simultaneously. For the GRM, item responses were scored as: 0 (inaccurate), 1 (somewhat correct), 2 (mostly correct), and 3 (correct). Responses were scored as *correct* when the perceiver selected both the felt and expressed emotion, *mostly correct* when the perceiver selected the correct emotion labels but confused the felt and expressed emotion (e.g., selected felt anger and expressed contentment, when the expresser actually felt contentment and expressed anger), *somewhat correct* when only one correct emotion label was selected, and *incorrect* for all other responses.

4.1.4. Measurement Equivalence

One goal of including a racially diverse set of *expressers* in the test was to increase its fairness across racially diverse groups of *perceivers*. In order to quantify the fairness of the test across different racial groups of perceivers, we conducted measurement equivalence (ME) analyses. ME examines the extent to which a test measures the same construct in the same way across groups (Vandenberg and Lance 2000). ME testing helps to ensure that differences in responses can be interpreted in a meaningful and unbiased manner rather than being confounded by group membership (LaPalme et al. 2016). In this case, it means ensuring that differences in scores on the MET primarily reflect emotion perception ability, and largely do not reflect the race or gender of the test taker. We also were interested in ensuring ME across male and female test takers because prior research has shown that women outperform men on EI ability tasks (Joseph and Newman 2010).

We used a Differential Item Functioning (DIF) approach to examine ME. The advantage of a DIF approach (as compared to more traditional ME analyses) is that DIF examines measurement equivalence at the item level rather than at the scale level. That is, DIF can identify which items are not equivalent across groups, and makes it possible to determine if specific items are not equivalent across groups (even when the total scale appears equivalent). Additionally, DIF makes it easy to quantify the effect size of non-equivalence between groups (i.e., how large group differences are). In this study, we operationalized DIF as the squared area between the ICCs of the comparison groups divided by the pooled standard deviation (LaPalme et al. 2016; Nye 2011). We compared the ME of our test for Asian versus Hispanic, Black versus Hispanic, Black versus Asian, White versus Black, White versus Hispanic, White versus Asian, and men versus women.

4.1.5. Results

We examined multiple indicators of item quality and item functioning, and we present evidence for each sub-test below.

4.1.6. Nonverbal Displays

For the nonverbal sub-test, the average factor loading across all 104 candidate items was 0.27 ($SD = 0.12$), demonstrating moderate average factor loadings and the need to potentially cull items with low loadings. We also examined item information. Item information represents the precision of measurement provided by an item, which is inversely related to the standard error of measurement across the latent continuum of emotion perception ability. Item information is important to examine because items that provide little information do not improve the precision of tests, whereas items with high information values lead to less measurement error (Lord 2012).⁷ Higher item information values are preferred to lower item information values, so we can compare which items perform better relative to the mean information value across items. The mean candidate item information was 0.40 ($SD = 0.28$).⁸ Finally, we also examined item misfit. Item misfit indicates

that responses to an item did not fit the expected or modeled responses well. Out of the 104 candidate items, 19 items had statistically significant misfit. To further examine misfit, we also computed the chi-square to degrees-of-freedom ratio.⁹ Ratios greater than or equal to three are interpreted as poor fit, while ratios that are less than three are interpreted as adequate fit (Tay et al. 2011); all the items examined had adequate fit using this standard.

We chose to cull nonverbal candidate items that had a combination of: (1) significant misfit, (2) poor factor loadings (i.e., loadings below 0.30), and/or (3) provided below average item information. As such, we removed 54 items (which had poor fit, poor factor loadings, and/or low item information) and retained 50 items. From this set of 50 retained items, to ensure content validity of the MET, we selected 31 items such that there were displays to represent both high activation and low activation positive and negative emotions (Russell 1980), and such that each emotion quadrant had male and female expressors, as well as expressors of different racial backgrounds. Table 4 displays the item statistics for the retained items. The average factor loading across the 31 retained items was 0.41 (*SD* = 0.12) and the average item information was 0.75 (*SD* = 0.28), which indicates measurement precision improved after culling items. The internal consistency reliability of the 31-item nonverbal test was $\alpha = 0.81$ and McDonald’s Omega was 0.81.

Table 4. Statistics for Nonverbal Items.

Item Name	Emotion	Item Information	Factor Loadings	χ^2	<i>d.f.</i>	<i>p</i>	$\chi^2/d.f.$
NV1	Amusement	1.26	0.54	160.27	141	0.13	1.14
NV2	Amusement	0.94	0.48	154.68	140	0.19	1.1
NV3	Amusement	0.95	0.48	162.45	143	0.13	1.14
NV4	Amusement	0.73	0.38	156.58	158	0.52	0.99
NV5	Amusement	0.93	0.44	153.74	157	0.56	0.98
NV6	Amusement	0.99	0.46	173.61	146	0.06	1.19
NV7	Boredom	0.72	0.42	171.35	148	0.09	1.16
NV8	Boredom	0.72	0.41	169.86	155	0.2	1.1
NV9	Boredom	0.49	0.32	169.5	163	0.35	1.04
NV10	Content	0.59	0.35	132.62	158	0.93	0.84
NV11	Content	0.65	0.37	146.13	153	0.64	0.96
NV12	Content	0.65	0.4	194.65	140	0	1.39
NV13	Content	0.83	0.42	211.77	152	0	1.39
NV14	Disgust	0.75	0.45	160.62	141	0.12	1.14
NV15	Disgust	0.77	0.41	144.67	155	0.71	0.93
NV16	Embarrassment	0.61	0.38	137.34	155	0.84	0.89
NV17	Embarrassment	0.92	0.44	151.92	152	0.49	1
NV18	Embarrassment	0.68	0.38	170.56	152	0.14	1.12
NV19	Relief	0.51	0.38	166.48	143	0.09	1.16
NV20	Relief	0.65	0.46	147.98	127	0.1	1.17
NV21	Sad	0.65	0.41	131.95	139	0.65	0.95
NV22	Sad	0.46	0.32	175.37	152	0.09	1.15
NV23	Shame	0.74	0.39	181.41	157	0.09	1.16
NV24	Shame	0.6	0.37	160.47	149	0.25	1.08
NV25	Shame	0.68	0.39	153.55	154	0.5	1
NV26	Surprise	0.37	0.29	161.45	158	0.41	1.02
NV27	Surprise	0.74	0.41	128.21	153	0.93	0.84
NV28	Sympathy	1.05	0.5	197.73	144	0	1.37
NV29	Sympathy	0.77	0.41	143.07	149	0.62	0.96
NV30	Sympathy	0.9	0.47	126.54	142	0.82	0.89
NV31	Sympathy	0.84	0.41	145.04	155	0.71	0.94

4.1.7. Verbal Displays

For the 44 verbal candidate items, the average factor loading was 0.28 (*SD* = 0.12). The mean candidate item information was 0.44 (*SD* = 0.32). Finally, we also examined item misfit. Out of the 44 candidate items, 10 items had significant misfit. To further examine

misfit, we also computed the chi-square to degrees-of-freedom ratio. All items had ratios less than three, which indicates adequate fit.

We culled 24 items (including all relief items, which had poor factor loadings and low item information) and retained 20 items. Table 5 displays the item statistics for the retained items. The average factor loading across the 20 retained verbal sub-test items was 0.37 ($SD = 0.08$) and the average item information was 0.68 ($SD = 0.27$), suggesting improved measurement precision. The internal consistency reliability of the 20-item verbal sub-test was $\alpha = 0.71$ and McDonald's Omega was 0.71.

Table 5. Statistics for Verbal Items.

Item Name	Emotion	Item Information	Factor Loadings	χ^2	<i>df.</i>	<i>p</i>	$\chi^2/df.$
V2	Amusement	0.49	0.31	73.37	53	0.03	1.38
V3	Amusement	0.32	0.27	77.53	52	0.01	1.49
V5	Anger	0.87	0.45	61.88	51	0.14	1.21
V6	Anger	1.10	0.47	78.89	52	0.01	1.52
V9	Boredom	0.89	0.45	56.5	50	0.24	1.13
V10	Boredom	0.65	0.37	46.21	53	0.73	0.87
V13	Content	0.35	0.27	48.11	54	0.70	0.89
V14	Content	0.46	0.33	75.84	49	0.01	1.55
V17	Disgust	0.93	0.46	66.34	51	0.07	1.30
V19	Disgust	1.27	0.51	63.87	48	0.06	1.33
V22	Embarrassment	0.49	0.31	59.12	54	0.29	1.09
V23	Embarrassment	0.55	0.33	52.56	53	0.49	0.99
V25	Fear	0.80	0.39	54.98	52	0.36	1.06
V28	Fear	0.42	0.29	60.83	55	0.27	1.11
V33	Sadness	0.63	0.36	74.03	53	0.03	1.40
V34	Sadness	0.25	0.22	61.67	55	0.25	1.12
V38	Surprise	0.83	0.42	60.87	52	0.19	1.17
V39	Surprise	0.78	0.4	94.03	53	0.00	1.77
V41	Sympathy	0.97	0.44	60.5	52	0.20	1.16
V42	Sympathy	0.57	0.35	53.94	54	0.48	1.00

4.1.8. Concealed Displays

For the concealed emotion sub-test, the average factor loading across all 20 candidate items was 0.36 ($SD = 0.13$). The mean candidate item information was 0.80 ($SD = 0.51$). Out of the 20 items, 12 items had significant misfit. To further examine misfit, we also computed the chi-square to degrees-of-freedom ratio. All items had ratios less than three, which indicates adequate fit.

We culled seven items and retained 13. Table 6 displays the item statistics for the retained items. The average factor loading across the 13 retained items was 0.45 ($SD = 0.08$) and the average item information was 1.10 ($SD = 0.40$). The internal consistency reliability of the 13-item concealed emotion sub-test was $\alpha = 0.71$ and McDonald's Omega was 0.71.

4.1.9. Measurement Equivalence

Finally, we found that the test had only small differences across racial and gender groups in our ME analysis, which indicates that the MET fairly assesses emotion perception ability across race and gender. Effect sizes for DIF analyses can be interpreted similarly to a Cohen's *d* (LaPalme et al. 2016; Wang et al. 2013), where 0.2, 0.5, and 0.8 represent small, medium, and large effect sizes, respectively (Cohen 1988). All effect sizes are reported in Table 7. For the nonverbal sub-test and concealed emotion sub-test, the average *d*-DIF was small across all race comparisons, and also across men and women. For the verbal test, the average *d*-DIF was also small across race comparisons, and it was small to moderate for the White versus Asian comparison, and also small across men and women. No items examined had large DIF between groups.

Table 6. Concealed Item Statistics.

Item Name	Emotion	Item Information	Factor Loadings	χ^2	<i>d.f.</i>	<i>p</i>	$\chi^2/d.f.$
C1	Anger X Content	1.66	0.54	77.15	67	0.19	1.15
C2	Anger X Content	0.48	0.32	79.24	64	0.09	1.24
C3	Anger X Content	0.95	0.42	75.04	61	0.11	1.23
C4	Anger X Content	0.98	0.44	85.39	60	0.02	1.42
C5	Anger X Content	0.96	0.42	79.68	67	0.14	1.19
C6	Content X Anger	0.77	0.39	153.81	76	0.00	2.02
C7	Joy X Sadness	0.83	0.40	158.21	79	0.00	2.00
C8	Joy X Sadness	0.52	0.32	155.54	78	0.00	1.99
C9	Sad X Joy	1.75	0.57	79.24	62	0.07	1.28
C10	Sad X Joy	1.58	0.54	75.31	57	0.05	1.32
C11	Sad X Joy	1.10	0.46	63.79	67	0.59	0.95
C12	Sad X Joy	1.52	0.53	92.94	72	0.05	1.29
C13	Sad X Joy	1.22	0.48	72.75	64	0.21	1.14

Table 7. Differential Item Functioning.

	<i>d-dif</i>
Non-Verbal	
Asian versus Hispanic	0.10
Black versus Hispanic	0.11
Black versus Asian	0.11
White versus Black	0.20
White versus Hispanic	0.13
White versus Asian	0.14
Men versus Women	0.12
Verbal	
Asian versus Hispanic	0.29
Black versus Hispanic	0.14
Black versus Asian	0.34
White versus Black	0.11
White versus Hispanic	0.23
White versus Asian	0.40
Men versus Women	0.12
Concealed	
Asian versus Hispanic	0.15
Black versus Hispanic	0.16
Black versus Asian	0.17
White versus Black	0.23
White versus Hispanic	0.12
White versus Asian	0.19
Men versus Women	0.08

4.2. Discussion

In Study 2, we developed a novel measure of emotion perception ability called the MET assessment. We employed naturalistic, ecologically valid meso-expressions in a racially and gender-balanced sample, where we found evidence for the internal consistency and structural validity of the MET. Additionally, across each of the sub-tests (i.e., nonverbal, verbal, and concealed emotion tests), we found moderate to high reliability of the emotion

stimuli. We also showed that the MET test, as designed, largely operated equally across gender and four racial groups in the U.S., meaning there were only small differences in performance on the measure on the basis of race and gender. The MET is the first emotion perception measure to examine and demonstrate overall test fairness across racial and gender groups. A sample of the assessment may be found here: (URL accessed 1 July 2023 https://osf.io/7czyp/?view_only=ba134383e47d4b4bb5da2da40298d5a5).

5. Study 3

In Study 3, we examined the construct validity (convergent and divergent validity) of all three subtests of emotion perception on the MET. Our goals were to test whether: (1) the MET converges with other measures of emotion perception ability, and (2) the MET is distinct from cognitive ability.

5.1. Methods

5.1.1. Participants

Two hundred and eighteen participants were recruited from a university in the Northeastern United States. The participants were 71.1% female, and were 16.5% African-American, 36.2% Asian, 9.2% Hispanic, 0.5% Native American, 33.6% White, and 3.7% identified as other. The mean age of the sample was 24.81 years old ($SD = 10.55$). Data were collected in the spring of 2019.

5.1.2. Measures

We used a 64-item version of the MET (31 nonverbal items, 20 verbal items, and 12 concealed items). In addition to the MET, we included measures of convergent and divergent validity, which are two core components of construct validity (Cronbach and Meehl 1955).

To demonstrate convergent validity, we included two previously validated measures of emotion perception: the Diagnostic Analysis of Nonverbal Accuracy (DANVA; Nowicki and Duke 1994) and the short Geneva Emotion Recognition Test (GERT-S; Schlegel and Scherer 2016). For the DANVA, we used the 23-item face recognition and 23-item nonverbal recognition portions of the test. These examine the ability to recognize happiness, sadness, anger, and fear via facial expression and through non-verbal vocal cues, respectively. The GERT-S consisted of 42 short videotaped emotional expressions. These emotional expressions contained both bodily expression of emotion and nonverbal emotion expression. Perceivers were asked to label the emotion expressions as amusement, anger, disgust, despair, pride, anxiety, interest, irritation, fear, pleasure, relief, surprise, or sadness. Both the DANVA and GERT items were scored as either: correct (1) or incorrect (0) using a two-parameter logistic Rasch model (Rasch 1960).

We tested divergent validity using the 30-item quick form of the Wonderlic Personnel Test (WPT-Q; Wonderlic, Inc. 2007). The WPT-Q is a test of cognitive ability that examines the ability to learn, adapt, and solve problems.

5.2. Results

Table 8 shows the correlations between the MET and our measures of convergent and divergent validity. The subtests of the MET (nonverbal, verbal, and concealed emotion perception) were highly correlated with one another ($r = 0.48$ to 0.59 , $p < .001$); the concealed MET is correlated 0.48 with the nonverbal MET, 0.50 with the verbal MET, and 0.82 with the MET total score. The MET demonstrated convergent validity with both the DANVA ($r = 0.59$, $p < .001$) and the GERT ($r = 0.68$, $p < .001$). Finally, like other emotion perception tasks, the MET was significantly positively related to cognitive ability though the effect was moderate in size ($r = 0.36$, $p < .001$; Cohen 1988), supporting overall its divergent validity (Mayer et al. 2008).

Table 8. Convergent and Divergent Validity.

	1	2	3	4	5	6	7	8	9
1. MET total score	1								
2. MET Non-Verbal	0.85 *	1							
3. MET Concealed	0.82 *	0.48 *	1						
4. MET Verbal	0.78 *	0.51 *	0.50 *	1					
5. GERT	0.68 *	0.59 *	0.53 *	0.52 *	1				
6. DANVA total score	0.59 *	0.50 *	0.41 *	0.55 *	0.62 *	1			
7. DANVA faces	0.39 *	0.34 *	0.26 *	0.34 *	0.41 *	0.73 *	1		
8. DANVA voices	0.55 *	0.45 *	0.40 *	0.52 *	0.56 *	0.86 *	0.29 *	1	
9. WPTQ	0.36 *	0.34 *	0.27 *	0.29 *	0.46 *	0.25 *	0.17 *	0.23 *	1
10. Age	-0.47 *	-0.35 *	-0.32 *	-0.50 *	-0.45 *	-0.29 *	-0.13	-0.32 *	-0.32 *

Notes: * $p < .05$.

To demonstrate the incremental validity of the MET (beyond the other perception measures in this study), we also compared the total information provided by the test to the DANVA and the GERT. As discussed in Study 2, item information is inversely related to the standard error of measurement. Tests that provide more information are more precise, whereas tests with lower information have more measurement error. The more information a test provides consistently, the better the measure is tapping the construct of interest. Figure 1 shows the test information function (TIF) for the MET, DANVA, and GERT across the emotion perception ability continuum from ($\theta = -3$ to $+3$). On average, the MET provided significantly more information than the DANVA, $t(59) = 9.88, d = 2.57, p < .001$, or the GERT, $t(59) = 21.87, d = 5.69, p < .001$. Further, the total information provided by the MET (i.e., the area under the TIF curve) was 31.8 compared to 22.4 for the DANVA and 23.7 for the GERT. Figure 1 also shows that the MET provides consistently high information value across low, moderate, and high perception ability levels.

5.3. Discussion

In Study 3, the MET converged with two widely used measures of emotion perception ability (the DANVA and GERT), demonstrating that it taps the same emotion perception construct (convergent validity). We also found that the MET is largely distinct from cognitive ability, supporting its divergent validity (noting a moderate correlation is common between different mental ability tests; Mayer et al. 2008). Together, these findings support the construct validity of the MET, placing it in a nomological network where it is highly associated with other emotion perception tests and more weakly associated with cognitive ability tests (Cronbach and Meehl 1955). Finally, importantly, the MET also showed incremental value above and beyond the DANVA and the GERT in that it provides more test information about emotion perception ability across a wide range of the latent continuum (i.e., it is suitable for assessing emotion perception ability in low, medium, and high perception ability individuals). We note that a limitation of Study 3 is that the sample was majority female, and women outperform men on assessments of EI. In study 4, we use a gender-balanced sample to examine gender differences on the MET.

6. Study 4

In Study 4, we assessed the criterion-related validity of our emotion perception test on psychosocial outcomes. Based on prior studies relating emotion perception to psychosocial outcomes, in Study 4 we assessed the relationship between the MET with social well-being, empathic concern, social connectedness, relationship quality, alexithymia, stress, depression, and anxiety. We hypothesized that emotion perception measured by the MET would be positively associated with well-being, empathic concern, social connectedness, and relationship quality, and negatively related to alexithymia, stress, depression, and anxiety (e.g., Fernández-Berrocal and Extremera 2016; Mayer et al. 2008). We also investigated whether perceiving concealed emotions would be positively or negatively related to rela-

tionship quality since prior research on emotional eavesdropping has shown the potential for negative effects of detecting leaked concealed emotions on social relationships.

6.1. Methods

6.1.1. Participants

We sampled 740 participants using an online panel. Participants were employed individuals in the United States 18 years of age or older and were selected to be racially/ethnically and gender-representative of the US workforce. The final sample of participants were 48.8% female, and were 10.5% African-American, 4.6% Asian, 67.2% Caucasian, 14.6% Hispanic, 0.9% Native American, and 0.8% Pacific Islander; 1.6% identified as other. The mean age of the sample was 39.36 years old ($SD = 17.51$). Data were collected in the summer of 2020.

6.1.2. Measures

We examined the relationship of emotion perception ability with social well-being, empathic concern, social connectedness, relationship quality, alexithymia, stress, depression, and anxiety.

Social well-being. For social well-being, we used the Ryff and Keyes (1995) Positive Relationships subscale of the Psychological Well-Being (PWB) scale. Scale reliability was $\alpha = 0.60$.

Empathic Concern. For empathic concern, we used the seven-item empathic concern sub-scale of the Interpersonal Reactivity Index (IRI; Davis 1980). Scale reliability was $\alpha = 0.58$.

Social connectedness. For social connectedness, we used the eight-item Lee and Robbins (1995) Social Connectedness Scale (CSC). Scale reliability was $\alpha = 0.94$.

Alexithymia. We measured alexithymia using the twenty-item Toronto Alexithymia Scale (Bagby et al. 1994). Scale reliability was $\alpha = 0.86$.

Stress. We measured stress using the Perceived Stress Scale (PSS; Cohen et al. 1994) which conceptualizes stress as the degree to which one appraises situations in one's life as stressful. Scale reliability was $\alpha = 0.70$.

Depression and anxiety. We measured depression and anxiety using the PROMIS Anxiety and Depression scales (Broderick et al. 2013; Schalet et al. 2016). Scale reliability was $\alpha = 0.91$ and $\alpha = 0.92$ for the anxiety and depression scales, respectively.

Relationship quality. Finally, we measured the quality of close relationship, using the short version of Network of Relationships Inventory (NRI; Furman and Buhrmester 2010). This scale asked participants to think of a close significant other, and to answer questions about positive relationship factors such as social support (e.g., 'How much does this person show support for your activities?') and negative relationship factors (e.g., 'How much do you and this person get on each other's nerves?'). Scale reliability for positive relationships was $\alpha = 0.86$, and $\alpha = 0.94$ for negative relationships.

6.2. Results

Correlations are reported in Table 9. The MET was significantly positively related to social well-being, empathic concern, and social connectedness, and significantly negatively related to alexithymia, stress, depression, anxiety, and negative interpersonal interactions with significant others. The MET also had a small unexpected negative relationship with positive social interactions with significant others.

We also tested the concealed emotion scores separately to determine whether or not they were related to positive or negative outcomes. Concealed emotion perception was significantly positively related to empathic concern ($r = 0.23, p < .001$) and social connectedness ($r = 0.17, p < .001$), and significantly negatively related to alexithymia ($r = -0.24, p < .001$), depression ($r = -0.19, p < .001$), and anxiety ($r = -0.20, p < .001$). Additionally, the concealed emotion score was negatively correlated with negative interpersonal interactions with significant others ($r = -0.34, p < .001$), and as with the full test, had a small unexpected negative relationship with positive social interactions with significant others ($r = -0.07$

$p = .048$). Concealed emotion perception was not significantly related to social well-being ($r = 0.06, p = .10$) or stress ($r = 0.06, p = .20$).

Table 9. MET Correlates.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. MET total score	1														
2. MET Non-Verbal	0.92 *	1													
3. MET Concealed	0.82 *	0.57 *	1												
4. MET Verbal	0.83 *	0.67 *	0.49 *	1											
5. Social well-being	0.16 *	0.19 *	0.06	0.12 *	1										
6. Empathic con.	0.38 *	0.38 *	0.24 *	0.31 *	0.46 *	1									
7. Social connect.	0.28 *	0.29 *	0.17 *	0.23 *	0.59 *	0.36 *	1								
8. Alexithymia	-0.42 *	-0.42 *	-0.24 *	-0.37 *	-0.49 *	-0.41 *	-0.75 *	1							
9. Stress	-0.13 *	-0.17 *	-0.05	-0.09 *	-0.42 *	-0.13 *	-0.55 *	0.56 *	1						
10. Depression	-0.33 *	-0.35 *	-0.19 *	-0.27 *	-0.41 *	-0.27 *	-0.70 *	0.68 *	0.65 *	1					
11. Anxiety	-0.33 *	-0.34 *	-0.20 *	-0.27 *	-0.37 *	-0.23 *	-0.67 *	0.65 *	0.66 *	0.87 *	1				
12. Positive rel.	-0.10 *	-0.09 *	-0.07 *	-0.10 *	0.36 *	0.19 *	0.01	0.07	-0.01	0.10 *	0.13 *	1			
13. Negative rel.	-0.54 *	-0.53 *	-0.34 *	-0.48 *	-0.23 *	-0.35 *	-0.53 *	0.61 *	0.35 *	0.57 *	0.55 *	0.26 *	1		
14. Age	0.15 *	0.24 *	-0.03	0.11 *	0.17 *	0.09 *	0.17 *	0.21 *	-0.29 *	-0.29 *	0.10 *	-0.02	-0.29 *	1	
15. Gender	-0.30 *	-0.26 *	-0.17 *	-0.26 *	-0.07 *	-0.18 *	-0.11 *	0.20 *	-0.02	0.10 *	0.10 *	0.08 *	0.26 *	0.09 *	1

Notes: * $p < .05$.

Gender

Prior research has shown that mean EI scores (Cabello et al. 2016, p. 1486) and the relationship between EI constructs and psychosocial outcomes may differ between men and women (Brackett et al. 2004; Joseph and Newman 2010), and in our study, men underperformed on the MET compared to women ($r = -0.30, p < .05$). As such, we followed up by testing gender as a moderator. We entered gender and a gender x MET score interaction term into separate regressions for each outcome of interest and we report the interaction betas and significance below. Gender was a significant moderator of the relationship between emotion perception and empathic concern ($\beta = -0.30, p < .05$), stress ($\beta = -0.51, p < .05$), depression ($\beta = -0.44, p < .05$), anxiety ($\beta = -0.38, p < .05$), positive relationships ($\beta = -0.34, p < .05$), and negative relationships ($\beta = -0.26, p < .05$; see Table 10 for regression models). Gender was also a marginally significant moderator of social well-being ($\beta = -0.26, p < .10$), but was not a moderator for the social connectedness ($\beta = -0.10, n.s.$) or alexithymia associations ($\beta = -0.12, n.s.$). Following up these gender interactions, we report correlations for women and men separately in Table 11. The trend of the interactions and correlations show that women received more of the social well-being and empathy benefits of emotion perception ability, whereas men received lower stress and depression benefits of high emotion perception ability. One notable difference is that we found that MET scores were not related to social well-being for men ($r = 0.06, n.s.$) and had a small negative relationship with positive social interactions ($r = -0.33, p < .05$), which was not true for women and is consistent with prior research showing differences in the effects of emotion perception ability between men and women (Brody and Hall 2008; Joseph and Newman 2010; Olderbak et al. 2019).

Table 10. MET × Gender Interactions.

	β	R^2
Social Well-being		
MET score	0.35 *	
Gender	-0.14 *	
Gender × MET score	-0.26 †	0.03
Empathic concern		
MET score	0.59 *	
Gender	-0.20 *	
Gender × MET score	-0.30 *	0.16
Social connectedness		
MET score	0.20 †	
Gender	0.01	
Gender × MET score	0.10	0.08

Table 10. *Cont.*

	β	R^2
Alexithymia		
MET score	−0.30 *	
Gender	0.05	
Gender × MET score	−0.12	0.18
Stress		
MET score	0.24 *	
Gender	−0.26 *	
Gender × MET score	−0.51 *	0.04
Depression		
MET score	0.02	
Gender	−0.17 *	
Gender × MET score	−0.44 *	0.12
Anxiety		
MET score	−0.03	
Gender	−0.14 *	
Gender × MET score	−0.38 *	0.12
Positive relationships		
MET score	0.12	
Gender	−0.08	
Gender × MET score	−0.34 *	0.02
Negative relationships		
MET score	−0.31 *	
Gender	0.01	
Gender × MET score	−0.26 *	0.31

Notes: * $p < .05$, † $p < .10$.

Table 11. MET Correlates for Women and Men.

	r
Women MET scores with	
Social well-being	0.21 *
Empathic concern	0.40 *
Social connectedness	0.25 *
Alexithymia	−0.35 *
Stress	0.00
Depression	−0.20 *
Anxiety	−0.21 *
Neg Social interactions	−0.46 *
Pos Social interactions	0.02
Men MET scores with	
Social well-being	0.06
Empathic concern	0.28 *
Social connectedness	0.27 *
Alexithymia	−0.41 *
Depression	−0.43 *
Stress	−0.33 *
Anxiety	−0.41 *
Neg Social interactions	−0.54 *
Pos Social interactions	−0.19 *

Notes: * $p < .05$.

6.3. Discussion

In Study 4, we set out to examine the initial criterion validity of the MET. We found that the MET was significantly associated with a number of healthy psychosocial and emotional outcomes identified in prior research. Across all participants, higher MET scores were associated with lower depression, stress, and anxiety, and negative interpersonal conflict as well as greater awareness of feelings (i.e., lower alexithymia and higher empathy).

Consistent with prior findings in the emotion perception literature, MET correlations with psychosocial and affective indicators of healthy functioning were moderated by gender. For women, emotion perception ability was more strongly related to most indicators of social functioning and health, whereas for men we found that emotion perception may actually show small negative correlations with healthy relationships (e.g., a reduction in close positive social interactions). Women's MET scores also did not correlate with stress, whereas men's scores did.

7. General Discussion

In the present research, we investigate the existence, measurability, and psychosocial value of perceiving meso-expressions. Prior research has suggested that emotion perception is the primary ability of EI (Joseph and Newman 2010) and in this study, we advance the literature by defining meso-expressions as the dynamic, conscious moderate-intensity emotions of everyday life. Across four studies, we develop and validate a novel measure of emotion perception ability—the MET. There are multiple theoretical and practical contributions as well as implications of this research for affective science.

First, we found that meso-expression perception ability was correlated with an array of psychosocial outcomes and that the MET showed validity above and beyond other popular measures of EI. Across all participants, higher MET scores were associated with lower depression, stress, anxiety, and negative interpersonal conflict as well as greater awareness of feelings (i.e., lower alexithymia and higher empathy). These findings comport with prior meta-analytic evidence (Fernández-Berrocal and Extremera 2016; Sánchez-Álvarez et al. 2016; Mayer et al. 2008), and suggest that emotion perception ability reliably predicts a wide range of healthy and unhealthy psychosocial outcomes in a diverse pool of individuals. This is likely the case for a number of reasons, including that emotion perception plays a foundational role in facilitating effective emotion understanding and emotion regulation processes (Joseph and Newman 2010), and it plays a key role in the quality of social relationships, which are among the most robust predictors of psychological health and adjustment across the lifespan (Coan and Sbarra 2015; Pietromonaco et al. 2013; Sbarra and Coan 2018). We also show that the MET outperforms both the DANVA and the GERT and gives more information about emotion perception ability across the continuum of ability (see Figure 1) which speaks to the importance of the contribution of the MET.

We note that, as with prior studies of EI, these findings were moderated by gender. We found that men underperformed on the MET compared to women, and that women received more of the social benefit of meso-expression perception than men, but received no benefit to their stress levels. Relatedly, we found an unexpected negative correlation with positive relationship interactions for men only. Future research should explore why emotion perception ability might be associated with men experiencing fewer positive interactions with close friends and significant others. Prior research has identified such differences in the effects of emotion perception between men and women (Brody and Hall 2008; Joseph and Newman 2010; Olderbak et al. 2019), but it is not clear what mechanism may account for this. For example, some prior research has indicated that emotion perception ability may also allow others to read threatening information from close partners which can hurt close relationships (Simpson et al. 2003) and the gender roles of men could potentially intensify these effects on close relationships.

Second, our paper helps to address a key theoretical tension in the literature by bridging the gap between what emotions are theorized to be and how they are measured in the EI construct. The vast majority of the literature to date has either examined macro-expressions (intense, dramatized emotions) or micro-expressions (subtle and unconscious emotions) (Ekman 2003; Matsumoto and Hwang 2011, 2014). In particular, the literature is dominated by a basic emotion paradigm, which views emotions as fixed, biologically innate patterns of activation. This view narrowly defines and measures emotions through intense, stereotypic displays (Ekman 1992, 1997; cf. Barrett 2017a; Buck et al. 2017). We contribute to the emotion literature by examining an alternative to this macro-expression

paradigm: the meso-expression emotion paradigm. We examine meso-expressions—the moderately intense emotions of everyday life. These patterns of activation are not fixed (as in the basic emotion paradigm), and the ability to accurately label them requires the nuance to process the natural idiosyncrasies of each expressor and the variation of the eliciting situation.

Third, our research also addresses multiple central methodological limitations of measuring emotion perception as a facet of EI. Notably, prior work has critiqued the use of artificial emotion displays that hamper one’s ability to make judgements about the accuracy of emotion perception (Barrett 2017a; Buck et al. 2017). Using autobiographical recall (a well-established emotion induction and method acting technique; Joseph et al. 2020; Salovey 1992; Stanislavski 1989), we elicited lived emotions in the expressors in our stimuli to address this longstanding critique. In line with componential theories of emotions (Frijda 2007, 2008; Ellsworth and Scherer 2003; Dael et al. 2012; see also Shaver et al. 1987), and recent extensions of this theory (Cowen and Keltner 2021), our work suggests that there are many varied patterns of activation which may reliably signal the same emotions to perceivers. Our approach to inducing emotions provides stimuli that capture authentic complex emotions that are still reliably labeled.

Fourth, we are the first paper to examine emotion labeling through a theoretically appropriate ‘graded’ response model (GRM; Samejima 1969). That is, we theorize and measure emotion labels from the perspective of their varying degrees of correctness based on shared phenomenology (Cowen and Keltner 2017, 2020, 2021; Shaver et al. 1987). Prior research has predominantly examined emotion labels as either correct or incorrect based on consensus (Ekman and Friesen 1974; Matsumoto and Ekman 1988; Nowicki and Duke 1994; Schlegel and Scherer 2016), thus introducing a false dichotomy into the emotion literature that does not theoretically align with emotions as a fuzzy set. Prior correct or incorrect dichotomy has served to reinforce the view that emotions are ‘basic’ or discrete constructs because each emotion label must belong to a distinct ‘emotion fingerprint’ (Barrett 2006, 2017a, 2017b). Rather, the results of our study suggest that, in line with our meso-expression paradigm and componential theory of emotions (Frijda 2007, 2008; Ellsworth and Scherer 2003; Dael et al. 2012; and well-supported extensions of this theory, see Cowen and Keltner 2021), emotions are a *fuzzy set*. This means that specific emotions share common features (e.g., phenomenology, expressions, appraisals), as their categories overlap with one another to varying degrees, so they are not mutually exclusive constructs, though they also carry unique variance. Our novel assessment of emotion perception advances the literature by conceptualizing emotions as a fuzzy set and applying a theoretically appropriate Graded Response Model.

We found consistent evidence of this important phenomenon in Tables 1 and 2. Across the numerous emotion labels included in our study, *every* intended emotion expression yielded a *non-zero* chance of being labeled as another emotion category. Furthermore, emotion labels which had highly shared phenomenology and appraisals tended to be selected together. For example, anxious emotion expressions tended to be labeled above chance as anxiety or fear, demonstrating the fuzziness between these two high-activation, negative emotions. At the same time, however, there is a reliable signal that can be discerned and used to distinguish between emotion related expressions (each expressed emotion was detected above chance, and above and beyond related emotion labels). Some prior work has viewed this fuzziness between emotion sets as ‘response bias’ (Lynn and Barrett 2014) and treated it as a source of measurement error (Elfenbein and Ambady 2003), which may unintentionally perpetuate the idea that emotions are discrete kinds. Our results clearly suggest that emotion labels are a fuzzy set and that there is a utility in conceptualizing and measuring the ‘confusions’ between emotion labels as partially correct responses. This affords us the opportunity to better capture and study the dynamic complexity and richness inherent in emotion perception phenomena as they occur in daily life.

Fifth, our paper builds on the robust literature demonstrating the in-group racial advantages in face and emotion perception (Elfenbein and Ambady 2002a; Gitter et al.

1972; Hugenberg 2005; Young et al. 2012). Prior measures of emotion perception have largely used expressors of a single racial/ethnic background (typically White) or compared expressors of two different national origins. This presents a serious threat to validity in the literature because performance on emotion perception measures will favor the racial in-group (Council of National Psychological Associations for the Advancement of Ethnic Minority Interests 2016). We address this methodological limitation by explicitly balancing the race of expressors in our studies to include Asian, Black, and Hispanic expressors in addition to White expressors, and by validating the stimuli on an equally racially and gender-balanced sample. We find that the MET shows measurement equivalence across an array of racial/ethnic group comparisons. We also showed similar measurement equivalence across male and female groups.

Finally, our study contributes to an understanding of how well people can detect purposely concealed emotion states. In light of growing research suggesting that people often feel compelled to hide their true feelings and engage in emotional labor (Hochschild 1983; Grandey and Melloy 2017), our research demonstrates that people can detect purposefully concealed emotion states. This finding complements prior research on the perception of micro-expressions and emotion eavesdropping (which has examined the unconscious leaking of emotions; Elfenbein and Ambady 2002a). We extend these fields by showing that *conscious* concealment of emotions is a phenomenon that can be reliably perceived by others. Additionally, we found that the ability to detect concealed feelings is highly correlated with emotion perception ability in general, and that detecting concealed feelings may be a specific facet of EI—a finding which suggests that this facet might be incorporated into EI theory. Furthermore, importantly, unlike perceiving leaked micro-expressions, we found that the perception of purposefully concealed emotions is associated with adaptive psychosocial functioning. This helps to support prior theoretical conjectures that, because perceiving unconscious emotions is a form of emotion eavesdropping, it may have negative social consequences (Blanck et al. 1981; Puccinelli and Tickle-Degnen 2004), whereas perceiving the conscious and surreptitious concealment of emotions in our study was a beneficial emotion ability.

7.1. Limitations and Future Directions

A central limitation of our research and the MET is that it is mono-cultural. In this research, we examined a wide variety of emotion expressions across expressors and perceivers who varied in gender and race. However, all of the expressors and perceivers in our study resided in North America—the United States, specifically. Prior research has noted that cultural differences play an important role in emotion expressions and perceptions, and emotion expression and perception can and do vary by cultural group (Gendron et al. 2018; Matsumoto 1992, 2001; Tracy and Robins 2008b). Therefore, a key next step for emotion perception research will be to extend our meso-expression approach to examine emotion expression in other cultures. While a substantial literature suggests that emotion expressions are recognized across cultures (Cordaro et al. 2018, 2020; Cordaro 2014; Matsumoto 2001), most of these studies have examined macro-expressions. Future research should test whether or not more naturalistic, moderate-intensity meso-expression displays also show degrees of cultural universality. Furthermore, in this study, we examined only a small subset of gender (male and female) and racial (Asian, Black, Hispanic, and White) identities. Future research should consider examining emotion perception across a broader array of diverse expressers including non-binary expressors or indigenous expressors.

Another limitation of this research is that our criterion validity test (Study 4) relied on cross-sectional self-report data. As such, the direction of association between emotion perception ability as indicated by the MET and the reported psychosocial functioning is unclear. Furthermore, the association between meso-expressions measured by the MET and social-behavioral outcomes in real social contexts is unknown. Future research should employ longitudinal designs and include measures of social ratings or actual social behavior to afford temporal separation between emotion perception and to measure the psychosocial

outcomes of interest more objectively to determine the predictive validity of the MET. Furthermore, across our validation studies, we did not examine the test–retest reliability of the MET. Future research should examine the stability of MET scores across time using a test–retest paradigm to further demonstrate the reliability of the MET.

One aspect of our study that improves the ecological validity of our stimuli is that we utilized autobiographical recall to elicit emotions from our actors. This means that emotions were reproduced rather than based on prototypical activation (e.g., asking someone to fake a smile). While there is evidence that autobiographical recall is a valid method of eliciting emotions, it still does not confirm that an actor actually felt that emotion. Future research should implement manipulation checks to confirm that recalled scenarios match the expected patterns during the recall. Subjects can be asked to write down their recalled scenarios in advance and to confirm what emotion they feel during the recall.

Across our studies, we also chose to randomize the presentation of stimuli in order to avoid trial effects biasing the findings of our studies. Some emotion literature suggests that part of perceiving an emotion involves feeling that emotion through a process called mirroring and that perceived emotions can influence one’s own mood through emotion contagion (Barsade et al. 2003). Thus, it is possible that presentation of emotion trials differing on valence, for example, could bias future trials. For example, if one were to receive several negative emotion stimuli in a row, perhaps it would decrease the accuracy of the next subsequent positive stimuli presented. This could have real-world implications as an individual moves across situations where the valence of emotions present is very different (e.g., leaving a hostile meeting, you may be more prone to mis-perceive negative emotions in others). Future research should examine independence/non-independence of trials when presenting emotion stimuli.

Finally, our study found inconsistent correlations between the MET and age. In study 3, the MET had a significant negative correlation with age ($r = -0.47, p < .05$) such that older participants scored lower on the MET. This finding was driven by a bimodal sample that consisted of younger students and some older non-student adults. Findings in Study 4, however, showed that the MET was correlated positively with age ($r = 0.15, p < .05$). Prior research has shown curvilinear relationships between the MSCEIT and age (Cabello et al. 2016), and future research should examine the relationship between the MET and age.

7.2. *Practical Contributions and Research Implications*

A key goal of this research was to develop and validate a novel measure of naturalistic emotion perception for diverse individuals that could be used for research purposes in the U.S. As a part of this goal, the MET will be made freely available online to researchers interested in using it. Although many assessments of emotion perception exist, the lack of valid and free assessments has limited the progress of emotion ability research. A core practical contribution is thus to make the MET freely available and accessible via the web for research purposes.

Another practical contribution is that the MET holds the potential to substantially improve the quality of information measured about one’s emotion perception ability. It helps to address the serious threat to validity of in-group biases in the stimuli to improve fairness in the assessment. Additionally, as we found in Figure 1, the MET outperforms other tests of emotion perception, as it provides more information about emotion perception ability and includes less measurement error. Relatedly, the MET consistently gives information about emotion perception ability across a wide range of latent ability. This practical contribution means that the MET can provide researchers with valuable information at low, moderate, and high perception ability levels. For example, the MET is appropriate to use in populations with putatively high emotion perception requirements (e.g., customer service, education, nursing) and low emotion perception requirements (e.g., mechanics, engineering, software development).

8. Conclusions

Our research theorized and found evidence in support of a meso-expression paradigm for measuring emotion perception. We show that meso-expression—the moderate-intensity, conscious emotion expressions of everyday life—can be reliably perceived. We developed the MET, a psychometrically rigorous and race- and gender-balanced measure of meso-expression. Across four studies, we demonstrate the validity of the MET and make it freely available for research.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/jintelligence11070145/s1>, Table S1: Study 1 Item-level Confusion Matrix and Selected Distractors; Table S2: Study 2 Item-level Scoring and Confusions.

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Notes

- ¹ The most popular assessment of EI is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer 2002) which has over 3000 citations, and evidence of validity across cultures. Assessments of emotion perception include the Japanese and Caucasian Facial Expressions of Emotion instrument (JACFEE; Matsumoto and Ekman 1988), the Diagnostic Analysis of Nonverbal Accuracy (DANVA; Nowicki and Duke 1994) and, more recently, the Geneva Emotion Recognition Test (GERT; Schlegel and Scherer 2016). These assessments all examine macro-expressions.
- ² In this study, we were interested in both male and female expressors and we included actors who identified as male or female. We also included actors who identified as Asian, Black, Hispanic, and White. We note that other gender and racial identities exist and that the groups included in our study were a starting point to better understand the interplay of intersectionality in emotion perception ability.
- ³ Each participant rated 4 randomly selected nonverbal Caucasian stimuli, 4 randomly selected nonverbal African-American stimuli, 4 randomly selected nonverbal Asian stimuli, 4 randomly selected nonverbal Hispanic stimuli, 3 randomly selected verbal Caucasian stimuli, 3 randomly selected verbal African-American stimuli, 3 randomly selected verbal Hispanic stimuli, 3 randomly selected verbal Asian stimuli, 1 randomly selected concealed Caucasian stimuli, 1 randomly selected concealed African-American stimuli, 1 randomly selected concealed Hispanic stimuli, and 1 randomly selected concealed Asian stimuli.
- ⁴ Some have argued that perceivers may simply select the same emotion label repeatedly, which can lead to artificially high recognition rates above chance (Laukka et al. 2016; Wagner 1993; See also Gendron et al. 2018). For example, if perceivers always select ‘anger,’ all anger stimuli will be recognized above chance. Research shows, however, that perceivers are actually failing to distinguish anger from other emotions (Elfenbein and Ambady 2003). In this study we were interested in patterns of confusions between emotions which may share phenomenological and cognitive appraisal similarities. In fact, we intentionally included emotions which may be easily confused (e.g., embarrassment and shame) during our assessment development with the intention of both: (1) increasing the difficulty of the test we created, and (2) giving perceivers credit for answers that are close to the intended emotion (i.e., embarrassment may be a plausible answer for a shame stimuli). This Graded Response Model approach, which we elaborate more on in Study 2, fundamentally treats responses as having a continuum of correctness or accuracy (as opposed to a correct/incorrect dichotomy). We believe that since different discrete emotions share phenomenological and appraisal similarities, a graded approach is more appropriate for our study rather than controlling for confusions or false positives. In other words, we treat confusions for emotions that are similar as evidence of emotion perception ability and as evidence that emotions concepts are a fuzzy set.

- 5 Because the expressors are concealing their true emotion, it was expected that perceivers would view the displays as less authentic in our believability rating.
- 6 These results are for the nonverbal and verbal stimuli. The concealed displays were also rated as moderate intensity (2.73 out of 5) but as expected, rated low on believability rating (1.05 out of 5) because these displays involve concealment of emotions.
- 7 We calculated the total amount of information provided by each item by calculating the items' information function from $\theta = -3$ to $\theta = +3$. This area under the item information curve allows us to compare the relative value of each item in the test to determine which items contribute the most information, and therefore, should be retained.
- 8 We use the mean item information as a starting place to examine whether an item relatively improves the information value of our assessment rather than as a rule-of-thumb cut-off. See below.
- 9 Because the Chi-square test is sensitive to sample size and may be insensitive to model misfit, it is recommended to examine the ratio between chi-square and degrees of freedom (Tay et al. 2011).

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Article

Development and Validation of an Ability Measure of Emotion Understanding: The Core Relational Themes of Emotion (CORE) Test

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Abstract: Emotion understanding (EU) ability is associated with healthy social functioning and psychological well-being. Across three studies, we develop and present validity evidence for the Core Relational Themes of Emotions (CORE) Test. The test measures people’s ability to identify relational themes underlying 19 positive and negative emotions. Relational themes are consistencies in the meaning people assign to emotional experiences. In Study 1, we developed and refined the test items employing a literature review, expert panel, and confusion matrix with a demographically diverse sample. Correctness criteria were determined using theory and prior research, and a progressive (degrees of correctness) paradigm was utilized to score the test. In Study 2, the CORE demonstrated high internal consistency and a confirmatory factor analysis supported the unidimensional factor structure. The CORE showed evidence of convergence with established EU ability measures and divergent relationships with verbal intelligence and demographic characteristics, supporting its construct validity. Also, the CORE was associated with less relational conflict. In Study 3, the CORE was associated with more adaptive and less maladaptive coping and higher well-being on multiple indicators. A set of effects remained, accounting for variance from a widely used EU test, supporting the CORE’s incremental validity. Theoretical and methodological contributions are discussed.

Keywords: emotion understanding ability; emotional intelligence test; emotion knowledge; emotion appraisals; core relational themes; emotional granularity; Semantic Space Theory

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“To feel these feelings at the right time, on the right occasion, towards the right people, for the right purpose and in the right manner. . . is the mark of virtue.”—Aristotle (2009, 353 BC)

1. Introduction

Knowing how to utilize emotions to guide skillful action has been a pillar of human wisdom for millennia. Over the past few decades, theoretical and methodological advances in research on emotional expertise has grown rapidly in affective science (Hoemann et al. 2021a). There is a particular interest in people’s emotion understanding (EU) ability. EU ability is an umbrella term that incorporates a suite of interrelated emotion skills. These skills include recognizing patterns in the causes and consequences of emotions, knowing the various ways that emotions are akin to and distinguished from one another, and representing emotional experiences with precision and granularity using language (Castro et al. 2016; Kashdan et al. 2015; Mayer et al. 2016; Tugade et al. 2004).

The Cascading Model of Emotional Intelligence (EI; Joseph and Newman 2010) suggests that EU ability is central to how all emotional abilities operate. The model proposes that emotional abilities build upon and facilitate each other. The ability to accurately perceive emotions in faces, voices, and body movements provides rich information that one interprets and makes sense of using EU ability. After gathering emotion-laden information

and parsing its meaning, people can then employ these data to direct behavior and regulate emotions in ways that suit personal goals or situational demands. Given that goals and environments are dynamic, the capacity to continuously update behavior based on new emotional information promotes flexibility and adaptability. EU ability, therefore, serves as a key link between perceiving emotions and knowing how to best manage them.

Furthermore, research on emotion granularity suggests that EU ability is associated with beneficial social and well-being outcomes by supporting targeted, adaptive emotion regulation (Kashdan et al. 2015; Tugade et al. 2004). The granular emotion knowledge gleaned from EU informs judgment and decision-making, driving specific regulatory behaviors that impact many life outcomes (e.g., Hu et al. 2014; Webb et al. 2012). In support of these models, meta-analyses and recent studies show that higher EU is associated with healthier emotion regulation, and more adaptive and less maladaptive coping, as well as other desirable outcomes, including supportive relationships, job performance, psychological well-being, and even physical health (Fernández-Berrocá and Extremera 2016; Hoemann et al. 2021b; Kotsou et al. 2019; Sánchez-Álvarez et al. 2016). Although more research is needed both on cascading and granularity accounts of emotional abilities, EU ability plays a central role in skillfully navigating emotions to meet a variety of demands.

Given the value of EU ability, the quality of the measurement tools that assess this construct is of scientific and real-world significance. By quality, we mean the psychometric standards of reliability and validity (AERA et al. 2014). Scholars have noted limitations in the existing EU ability tests (e.g., Castro et al. 2016). These limitations include: (1) measuring multiple facets of EU ability and then aggregating them into a single mean score, preventing the study of specific facets of EU ability; (2) relying on situation-based vignettes, rather than tapping emotion knowledge directly; (3) employing dichotomous scoring, despite the complex interconnected structure of emotion concepts (Cowan and Keltner 2017, 2021); (4) having low reliability, reducing their statistical power; and (5) being primarily validated with White, college-attending or college-educated samples, not representing the diversity of respondents in many populations. These issues may limit the scope, precision, and generalizability of research on the nature of EU ability, including how it relates to other EI abilities and primary outcomes of interest (AERA et al. 2014).

Across three studies, we develop and present validity evidence for a novel performance measure of EU ability, the Core Relational Themes of Emotion (CORE) Test.¹ The CORE assesses people's ability to identify *core relational themes* (Campos et al. 2013; Lazarus 1991; Smith and Lazarus 1993), which are primary meanings or semantic features underlying 19 different positive and negative emotions. The specific core relational themes were drawn from an in-depth review of the emotion science literature. We aimed to address some of the noted limitations of current measures to advance research in the field. In the following section, we review appraisal theories of emotion and the literature on core relational themes to establish the theoretical basis for the development of the CORE.

1.1. *Appraisal Theories of Emotion and Core Relational Themes*

Cognitive appraisals are evaluations of the proximity and nature of threats and opportunities in the environment that activate particular emotions (Moors 2020). From an appraisal perspective, the subjective evaluation of situations elicits emotions, not the characteristics of the situations themselves. This affords a great degree of flexibility in responding to a dynamically changing environment with updated and personalized information. Appraisal theories of emotion are well-supported empirically, though the exact features, boundary conditions, and number of appraisals remain areas of study (Moors 2020). Example appraisals in response to emotion-eliciting situations include: self-relevance (i.e., how much an event matters for the self), motivational congruence (i.e., how consistent is the event with one's motivation or goals), coping potential (i.e., how matched are one's resources to those needed for the event), and predictability (i.e., how expected is the event) (Roseman 2013; Scherer 2019). Appraisal theories of emotion contend that different combinations of people's appraisals reliably converge in response to situations, giving rise to

specific emotions (Moors 2014). For example, when an event is seen as highly unpredictable, and other appraisals are less salient, one is likely to feel surprised. Or, when an event is appraised as unexpected, counter to one's motives, and coping potential is low, one may be likely to experience fear, among other emotions (Roseman 2013; Scherer 2019).

Although at times people may consciously reflect on appraisals, such as predictability and coping potential, the interaction between appraisals that leads to an emotion is typically automatic and unconscious (Moors 2020). As such, most EU tests require individuals to evaluate social situations—as the situations are thought to be more accessible—assuming the vignettes will tap knowledge of emotion concepts. However, this approach measures emotion knowledge indirectly, and also measures knowledge of situated sociocultural norms that might confound test performance. That said, research suggests emotion appraisals take on a more consciously accessible and identifiable form—which is central to how people think about their emotions—called core relational themes (Campos et al. 2013; Lazarus 1991; Smith and Lazarus 1993; see also Cowen et al. 2019; Shaver et al. 1987).² Core relational themes combine “the individual appraisal components into summaries”, and thus represent “gestalts of relational meaning”, signifying “the central harm or benefit that underlies each of the negative and positive emotions” (Smith and Lazarus 1993, p. 236). Examples of emotions and their core relational themes are: experiencing pride from perceptions of earned achievement, gratitude from perceived generosity, sadness from the perceived loss of something valued, and anger from perceived injustice one experiences or witnesses (see Table 1; Campos et al. 2013; Lazarus 1991; Smith and Lazarus 1993). As with appraisals, relational themes reflect people's subjective evaluations of situations rather than properties of the situations themselves, and they help people to differentiate among and make sense of their emotions.³ Relational themes are reflected on and communicated in daily life as primary meanings of emotions and carry notable psychological and cultural value (Campos et al. 2013; Cordaro et al. 2016a; Lazarus 1991).

Although there are different perspectives on the relational themes of emotions, many themes arise repeatedly across the literature as central to the meaning of emotions (e.g., achievement, loss; see Table 1; Campos et al. 2013; Cordaro et al. 2016a; Cowen et al. 2019; Lazarus 1991; Smith and Lazarus 1993). Based on these consistencies, relational themes are features of emotions people might reliably identify, and thus the ability to do so could be measured as a facet of EU ability (see Castro et al. 2016; Mayer et al. 2016). Here, we develop and offer initial reliability and validity evidence for the CORE, a test of the ability to categorize and distinguish among core relational themes for 19 different emotions.

Table 1. Core Relational Themes for 24 Emotions: Basis of The CORE Test Item Generation and Correctness Criteria.

Emotion	Core Relational Themes	Primary Citations
Amusement	Benign incongruity in thinking, speech, or action; Playful social rule violation; Absurdity or seeming nonsensical	Campos et al. (2013); Cordaro et al. (2016a); Fredrickson (2013)
Awe	Experiencing something greater than oneself in size, beauty, or meaning; Being in the presence of power	Gordon et al. (2017); Keltner (2023); Shiota et al. (2007, 2014)
Compassion	Witnessing suffering; Wanting to help or support others in need	Cowen and Keltner (2017); Goetz et al. (2010); Lazarus (1991)
Contentment	Sense of completeness, acceptance, or fulfillment	Campos et al. (2013); Cordaro et al. (2016b, 2021); Fredrickson (2013)
Gratitude	Receipt of specific benefits, acts of kindness, or generosity; Experiencing favorable life conditions (in general)	Campos et al. (2013); Emmons et al. (2019); Emmons and McCullough (2004); Fredrickson (2013)
Hope	Possible goal attainment (something might go well or could go well); Pathway to solving a problem or potential problem alleviation	Fredrickson (2013); Smith and Lazarus (1990, 1993); Snyder (1995, 2002)
Inspiration	Witnessing extraordinary moral virtue; Seeing resilience through hardship	Haidt (2000, 2003); Shiota et al. (2014); Thrash and Elliot (2003, 2004)
Interest	Novelty and attention-worthiness	Campos et al. (2013); Fredrickson (2013); Silvia (2005)
Joy	Free and safe to engage in play or have fun; Favorable news or outcome(s)	Campos et al. (2013); Cowen and Keltner (2017); Fredrickson (2013); Lazarus (1991) (see “happiness”)
Love	Full acceptance by another person; Reliable support from another person; Sharing precious moments, attention, and/or positive emotions with another person	Campos et al. (2013); Cowen and Keltner (2017) (see “adoration”); Fredrickson (2013); Lazarus (1991); Shaver et al. (1996)
Pride	Earned achievement from effortful action (authentic pride); Inflated sense of self-worth compared with others regardless of behavior (hubristic pride)	Campos et al. (2013); Cowen and Keltner (2017) (see “triumph”); Fredrickson (2013); Lazarus (1991); Tracy and Robins (2007, 2014)
Relief	A negative or undesired event goes away, does not happen, or is not as bad as expected	Cowen et al. (2019); Cowen and Keltner (2017); Lazarus (1991); Roseman (2013)
Anger	Goals are blocked or intentional action thwarted in some way; Experienced harm, offense, injustice, or unfairness—or witnessing it happen to others	Cowen and Keltner (2017); Fischer and Roseman (2007); Lazarus (1991); Roseman (2013) (see “anger” and “frustration”); Rozin et al. (1999); Smith and Lazarus (1990, 1993)
Anxiety	Experience of uncertainty; Something might go wrong or could be wrong	Cowen and Keltner (2017); Hammon-Jones et al. (2016); Lazarus (1991); Smith and Lazarus (1990, 1993)
Boredom	Experiencing monotony or repetitiveness; Irrelevance to the self or lack of meaningfulness	Cowen and Keltner (2017); Fahlman et al. (2013); Goldberg et al. (2011); van Tilburg and Igou (2017)
Disgust	Perceiving a stimulus or person as physically toxic or gross; Viewing a person, group, or idea as socially or morally toxic or gross (objectionable)	Fischer and Roseman (2007) (see “contempt”); Lazarus (1991); Roseman (2013) (see “disgust” and “contempt”); Rozin and Fallon (1987); Rozin et al. (1999, 2008)

Table 1. *Contt.*

Emotion	Core Relational Themes	Primary Citations
Embarrassment	Committing minor infractions of social rules (faux pas); Awkwardness; The self becoming exposed publicly in a way that feels vulnerable or uncomfortable	Cowen et al. (2019); Cowen and Keltner (2017) (see “awkwardness”); Tangney (1999); Tangney et al. (1996, 2007)
Envy	Desiring or coveting what someone else has (that is perceived as valuable)	Lazarus (1991); Parrott and Smith (1993); Smith et al. (1988); Smith and Kim (2007)
Fear	Perceiving a clear and present danger or threat in one’s vicinity	Cowen and Keltner (2017); Harmon-Jones et al. (2016); Lazarus (1991); Roseman (2013)
Guilt	Transgressing valued societal norms or moral standards; Loss of social standing or reputation	Lazarus (1991); Niedenthal et al. (1994); Roseman (2013); Tangney et al. (1996); Tangney and Fischer (1995); Tracy et al. (2007)
Jealousy	Worrying that someone is going to take, or has taken away, something of value from you (especially a close social partner’s attention, time, and affection, romantic, platonic, or otherwise)	Lazarus (1991); Parrott and Smith (1993); Smith et al. (1988); Smith and Kim (2007)
Sadness	Missing or permanently losing something or someone of value; A desired outcome does not materialize	Cowen and Keltner (2017); Lazarus (1991); Roseman (2013); Smith and Lazarus (1990, 1993)
Shame	Violating one’s own internal norms or moral standards; Loss of perceived self-worth or self-regard	Lazarus (1991); Niedenthal et al. (1994); Roseman (2013); Tangney et al. (1996); Tangney and Fischer (1995); Tracy et al. (2007)
Surprise	Unexpectedness	Cowen and Keltner (2017); Ekman and Cordaro (2011); Noordewier and Breugelmans (2013); Roseman (2013)

Note. Relational themes are based on how a person appraises a given event or stimulus, rather than necessarily reflecting features of the event or stimulus itself.

1.2. Existing Emotion Understanding Ability Measures and Their Limitations

Currently, there are two primary approaches to assessing EU ability, including understanding emotion appraisals and relational themes: situation-judgment tests (SJTs; measuring knowledge) and performance-based assessments (measuring ability) (Castro et al. 2016). Six EU ability tools have been developed and validated in English for adults that tap the ability to understand emotions, including (in part) emotion appraisals (not core relational themes) (for a review of the EU ability tools see Table 2; see also Castro et al. 2016).⁴ The two most widely used EU ability tests are the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT)-Understanding subtest (Mayer et al. 2002, 2003), and the Situational Test of Emotion Understanding (STEU; MacCann and Roberts 2008). Two more recent measures assess multiple EI abilities in the workplace and contain a subtest tapping EU ability, namely, the Geneva Emotional Competence Test (GECO; Schlegel and Mortillaro 2019) and the North Dakota Emotional Abilities Test (NEAT; Krishnakumar et al. 2016). The group that developed the GECO also published the Geneva Emotion Knowledge Test (GEMOK; Schlegel and Scherer 2018). As the GECO, NEAT, and GEMOK are newer, their validity evidence is limited (see Table 2). We thus benchmark the validity of the CORE with the more established tests (i.e., the MSCEIT-Understanding and STEU).⁵

The MSCEIT helped found the field of ability EI assessment (Fernández-Berrocal and Extremera 2006; Mayer et al. 2008b) and it remains the most cited EI ability measure to date (see Table 2). In the MSCEIT, the Understanding subtest contains two tasks: one assesses how emotions co-occur or blend into each other (Blends Task), and one assesses how emotions may intensify or change over time (Changes Task). To answer the test questions, knowledge of emotion appraisals or relational themes may be helpful, but neither task explicitly measures people’s ability to identify emotion appraisals or core relational themes. Also, the validity evidence for the MSCEIT-Understanding subtest typically combines scores on both tasks, so one cannot discern what facets of EU ability are related to which outcomes (Mayer et al. 2002, 2012; Maul 2012). Another challenge is that the MSCEIT (including the EU subtest) derives its correctness criteria from consensus ratings by emotion experts⁶ and a general population sample ($N = 5000$). There are questions about whether these scoring criteria are optimal for a maximal performance test of EI ability (Fiori et al. 2014; Maul 2012; Miners et al. 2018). Additionally, the MSCEIT validation studies ($N = 5000$), though international, oversampled people under 30 years old with some college education or higher, and race was not representatively sampled (Mayer et al. 2002), potentially limiting test validity only to certain groups (AERA et al. 2014).

The STEU draws on Roseman’s (2001) emotion appraisal theory and evidence in support of the theory to guide the correctness criteria of the test (MacCann and Roberts 2008). It also assesses emotion appraisals directly (in a subset of items), tests different response formats, and is free of charge. These are noteworthy advances in EU ability testing. That said, the STEU combines scores across different item types, including SJT items set in work and personal life contexts and items meant to tap emotion appraisals directly. This may increase content validity, but the reliance on SJTs with social contexts for most items may add construct-irrelevant variance (AERA et al. 2014) to the test (e.g., measuring of social norms knowledge or cultural rules; e.g., van Rijn and Larrouy-Maestri 2023).⁷ Additionally, the STEU employs binary (correct/incorrect) scoring that may not reflect the extent to which appraisals or relational themes of different emotions meaningfully overlap (see below On the Dimensionality of Emotion), possibly leading to construct underrepresentation (AERA et al. 2014). Finally, as with the MSCEIT, the STEU was validated with primarily White college students or college graduate samples (see Table 2), potentially limiting its validity generalization to those specific samples (AERA et al. 2014).

Table 2. Comparison of Situation-Judgment and Performance-Based Tests of Emotion Understanding Ability (in English-Speaking Adults).

EU Ability Measure	CORE Test	MSCET-Understanding	STEU	GCo-Understanding	GEMOK-Blends and Features	NEAT-Perception and Understanding	LEAS
Primary Citation	N/A	Mayer et al. (2003)	MacCann and Roberts (2008)	Schlegel and Mortillaro (2019)	Schlegel and Scherer (2018)	Krishnakumar et al. (2016)	Lane et al. (1990)
Google Scholar Citation Count (as of 26 August 2023)	N/A	3073	715	94	38	64	1281
Construct Measured	Core relational themes of emotion	Emotion blends/changes over time/intensity	Emotion appraisals (in general, work, personal contexts)	Emotion appraisals (e.g., novelty, power, valence)	Blends: Emotion appraisals and 4 other components (feeling, action tendencies, expression, and physiology) Features: Semantic knowledge about feature-emotion relationships	Emotion appraisals, emotion blends/transitions	Emotional awareness, emotional complexity, emotional development
Cost/Accessibility	Free, available in supplemental materials	Available on MHS website; Researcher discount—\$9 per subject (scored data set reports); Full report—\$48 to \$67 per subject; Certification required for non-researchers ^a (as of 18 April 2023)	Free, available in supplemental materials	Free for research purposes only (professional, or commercial, or personal use is prohibited); Available upon request with signed research agreement on the University of Geneva website	Free, available in supplemental materials	N/A	Available on eLEAS website; Online administration and scoring; Researcher—\$10 per subject; Clinician—\$50 per subject; Student—\$5 per subject (Paper/Manual scoring available) (as of 18 April 2023)

Table 2. *Cont.*

EU Ability Measure	CORE Test	MSCET-Understanding	STEU	GEC-Understanding	GEMOK-Blends and Features	NEAT-Perception and Understanding	LEAS
Mode of Assessment	Sentence completion task	Situation judgment task/vignettes	Situation judgment task/vignettes	Situation judgment task/vignettes	Blends: Situation judgment task/vignettes; Features: Semantic matching task	Situation judgement task/vignettes	Situation judgement task/vignette (open-ended responses)
Typical or Maximal Performance	Maximal	Maximal	Maximal	Maximal	Maximal	Maximal	Typical
Number of Items	38	32 (Blends: 12, Changes: 20)	42	20	120 (Blends: 20, Features: 100)	80 ratings: (Perception: 10, Understanding: 10) × 4 ratings each	20
Completion Time	5–7 min	30–45 min (full test battery)	N/A	50 min (full test battery)	N/A	N/A	30 min
Number of Emotions Measured	19 (10 positive and 9 negative): Amusement, awe, compassion, contentment, gratitude, hope, inspiration, joy, love, pride, anger, anxiety, boredom, disgust, embarrassment, envy, jealousy, sadness, shame	18 (8 positive and 10 negative): Admiration, contentment, gratitude, happiness, love, nostalgia, optimism, relief, anger, anxiety, confusion, disgust, guilt, hate, helplessness, jealousy, sadness, shame	14 (6 positive and 8 negative): Gratitude, hope, joy, pride, relief, surprise, angry, contempt, dislike, distressed, frustrated, regret, sad, scared	14 (4 positive and 10 negative): Happiness, interest, pride, relief, anger, anxiety, boredom, contempt, disgust, fear, guilt, irritation, sadness, shame	Blends: 15 (6 positive and 9 negative): Happiness, interest, joy, pleasure, pride, surprise, anger, anxiety, disgust, fear, guilt, irritation, jealousy, sadness, shame Features: 12 (5 positive and 7 negative): Interest, joy, pleasure, pride, surprise, anger, contempt, disgust, fear, guilt, sadness, shame	N/A	Self-generated

Table 2. *Cont.*

EU Ability Measure	CORE Test	MSCET-Understanding	STEU	GFCo-Understanding	GEMOK-Blends and Features	NEAT-Perception and Understanding	LEAS
Correctness Criteria (theory, prior research, expert/population consensus)	Based on theory and prior research across multiple emotion science literatures (see Table 1)	Expert or population (N = 5000) consensus	Based on theory: Roseman's (2001) Appraisal Theory	Based on theory: Component Process Model of emotion (Scherer 1984, Scherer et al. 2001)	Based on theory: Component Process Model of emotion (Scherer 1984, Scherer et al. 2001), and data from the GRID study (Fontaine et al. 2013) Features: Closeness to mean ratings from the GRID	Expert (MBA student) average ratings (N = 30)	Based on Levels of Emotional Awareness Theory (Lane and Schwartz 1987)
Scoring	Progressive scoring (no credit, half credit, full credit), based on theory and prior findings, cross-validated with a confusion matrix	Weighted scoring based on expert or population consensus scores	Binary scoring based on theory	Binary scoring based on theory	Blends: Binary scoring based on theory and GRID data Features: Profile correlations of participant ratings with GRID mean ratings	Weighted scoring based on expert consensus scores	Computer or hand scoring corresponding to Levels of Emotional Awareness Theory; Can sum individual self and other scores, or combine them
Reliability	Study 1: $a = 0.90$ Study 2: $a = 0.94$ Study 3: $a = 0.96$	Understanding total: General: Split-half = 0.80 Expert: Split-half = 0.77 Changes: General: $a = 0.70$ Expert: $a = 0.68$ Blends: General: $a = 0.66$ Expert: $a = 0.62$ Study 2: $a = 0.84$ (Present research)	Study 1: $a = 0.71$ Study 2: $a = 0.43$ Study 3: $a = 0.83$ (STEU-B) Study 2: $a = 0.84$ (Present research)	Study 2: Total: $\omega_t = 0.86$ Understanding subtest: $\omega_t = 0.78$ Study 3: Total: $\omega_t = 0.89$ Understanding subtest: $\omega_t = 0.75$	Study 1: Features: $a = 0.89$ Blends: $a = 0.80$ Study 2: Features: $a = 0.88$ Blends: $a = 0.74$ Study 3: Blends: $a = 0.79$ Study 4: Blends (brief): $a = 0.67$	Study 1: Perception: $a = 0.87$ Understanding: $a = 0.81$ Study 3: Perception: $a = 0.89$ Understanding: $a = 0.77$ Total: $a = 0.92$ Study 4: Perception: $a = 0.89$ Understanding: $a = 0.75$ Total: $a = 0.92$ Study 5: Perception: $a = 0.92$ Understanding: $a = 0.69$ Total: $a = 0.93$	$a = 0.81$ (Lane et al. 1990) $a = 0.80-0.88$ ^b (computer version: $a = 0.84, a = 9.88$) (Lane and Smith 2021)

Table 2. Cont.

EU Ability Measure	CORE Test	MSCET-Understanding	STEU	GCo-Understanding	GEMOK-Blends and Features	NEAT-Perception and Understanding	LEAS
Primary Sample (equal allocation, representative, purposive, other sampling method) ^c	Study 1: Disproportionate stratified sample (equal allocation; see Table S2)	N = 5000: 52% female, 37.3% male, 10.7% unreported; 58.6% White, 26.4% Asian, 5.4% Black, 4.9% Hispanic, 4.6% other; 58% some college, 14.9% college graduate, 5.5% master's degree or higher; 37% age 20–29, 35% age 17–19, 12.7% unreported, 6.1% 30–39, 5.5% 40–49, 3.7% 50+ (Mayer et al. 2002)	Study 1: N = 207; 67.6% female; M age = 21.2; 53.1% Australian/Anglo-Celtic; 100% undergraduate students	Item generation: 38, German- and French-speaking managers, HR, team leaders Item pre-test: 10 emotion researchers, 40 English speakers	Study 1: N = 443; M age = 45.4; 52% female; 65% Caucasian Study 2: N = 187; M age = 22.3; 55% female; 63% Asian, 33% Caucasian; 100% undergraduate/graduate students/staff members	All undergraduate samples Study 1: N = 290; M age = 19.8; 53% female Study 2: N = 578; M age = 19.6; 53% female Study 3: N = 96; M age = 19.2; 54% female	N = 40: Yale undergraduates; 50% female; majority late teens, early 20s (all less than 30 years old)
	Study 2: Quasi-representative sample (see Table S8)	N = 2112: 58.6% female; M age = 26.25; 39.2% some college, 33.7% college graduate, 16.1% holding master's level or higher; 34.0% Asian, 3.4% Black, 2.0% Hispanic, 57.9% White, and 2.3% other or mixed ethnicity; Majority U.S., but other countries sampled (Mayer et al. 2003)	Study 2: N = 149; 71.8% female; M age = 35.33; 73.8% Australian/Anglo-Celtic; 68% postsecondary school	Study 3: N = 211; M age = 36.5; 53% female; 70% Caucasian; 56.4% college degree, 12.4% postgraduate degree Study 4: N = 206; Only 12% of responses administered in English Study 5: N = 113; German-speaking sample	Study 3: N = 87; M age = 33.5; 53% female; 75% Caucasian; Study 4: N = 85; M age = 19.2; 52.3% female Study 5: N = 91; M age = 21.1; 53% female; worked 20+ hours a week		

Table 2. *Cont.*

EU Ability Measure	CORE Test	MSCIEIT-Understanding	STEU	GFCo-Understanding	GEMOK-Blends and Features	NEAT-Perception and Understanding	LEAS
	Study 2: Associated with relational conflict above and beyond the MSCIEIT or STEU			Mean of recognition, understanding, and management subtests associated with average grade and exam points over the MSCIEIT	N/A	N/A	N/A
Incremental Validity (over other EU ability measures)	Study 3: Associated with maladaptive coping, compassion fatigue, meaning and purpose, and a malleable emotion mindset above and beyond the STEU-B	N/A	N/A	Total (in a subsample of German-speaking adults)	N/A	N/A	N/A

Note. N/A = Information was not available or could not be found. CORE = Core Relational Themes of Emotion Test; MSCIEIT-Understanding = Mayer-Salovey-Caruso Emotional Intelligence Test-Understanding subtest; STEU = Situational Test of Emotion Understanding; GFCo-Understanding = Geneva Emotional Competence Test-Understanding subtest; GEMOK-Blends and Features = Geneva EMOTION Knowledge test – Blends and Features; NEAT-Perception and Understanding = North Dakota Emotional Abilities Test – Perception and Understanding subtests; LEAS = Levels of Emotional Awareness Scale. ^a \$2000–\$2495 a person (based on posted prices of 2/5 U.S. based companies qualified to run MSCIEIT certification training as of 18 April 2023). ^b Some reported studies included non-English speaking samples or used very brief versions of the scale (e.g., 5 of 20 items). Those studies were removed from this range. ^c Sample category labels (e.g., Asian, White) were listed as they appear in the original studies and were not determined by the authors.

Existing tests of EU ability signify notable strides in the scientific study of EU. However, the field is still in development, and leading EU tools have limitations, including measurement imprecision, the overreliance on social vignette-based methods, the lack of generalizable validity evidence, and scoring criteria that oversimplify the layered complexity in emotion concepts. Also, no existing tests provide a score quantifying people's knowledge of core relational themes. Importantly, these limitations are tractable, and we aim to address them (to an extent) with the development and validation of the CORE.

1.3. *On the Dimensionality of Emotion Space*

For decades, researchers have debated the number of distinct emotions, what separates one emotion from another, and how emotion categories vary across different components of emotions (e.g., phenomenology, appraisals, expressive behaviors; Barrett 2017; Barrett and Russell 2014; Ekman 1992; Roseman 2013; Scherer 2019; Smith and Lazarus 1993). Recently, a new research program has utilized massive-scale data collection and machine learning to test the existing theories (Cowen and Keltner 2017, 2021; Keltner et al. 2023). Findings from this work suggest that emotions cluster into “emotion families” based on shared characteristics, including appraisals and relational themes, and that emotion families are related to each other across multidimensional gradients of emotion space (see also Toivonen et al. 2012). Moreover, this perspective supports the notion that though there are primary kinds or clusters of emotions, there is reliable differentiation within emotion clusters, and there appear to be many specific (20+) emotions people distinguish among via facial expressions, vocal tone, music, and language/concepts, where some characteristics are shared and not others. A new, computational theory of emotions was developed based on these findings, called Semantic Space Theory (Cowen and Keltner 2021).

Semantic Space Theory informed our test development, as it suggests that knowledge about emotion appraisals and relational themes likely exists on a gradient, reflecting *degrees* of semantic relatedness. As such, we adopt a progressive versus dichotomous scoring paradigm (accuracy is determined by degrees of correctness; e.g., Castro et al. 2015) to score our EU ability test. This builds the natural relatedness of emotion themes into the test as signal rather than discarding it as noise. To our knowledge, no other quantitative measures of EU ability adopt this approach and root the correctness criteria in theory and prior research.⁸ Using this approach, we aim to better capture the complexity of EU ability.

1.4. *The Present Research*

Across three studies, we develop and provide validity evidence for a new performance test of EU ability, called the CORE. We followed best practices in developing and validating new EI ability measures, including clearly defining the theoretical construct and rooting its criterion for correctness in testable theory and prior findings (Maul 2012; Miners et al. 2018). Additionally, we consulted the Standards for Educational and Psychological Testing (AERA et al. 2014) in the process of evaluating the reliability (i.e., internal consistency) and validity evidence of the test, along with our consideration of its guidance regarding test fairness principles and the use of recommended language and terminology.

Test validity is evaluated based on integrating different kinds of validity evidence guided by the intended test use (AERA et al. 2014). In building the test, we took an expansive view regarding how many emotions exist to increase construct representation, based on recent advances in studying specific emotions (e.g., Cordaro et al. 2016b) and insights into the multidimensionality of emotion space (e.g., Cowen and Keltner 2021) (see Table 1). Regarding the test structure, we examined the test's unidimensionality with factor analysis. We also gathered convergent and discriminant evidence of validity and examined test-criterion relationships (AERA et al. 2014). Specifically, we studied the CORE's association with widely used EU tests (i.e., the MSCEIT-Understanding and STEU) (convergent evidence), and the CORE's relation to more construct-irrelevant variables associated with EU ability, including age, gender, race, education, and to an extent, verbal intelligence (discriminant evidence). For test-criterion relationships, we examined the association be-

tween the CORE and three constructs centrally related to EU ability: (1) relational conflict, given the significant role of understanding one's own and others' emotions in preventing and navigating social challenges (Brackett et al. 2011); (2) coping, based on the Cascading Model of EI that suggests EU predicts psychosocial and performance outcomes via targeted emotion regulation (Joseph and Newman 2010; Kashdan et al. 2015; see also Castro et al. 2016); and (3) well-being, based on recent data showing the link between EI abilities and indicators of emotional and subjective well-being (Fernández-Berrocal and Extremera 2016; Sánchez-Álvarez et al. 2016). Finally, we examined whether the CORE was associated with outcomes beyond variance accounted for by other EU ability tests (incremental validity evidence). These steps help to clarify measurement precision, measurement versus construct variance, and test-criterion relationships (Maul 2012).

To promote test fairness (AERA et al. 2014), we took three primary steps. First, the CORE items were developed with a demographically diverse sample (Study 1), and the validity data from Studies 2 and 3 also included greater participant diversity than is typical in EU test validation studies (see Table 2). Second, the CORE items were written using brief and simple language, and then we tested whether the items were readable by those with a high school education. Third, in all models examining the CORE's test-criterion relationships, we included demographic variables to assess the CORE's validity accounting for the contributions of these factors. We also make recommendations for future research that will help to further examine whether the CORE meets key fairness principles.

2. Study 1

The goals of Study 1 were to develop and refine the CORE item pool using a multi-stage process, achieve measurement economy, and assess the initial test reliability (internal consistency). Additionally, to understand participants' test experiences, we measured their perceptions of test instruction clarity and how engaging they found the test.

The Development of the Core Relational Themes of Emotion (CORE) Test

To begin, we drew on cognitive appraisal theories of emotions to guide the correctness criteria of the test (Moors 2014, 2020), focusing on core relational themes, which are thought to emerge from primary appraisals (Lazarus 1991; Smith and Lazarus 1993). We chose relational themes to increase the ecological validity of the test. Relational themes are likely a closer approximation of how non-academics consciously think and speak about the meaning of emotions (Smith and Lazarus 1993). We hoped that test-takers would find the relational theme language easier and less confusing to interpret, reducing measurement error. This approach also allowed us to measure emotion knowledge more directly rather than inferring it from responses to widely used situation-based vignettes.

Next, we selected 24 emotions with empirically supported core relational themes from three literatures: (i) relational theme studies (e.g., Lazarus 1991) and appraisal theories (e.g., Roseman 2013); (ii) recent large-scale empirical studies on the dimensionality of emotion (e.g., Cowen and Keltner 2017, 2021); and (iii) studies of specific emotions (e.g., pride research by Tracy and Robins 2007). The emotions were: amusement, awe, compassion, contentment, gratitude, hope, inspiration, interest, joy, love, pride, relief, anger, anxiety, boredom, disgust, embarrassment, envy, fear, guilt, jealousy, sadness, shame, and surprise. We examined whether multiple themes were present per emotion and considered all core themes for each emotion to serve as the basis for test items. The relational themes we used to write the items and to determine response accuracy are in Table 1.

We drew on the specific language describing the core relational themes from the literature to write the CORE items. In doing so, we included common phrases used by researchers and participants to describe relational themes. We adapted words and phrases as needed to ensure the use of simple and plain language. We wanted those with a high school education to understand the items (noting that other EU ability tools largely develop and validate their items with college-educated samples; see Table 2). We wrote and revised items in an iterative cycle to capture the relational themes as succinctly as possible.

Then, an expert panel of five doctoral-level emotion scientists (the authors) with backgrounds in psychology, organizational behavior, and education reviewed the items and answers (derived from theory and prior work). Panelists possessed relevant research knowledge about emotion, cognition, and EI abilities and EI tests (AERA et al. 2014). The panel reviewed the items, assessing: (1) item accuracy—fidelity to the emotion science literature for each relational theme; (2) item diversity—coverage of emotions across the breadth of emotion space, including positively and negatively valenced and high and low arousal emotions; (3) item differentiation—a reasonable degree of exclusivity between relational themes within and between emotions to distinguish among them (noting full mutual exclusivity was not possible given our theoretical orientation toward Semantic Space Theory; Cowen and Keltner 2021); and (4) item readability—clarity and concision in item language. Panelists reviewed the items on their own, and then met as a group to discuss the extent to which items met the criteria. Item framing, word choices, and answer decisions, among other topics, were deliberated until the panel agreed on sufficient satisfaction of all criteria, including changing items and adding or dropping items. Following these steps, we developed 78 items for inclusion in the CORE to be tested in Study 1.

3. Materials and Methods

3.1. Participants and Procedure

Psychological test development standards suggest that subgroups relevant to the intended test use should be employed in test construction (AERA et al. 2014). Accordingly, for the creation of the CORE in Study 1, we implemented disproportionate stratified sampling using equal allocation to obtain equal representation across major demographic groups in U.S. adults (our target population) (see Daniel 2012). This approach also allowed us to build a confusion matrix (see below). Specifically, we aimed to sample the following demographic characteristics equally reported by the U.S. Census Bureau (2020a, 2020b, 2020c): age, gender, race, and education level. We did not nest our sampling targets within each other (e.g., an equal number of men and women across racial categories), given practical constraints. Conducting such a study in future research would be useful, as it would permit an examination of the role intersectionality plays in EU ability and EU tests, as measured by the CORE and other EU ability tools (e.g., see Monroy et al. 2022). The sampling targets were as follows: (i) 33% ages 18–29, 33% ages 30–49, and 33% ages 50–65; (ii) 50% female and 50% male; (iii) 25% Asian, 25% Black, 25% Latinx, 25% White⁹; (iv) 33% high school education, 33% some college or associate degree, and 33% four-year college degree or higher. The obtained sample ($N = 684$) largely reflects these targets with a degree of under/oversampling (see Table S2). Regarding age, participants were 26.8% 18–29, 47.3% 30–49, and 25.9% 50–65. In terms of gender and race, participants were 55.7% female, and 38% White, 22.5% Latinx, 19.9% Asian, and 19.6% Black. Regarding education, 28.8% had a high school education, 31.4% reported some college or an associate degree, and had 39.8% four-year college degree or higher. Also, 100% of participants were primary English language speakers and 100% worked full-time (>30 hours a week) across sectors (e.g., education/research, construction/manufacturing, and business/finance).

Participants were recruited via Qualtrics panel services and they were financially compensated for their time. This study was administered online via the Qualtrics platform in July of 2020. Two attention checks were included in the study (one or more attention checks missed was considered grounds for response removal; Kung et al. 2018). Also, completion time was reviewed to ensure data quality (finishing the study in less than $\frac{1}{4}$ median time was considered speeding; Curran 2016). Screening was implemented proactively, so responses that did not meet our requirements were automatically screened out. Informed consent was obtained from all participants involved in this study. The research study was reviewed and approved by our university IRB (protocol #: 2000022943).

3.2. Analytic Plan

3.2.1. Confusion Matrix, Item Pruning, and Progressive Scoring

We calculated the proportion of participants who chose the target answer for each of the 78 items (i.e., the raw “hit rate”). We then generated a confusion matrix (see Tables S3–S6). A confusion matrix indicates the proportion of participants who selected the target response on the diagonal of the matrix (i.e., how often they picked the target response), and the proportion of participants that selected any “distractor” responses on the off-diagonal (e.g., LaPalme et al. 2023; Laukka et al. 2016). To aid interpretability, we converted raw hit rates into a proportion index based on the total number of response options (i.e., 24 possible responses/emotions). This proportion index (pi ; Hall et al. 2008; Rosenthal and Rubin 1989) represents hit rates as if the answers were made dichotomously (though they were not).¹⁰ Chance level of accuracy is .50 (see the Supplemental Materials).

Along with applying the same criteria from the expert panel (i.e., item accuracy, diversity, differentiation, and readability), we used the confusion matrix results to prune CORE items. The goal was to increase measurement economy while retaining key facets of test reliability and validity. Our plan was to remove items where the hit rate was below chance (.50) or nearly perfect (1.00), and then to retain items that covered as much emotion space as possible, trying to include at least two items per emotion. We also anticipated the removal of emotions and items where there was high semantic redundancy.

Full credit, half credit, and no credit (distractor) responses were based on: (i) relational theme (e.g., Lazarus 1991) and appraisal theory research (e.g., Roseman 2013); (ii) recent findings on the semantic relatedness of emotion concepts (e.g., Cowen et al. 2019; Toivonen et al. 2012); and (iii) research programs on specific emotions (e.g., Tracy and Robins 2007) (see Table 1). The confusion matrix provided additional information to consider when finalizing the scoring key and it was a direct empirical test of the overlap between relational themes identified from the literature for the 24 target emotions. Emotions within the same emotion family, but not the target answer, were assigned half credit, such as: gratitude for a love item (prosocial emotion family), jealousy for an envy item (self-conscious emotion family), and inspiration for an awe item (epistemological emotion family) (Sauter 2017; Shiota et al. 2014; Simon-Thomas et al. 2009). Emotion families are linked by the evolutionarily adaptive and primary psychosocial functions they serve (e.g., see Keltner et al. 2022). This scoring approach is aligned with studies that suggest emotions exist along multidimensional gradients connected by clusters that share core meanings and functions, noting that substantive distinctions between emotions within the same emotion family can be made (Cowen et al. 2019; Cowen and Keltner 2021). For distractors, we selected emotions with potential semantic overlap, higher hit rates than other incorrect answers, and similar valence and arousal levels to the target answer (e.g., interested, amused, content for an inspired item, or embarrassed, guilty, anxious for a jealousy item).

3.2.2. Reliability

We used Cronbach’s alpha to test the internal consistency of the CORE and all other measures in the present research (Kalkbrenner 2023). We report this form of reliability as we expected that test scores are stable over time, given the consistency in EI and EU ability across test administrations (without EI training; see Mayer et al. 2003) (AERA et al. 2014).

3.2.3. Participant Ratings of Instruction Clarity and Test Engagement

Participants rated the CORE instructions as 1 (clear), 2 (confusing), or 3 (other; text entry). We also asked respondents to rate all test items on a scale of 1 (interesting/engaging) to 7 (dull/tedious).¹¹ We calculated response percentages to assess ratings of instruction clarity and used mean scores to assess how engaging participants found the test.

4. Results

4.1. Confusion Matrix

The confusion matrix indicated that most participants selected the target answer on the test items above 0.50 (chance). Across all 78 items, the mean pi (i.e., chance-adjusted hit rate) was 0.94 ($SD = 0.04$). The item-level hit rate range was 0.73 to 0.98. At the emotion level, the lowest and highest chance-adjusted hit rates were for guilty (0.86) and surprise (0.98), respectively (see Tables S3–S6). High hit rates may reflect shared knowledge of relational themes and their intuitive nature (Smith and Lazarus 1993), and the simple item language and direct measurement of emotion knowledge. That said, the raw hit rates clearly indicate that many participants still found the items hard to answer correctly. Without adjusting for chance, the mean raw hit rate (percent correct) was 0.46 ($SD = 0.11$). The item-level raw hit rate range was 0.15 to 0.78, and at the emotion level, the lowest and highest raw hit rates were for guilty (0.23) and surprise (0.68), respectively (see Tables S3–S6).

4.2. Item Pruning

As the hit rate for all items was above chance (0.50), we did not use the <0.50 cutoff to prune CORE items. We still employed high hit rates (close to 1.00) to aid item pruning to increase item-level difficulty across emotions and the test. We also explored how often a non-target emotion was selected with a comparatively high hit rate (>0.70) to identify emotion overlap. That said, we first removed emotions from the CORE that did not add unique information, while retaining as many emotions with distinct relational themes as possible. We also tried to keep emotions that were of positive and negative valence, and high and low arousal to increase content validity. From this process, we removed all items for five emotions: interest, relief, fear, guilt, and surprise. The interest items were pruned as the relational theme was broad (i.e., novelty; Silvia 2005), overlapped highly with other emotions (e.g., surprise; Lazarus 1991), and other high-energy positive emotions were represented (e.g., pride). Similarly, the items for guilt overlapped too heavily in semantic features with shame, as did the answers for fear with anxiety.¹² Relief and surprise each only had one core relational theme (see Table 1) and they were easy to answer (emotion-level chance-adjusted hit rates = 0.96 for relief and 0.98 for surprise). We therefore retained items for 19 emotions. Next, we removed items within the 19 emotions that were different ways of capturing the same relational theme to offer coverage of multiple themes for each emotion (where possible). Finally, when multiple relational themes were present, we relied on the literature to select the two most empirically supported themes. After pruning, the CORE consisted of 38 items total, covering 19 different emotions with two items each.

4.3. Progressive (Degrees of Correctness) Scoring

With the 38-item set, we implemented a progressive (degrees of correctness) test scoring paradigm (e.g., Castro et al. 2015). Rather than use a dichotomous approach, where answers are only correct or incorrect, participants can receive 0 points (no credit), 0.5 points (half credit), or 1 point (full credit) (the scoring key is in Table S7). A higher score is intended to reflect a greater understanding of the core relational themes of emotions. Other EI ability tests have utilized progressive approaches for scoring protocols (e.g., Castro et al. 2015). Yet, to our knowledge, no other tests of EU ability have used progressive scoring methods. Theory and past findings mainly converged with the confusion matrix results regarding the full and half credit answers (mean chance-adjusted hit rate for the half-credit answers = 0.70, $SD = 0.17$). Answers that were not the target response were not random. The confusion matrix indicated participants selected non-target answers (e.g., jealousy for an envy item; fear for an anxiety item) above chance for 33 of 38 items. These answers appear to reflect the continuous gradients of shared meaning that emotions vary along (Cowen and Keltner 2021). No credit distractors were selected based on their semantic proximity to the correct answers, hit rates, and valence and arousal properties.

4.4. Reliability

Reliability (internal consistency) was high in the unpruned 78-item ($\alpha = 0.94$) and pruned 38-item ($\alpha = 0.90$) CORE. We retained the 38-item test for the sake of test economy.

4.5. Participant Experiences of the CORE

We found that 94.2% of participants indicated the instructions were “clear”, 4% found them “confusing”, and 1.8% selected “other”. In terms of test engagement, participants gave the CORE a mean rating of 5.73 ($SD = 1.91$) out of 7. For the most part, participants understood the test instructions and found the test moderately interesting and engaging.

4.6. Readability Statistics of the CORE

We calculated the commonly used Flesch–Kincaid Test and Gunning Fog Index to determine the readability of the CORE items. The Flesch–Kincaid Test calculates reading difficulty using average sentence length and average word length. The Gunning Fog Index calculates average sentence length and percent of complex words (words with three or more syllables). The CORE had a Flesch–Kincaid score of 6.7 out of 18, indicating it is readable for people at a sixth to seventh grade reading level or higher. The CORE had a Gunning Fog score of 10.14 out of 20, indicating it is readable for people at a tenth to eleventh grade reading level or higher. Our goal was for the CORE items to be readable for individuals with a high school education, and the CORE meets this benchmark.

5. Discussion

In Study 1, we reviewed multiple literatures in emotion science, selected core relational themes for 24 emotions, wrote 78 test items, and had an expert panel evaluate the items. We used emotion theory, prior findings, and the results from a confusion matrix to prune items and develop the progressive scoring key. The CORE showed high internal consistency, participants rated the test instructions as clear and the test as moderately engaging, and the items were readable by those with a high school education. The 38-item CORE (covering 19 different emotions) and answer key are in the Supplemental Materials.

6. Study 2

In Study 2, we examined the factor structure of the CORE. We also studied its construct validity by testing for convergent relationships between the CORE and widely used measures of EU ability (i.e., MSCEIT and STEU), and discriminant relationships between the CORE and demographic characteristics (i.e., age, gender, race, education level) and (to some extent) verbal intelligence (AERA et al. 2014).¹³ Additionally, we included a preliminary measure of test-criterion relationships (i.e., relational conflict).

Based on theories that contend EU ability is multi-faceted, we hypothesized understanding relational themes specifically to constitute one such facet of EU ability (Castro et al. 2016; Mayer et al. 2016). We thus predicted a single-factor structure would best fit the CORE. Also, based on research examining the construct and criterion-related correlates of other EU ability measures (Joseph and Newman 2010; MacCann and Roberts 2008; Mayer et al. 1999, 2003, 2008a, 2008b; Schlegel and Mortillaro 2019; Schlegel and Scherer 2018), we predicted: (i) the CORE to show moderate to large positive correlations with existing EU ability measures; (ii) small to moderate positive correlations with age, female gender, and education level; (iii) a moderate to large positive correlation with verbal intelligence; (iv) and a small to moderate negative correlation with relational conflict frequency. We did not predict how the CORE would relate to race, given the limited evidence on this topic. We selected relationship conflict as a preliminary criterion outcome based on prior research linking EI abilities to relationship quality and challenges (Brackett et al. 2005; Kotsou et al. 2019; Lopes et al. 2003, 2004), and research suggesting that how skillfully people process their emotions plays a central role in their relationship satisfaction and outcomes (e.g., see Sbarra and Coan 2018). For effect sizes, we used Cohen’s (1988, 1992) conventions: “small” $r = 0.10$ – 0.29 , “medium” $r = 0.30$ – 0.49 , and “large” $r = 0.50$ or greater.

7. Materials and Methods

7.1. Participants and Procedure

We aimed to representatively sample the U.S. working population in Study 2 to generalize the results to this group (AERA et al. 2014). The sampling targets were: (i) 100% age 18 or older; (ii) 47% female and 53% male; (iii) 70% White, 15% Latinx, 10% Black, 5% Asian; and (iv) 33% high school education, 27% some college or associate degree, and 40% four-year college degree or higher (U.S. BLS 2020). The collected sample ($N = 284$) largely reflects this distribution (see Table S8). Participants were all above age 18 (M age = 41.2 years, $SD = 14.2$), 50.4% female, and 66.2% White, 14.8% Latinx, 12.3% Black, 6.7% Asian. The education breakdown was: 27.1% high school education, 26.7% some college or associate degree, and 46.1% four-year college degree or higher. Also, participants were 100% primary English language speakers, and 100% worked full-time (>30 h a week) across multiple industries (e.g., business or finance, construction or manufacturing, and the service sector). We marginally oversampled female (by 3%), Black (by 2.3%), Asian (by 1.7%), and four-year college graduate (or higher) participants (by 6%), and undersampled high school educated participants (by 6%), so we consider this sample “quasi-representative”.

Recruitment occurred utilizing Qualtrics panel services, and participants were paid for their study time. The measures were administered online using the Qualtrics website in July of 2020. We used the same attention and speeding check procedures to ensure data quality as Study 1. Responses were culled proactively as they came in, and so the full sample was retained. Informed consent was obtained from all participants involved in this study, and the study was approved by our university IRB (protocol #: 2000022943).

7.2. Measures

The CORE. We administered the 38-item CORE developed in Study 1. The CORE assesses people’s ability to identify the core relational themes of 19 different emotions. Participants select from five response options. The test showed high reliability ($\alpha = 0.94$).

MSCEIT-Understanding Subtest. The EU subtest of the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al. 2002, 2003) is a measure of EU ability. It contains two parts: the Blends and the Changes Tasks. The Blends Task contains 12 items where participants either combine emotions into more complex ones or dissect a complex emotion into its component parts. The Changes Task is a 20-item task where participants analyze how emotions transition and change in intensity over time. Both tasks use a five-option multiple choice format. The EU subtest showed good reliability ($\alpha = 0.84$).

STEU. The Situational Test of Emotion Understanding (STEU; MacCann and Roberts 2008) is a 42-item EU ability test. Respondents read vignettes and select the emotion that best fits how a person may feel using multiple choice. STEU reliability was good ($\alpha = 0.84$).

Verbal Intelligence. Verbal intelligence was measured using the Wordsumplus Test (Cor et al. 2012). This is a 14-item test where participants indicate the word that is closest in meaning to the target word. The scale has six options to select from, including a “don’t know” option (marked as incorrect). The scale showed good reliability as well ($\alpha = 0.81$).

Relational Conflict. Relational conflict was assessed with items from the Network of Relationships Inventory-Relationship Qualities Version (NRI-RQV; Buhrmester and Furman 2008). Respondents indicated their frequency of conflict with friends, family, and romantic partners from 1 (never) to 6 (constantly). Scale reliability was good ($\alpha = 0.88$).

7.3. Analytic Plan

7.3.1. Confirmatory Factor Analyses

To assess the single-factor structure of the CORE, we used confirmatory factor analysis (CFA) with the weighted least squares mean values (WLSMV) estimator in Mplus 8.1. WLSMV is preferred for CFAs with categorical factor indicators (Li 2016). We tested model fit using the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). Our benchmarks for “adequate fit” were: ≥ 0.90 for CFI and ≤ 0.08 for RMSEA and SRMR, and for “good fit”

were: ≥ 0.95 for CFI and ≤ 0.05 for RMSEA and SRMR (Hooper et al. 2008; Hu and Bentler 1999). Standardized factor loadings exceeding 0.40 were considered acceptable.

We also conducted single-factor CFAs of the MSCEIT-Understanding, STEU, verbal intelligence measures, and relational conflict scale. We used the same analytic approach as we did for the CORE, except we used maximum likelihood estimation with robust standard errors (MLR) in Mplus 8.1 for the CFA of relational conflict (as the factor indicators were continuous; Li 2016). We saved the latent factor scores of each measure for use in all subsequent analyses. Factor scores incorporate item-level variance into latent variables that increases information in the model, as some items may (and frequently do) contribute more to the total score or carry more error than other items (Bollen 2002; McNeish and Wolf 2020). Employing factor scores versus manifest means thus more accurately estimates measurement error and increases power to detect effects (Rdz-Navarro 2019).¹⁴

7.3.2. Convergent and Discriminant Evidence, and Test-Criterion Relationships

To assess convergent and discriminant validity, and test-criterion relationships, we entered the factor scores of the CORE and other measures into bivariate correlations in SPSS 28.0. Gender (male = 0, female = 1), race (White = 0, POC¹⁵ = 1), and education level (less than four-year college degree = 0, 1 = four-year college degree or higher) were dichotomized given their distributions, and we correlated these variables with the CORE. Also, we ran partial correlations between the CORE with other EU ability tests, adjusting for verbal intelligence. All EU ability tools share sizeable variance with verbal intelligence (Joseph and Newman 2010; Mayer et al. 2008a, 2008b), and so this helped to precisely evaluate evidence of the CORE's convergence with other established EU ability tests.

7.3.3. Incremental Validity

Lastly, we examined whether the CORE accounted for additional variance in the criterion-related outcome (i.e., relational conflict), while accounting for variance from demographic factors and widely used EU ability tools. To test incremental validity, we conducted multiple regression analyses. In the first block, we entered demographic variables (i.e., age, gender, race, and education). In the second block, we entered either the MSCEIT-Understanding subtest or the STEU.¹⁶ In the third block, we entered the CORE. Utilizing this stepwise process, we examined whether the R^2 value significantly increased when adding the CORE to the model, compared to the model with only demographics and other EU ability tests. We also inspected whether the effect remained significant for the CORE and whether it became non-significant for the MSCEIT and STEU in the third block.

8. Results

8.1. Test Completion Time

The mean completion time of the CORE was 6.97 ($SD = 4.48$) minutes. Though we screened out speeders, we did not remove participants for taking “too long” to complete the study. As such, the median may offer a more accurate estimate at 5.55 minutes. Either way, the test takes approximately 5.5 to 7 minutes to complete, supporting test economy.

8.2. Factor Structure: CFA

A one-factor CFA of the CORE showed a good model fit, supporting our prediction, $\chi^2(665) = 726.80$, $p = .05$; RMSEA = 0.02; CFI = 0.99; SRMR = 0.06. Standardized factor loadings were moderate to high and ranged from 0.40 to 0.87 (all loadings are presented in Table S9).

8.3. Construct Validity Evidence: Latent Variable Correlations

Using factor scores, the CORE showed large positive associations with the MSCEIT-Understanding subtest ($r = 0.82$, $p < .001$) and the STEU ($r = 0.85$, $p < .001$) (see Table 3). The CORE, MSCEIT-Understanding, and STEU all showed large, commensurate relations to verbal intelligence ($r_s = 0.66$, 0.66 , and 0.67 , $p_s < .001$, respectively). Though the

0.66 to 0.67 relationships between the CORE, MSCEIT-Understanding, and STEU with verbal intelligence are sizeable (about 45% of the variance in EU overlaps with verbal intelligence)—over half (55%) of the variance in EU ability is not accounted for by verbal intelligence. Adjusting for verbal intelligence, the partial correlations between the CORE and the MSCEIT-Understanding ($r = 0.70, p < .001$) and STEU ($r = 0.73, p < .001$) decreased but remained large.

Table 3. Study 2: Zero-Order Correlations Among Latent Variables from CFAs and Covariates.

Variable	M	SD	Latent Study Variables				
			CORE	MSCEIT	STEU	V-IQ	Relational Conflict
Covariates							
Age	41.18	14.25	0.30 ***	0.33 ***	0.37 ***	0.40 ***	−0.24 ***
Gender (M/F)	0.50	0.50	0.17 **	0.18 *	0.22 **	−0.03	−0.12
Race (White/POC)	0.34	0.47	−0.04	−0.24 **	0.04	−0.09	0.11
Education (<4-year/>4-year degree)	0.46	0.50	−0.25 ***	−0.20 *	−0.23 **	−0.02	0.18 **
Latent Study Variables							
CORE	0.76	0.20	—				
MSCEIT	0.48	0.16	0.82 ***	—			
STEU	0.50	0.17	0.85 ***	—	—		
V-IQ	0.59	0.24	0.66 ***	0.66 ***	0.67 ***	—	
Relational Conflict	2.89	1.20	−0.39 ***	−0.30 ***	−0.42 ***	−0.27 ***	—

Note. *n*s = 140–284. CORE = Core Relational Themes of Emotion (CORE) Test. MSCEIT = Mayer–Salovey–Caruso Emotional Intelligence Test–Understanding subtest; STEU = Situational Test of Emotion Understanding; V-IQ = Verbal Intelligence. Participants were randomized to receive either the MSCEIT or the STEU. For the CORE, MSCEIT, STEU, and outcomes, we entered CFA-derived factor scores into the correlations. The reference group for binary variables is the last group in all cases. The mean and standard deviation values in the table reflect variable manifest means (not factor scores) for interpretability. * $p < .05$ ** $p < .01$ *** $p < .001$.

The CORE showed a moderate positive correlation with age ($r = 0.30, p < .001$), a small positive correlation with female gender ($r = 0.17, p < .01$), no correlation with race ($r = −0.04, p = .50$), and a moderate negative correlation with education ($r = −0.25, p < .001$; see Table 3). The results are consistent with prior work (Mayer et al. 2008a, 2008b), though a negative link with education is atypical (the MSCEIT and STEU showed the same pattern).

8.4. Initial Evidence of Test-Criterion Relationships and Incremental Validity

Regarding test-criterion relationships, the CORE latent factor score showed a moderate to large negative association with relational conflict ($r = −0.42, p < .001$; see Table 3).

Regarding incremental validity, adding the CORE to a multiple regression model containing demographic covariates and MSCEIT-Understanding, produced a significant increase in the $R^2, R^2 = 0.18, F(6,132) = 4.67, p < .001$. The $R^2_{change} (132) = 0.05, p < .01$, and total adjusted $R^2 = 0.14$. Also, after adding the CORE, the MSCEIT-Understanding link with relational conflict became non-significant (from $\beta = −0.24, p = .01$ without to $\beta = 0.06, p = .68$ with the CORE), while the CORE relationship remained significant ($\beta = −0.40, p = .01$).

Adding the CORE to a multiple regression model containing demographics and the STEU produced an increase in the $R^2, R^2 = 0.26, F(6,130) = 7.62, p < .001$. The $R^2_{change} (130) = 0.02, p = .04$, and the total adjusted $R^2 = 0.23$. Adding the CORE to the model, the STEU link with relational conflict became non-significant (from $\beta = −0.35, p < .001$ without to $\beta = −0.09, p = .58$ with the CORE), while the CORE association remained ($\beta = −0.30, p = .04$).¹⁷

Finally, we tested whether the CORE was associated with relational conflict, accounting demographic variables and verbal intelligence. Adding the CORE to a multiple regression model containing demographics and verbal intelligence scores produced an increased R^2 , $R^2 = 0.20$, $F(6,269) = 11.52$, $p < .001$. The R^2 change (269) = 0.06, $p < .001$, and the total model adjusted $R^2 = 0.19$. The CORE remained negatively associated with relational conflict ($\beta = -0.35$, $p < .001$), providing evidence of a test-criterion relationship between the CORE and relational conflict beyond shared variance with demographics and verbal intelligence.

9. Discussion

In Study 2, the CORE showed high reliability and the predicted unidimensional factor structure was well-supported. We also found evidence of convergence between the CORE with widely used EU ability tests, and evidence of divergence between the CORE with demographics and verbal intelligence, supporting its construct validity (AERA et al. 2014; Cronbach and Meehl 1955; Smith 2005). The CORE's association with verbal intelligence is akin to other EU ability tests in prior studies (Joseph and Newman 2010; Mayer et al. 2008a, 2008b), and in our data, with the MSCEIT-Understanding and STEU. Notably, the CORE was associated with the MSCEIT-Understanding and STEU beyond shared variance with verbal intelligence, suggesting the CORE measures EU ability, independent of verbal ability. Finally, the CORE was associated with less relationship conflict, accounting for demographics and established EU ability tests, supporting its incremental validity.

10. Study 3

The goals of Study 3 were to further examine the test-criterion relationships and incremental validity of the CORE in comparison with a widely used EU ability measure (the STEU¹⁸). We sampled professionals working in education, as emotion abilities may be particularly useful for populations engaging in high emotional labor (Newman et al. 2010), including education professionals (Wang et al. 2019). We investigated coping and well-being as outcomes based on the Cascading Model of EI (Joseph and Newman 2010), which specifies that EU ability predicts psychosocial and performance outcomes via emotion regulation. Also, recent findings show a link between EI abilities, coping, and well-being, and support the Cascading Model (Fernández-Berrocal and Extremera 2016; Sánchez-Álvarez et al. 2016). Specific outcomes selected reflect the multidimensionality of coping (e.g., Carver 1997) and well-being (e.g., Diener 2009; Lyubomirsky 2008; Ryff and Singer 2008; Seligman 2011), and they tap the demands of working in education (Granziera et al. 2021; Travers 2017). Broadly, coping skills are ways people manage emotional challenges, and effective coping means engaging in typically helpful (“adaptive”) and disengaging from typically unhelpful (“maladaptive”) coping strategies, where helpful and unhelpful strategies are determined by which reliably support well-being (e.g., Webb et al. 2012).¹⁹ Well-being includes positive (e.g., job satisfaction) and negative emotional experiences at work (e.g., emotional exhaustion), social-emotional demands (e.g., emotional labor and compassion fatigue), along with eudaimonia (e.g., a sense of purpose) and mindsets about emotions (e.g., implicit theories about emotion malleability) (Madigan and Kim 2021; Page and Vella-Brodrick 2009). Based on prior research (Fernández-Berrocal and Extremera 2016; Kotsou et al. 2019; Sánchez-Álvarez et al. 2016), we predicted the CORE would be positively related to adaptive coping, job satisfaction, purpose, and a mindset where emotions are seen as malleable and can be changed (Tamir et al. 2007). We also predicted that the CORE would be negatively related to maladaptive coping, emotional exhaustion, emotional labor, and compassion fatigue. We expected all effects to be small ($\beta > 0.20$) to medium ($\beta = 0.20-0.49$) in size (Fey et al. 2023; Joseph and Newman 2010). Lastly, we predicted that these results would hold with participant demographics and STEU scores in the same model, suggesting that the CORE accounts for unique variance in these outcomes.

11. Materials and Methods

11.1. Participants and Procedure

The total sample was $N = 491$ (see Table S11). Noting that the largest single race represented was White participants (39.3%), POC-identifying individuals comprised 60.5% of the sample (see below). The mean age was 39.0 ($SD = 8.3$). The majority of participants (69.1%) were employed full-time at a preK-12 school with an average of 11.0 years working in education ($SD = 7.2$). Modal income ranged from \$50,000 to \$59,999 a year, and the modal education level was a master's degree (45.0%).²⁰ Many participants (52.2%) reported working both remotely and in-person. The remaining participants reported only remote/virtual work (37.6%), only in-person (8.9%), or "other" work modality (1.3%).

We collaborated with seven national and regional organizations that represent Black and Latinx educators in the U.S. who supported study recruitment and outreach. We oversampled Black (28.9%) and Latinx (28.0%) educators to more equitably represent educators of color in research in the field. We disseminated the study via educational newsletters, listservs, talks and events, and educators' social media for a study on educator well-being. Participants were also able to share the study link with colleagues. The study took place online using Qualtrics and lasted about 20–25 minutes. The data reported for this study are a substudy conducted within a larger national study on educator coping and well-being. Participants were paid for their time. Informed consent was obtained from all participants. This research was approved by our university IRB (protocol #: 2000029065).

11.2. Data Screening

We used the same screening criteria as Studies 1 and 2, though they were not applied proactively. After inspection, $n = 30$ participants missed at least one attention check and/or were categorized as speeding. All results reported use the screened sample ($n = 461$).

11.3. Measures

The CORE. We used the same CORE as Study 2, and it was highly reliable ($\alpha = 0.96$).
STEU-B. The Situation Test of Emotion Understanding-Brief (STEU-B; Allen et al. 2014) is a 19-item version of the 42-item STEU. STEU-B reliability was good: $\alpha = 0.83$.²¹

Adaptive and Maladaptive Coping. To measure coping economically, we selected single items from the 14 coping strategies on the Brief-COPE (Carver 1997). The extent to which coping strategies are considered adaptive or maladaptive may vary by person, context, and culture (e.g., Bonanno and Burton 2013; Matsumoto et al. 2008). That said, based on research examining which coping strategies tend to correlate with beneficial outcomes (e.g., Carver and Vargas 2011; Webb et al. 2012), we considered the following strategies adaptive: acceptance, problem solving, positive reappraisal, planning, emotional support, instrumental support, humor, and religion. From past studies on which strategies tend to correlate with undesirable outcomes (e.g., Carver and Vargas 2011; Webb et al. 2012), we considered the following strategies maladaptive: distraction, denial, behavioral disengagement, venting, self-blame, and substance use. The response scale was 1 (didn't do this at all) to 5 (did this almost all of the time). The reliability of the adaptive ($\alpha = 0.74$) and maladaptive ($\alpha = 0.68$) coping measures was acceptable. A two-factor CFA of our coping model was supported adequately by the data (see the Supplemental Materials).²²

Emotional Exhaustion. We used the seven-item Emotional Exhaustion subscale of the Maslach Burnout Inventory for Educators (MBI-ES; Maslach et al. 1996). The response scale ranged from 1 (never) to 7 (every day). Scale reliability was high: $\alpha = 0.92$.

Job Satisfaction. Job satisfaction was measured using three items from the Teaching Empowering Leading Learning (TELL) Survey (New Teacher Center 2017). The response scale was 1 (completely disagree) to 6 (completely agree). The scale was reliable: $\alpha = 0.84$.

Emotional Labor. The authors developed a brief, face-valid scale to assess emotional labor for educators rather than use a general scale to enhance ecological validity. Three items were generated by an educational researcher and an emotion scientist. Items focused on up-regulating positive emotions while experiencing negative emotions, as this is a

common emotional labor demand (see Grandey and Gabriel 2015; Wang et al. 2019). The items were “At work. . . I feel I have to seem happy to students, coworkers, and others, even when I’m feeling depleted; Show enthusiasm to students, coworkers, and others, even when I’m feeling down; Look calm to students, coworkers, and others, even when I’m feeling anxious”. The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). A CFA supported a single-factor structure for this measure (see the Supplemental Materials). The scale reliability was acceptable: $\alpha = 0.76$.

Compassion Fatigue. Compassion fatigue was measured using five items from the Compassion Satisfaction and Fatigue scale (CSF; Figley 1995; Stamm 2002). We selected items that fit the education work environment and emotional demands. The response scale ranged from 1 (never) to 6 (very often). A single-factor CFA of this measure was supported by the data (see the Supplemental Materials). Scale reliability was good: $\alpha = 0.87$.

Meaning and Purpose. We used the PROMIS Meaning and Purpose Short-Form measure (Salsman et al. 2020) to assess sense of purpose. The response scale ranged from 1 (strongly disagree) to 5 (strongly agree). The scale reliability was acceptable: $\alpha = 0.79$.

Malleable Emotion Mindset. We measured implicit theories of emotion—which we call “malleable emotion mindset” for clarity—using a version of Tamir et al.’s (2007) four-item scale. Participants rated statements regarding their beliefs about the malleable versus fixed nature of emotions. The version we used changed items to “I” statements, rather than rating people in general, to increase predictive validity (Castella et al. 2013). Responses ranged from 1 (strongly disagree) to 5 (strongly agree). An example item is “If I want to, I can change the emotions that I have”. Scale reliability was acceptable: $\alpha = 0.68$.

11.4. Analytic Plan

11.4.1. CFAs

We conducted CFAs of the CORE, STEU-B, and all eight outcomes. We saved those factor scores, and then used them in all analyses reported below to reduce measurement error and to increase power in our statistical models (Rdz-Navarro 2019).²³ We used the WLSMV estimator for CFAs of the CORE and STEU-B, and the MLR estimator for all outcome variables in Mplus (Li 2016), utilizing the same model fit criteria as Study 2.

11.4.2. Evidence of Test-Criterion Relationships and Incremental Validity

We first ran bivariate correlations between the CORE, STEU-B, eight outcomes, and the covariates (i.e., age, gender, race, income, education) in SPSS 28.0. Gender (male = 0, female = 1), race (White = 0, POC = 1), and education (less than four-year college degree = 0, 1 = four-year college degree or higher) were dichotomized to reduce model parameters.

Next, we conducted multiple regression analyses, where demographic covariates were entered in the first block, and the CORE was entered in the second block with the coping and well-being variables entered as outcomes. We ran separate regressions for each outcome given the intercorrelations between the outcomes (see Table 4).

To test incremental validity, we conducted multiple regression models where demographic factors were entered in the first block, the STEU-B was in the second block, and the CORE was in the third block, with coping and well-being as outcomes. This allowed us to test whether the CORE was associated with outcomes accounting for variance from the demographics and the STEU-B. We looked for changes in the R^2 from the second to third block, and whether the CORE and STEU-B effects were significant in the third block.

Table 4. Study 3: Zero-Order Correlations Among Latent Study Variables from CFAs and Covariates.

Variable	M	SD	EU Ability Measures			Coping		Well-Being Measures			
			CORE	STEUB	Adaptive Coping	Maladaptive Coping	Emotional Exhaustion	Job Satisfaction	Emotional Labor	Compassion Fatigue	Meaning and Purpose
Covariates											
Age	39.00	8.34	0.34 ***	0.34 ***	0.02	-0.31 ***	0.05	0.17 ***	-0.11 **	0.10 *	0.18 ***
Gender (M/F)	0.70	0.46	0.34 ***	0.38 ***	0.07	-0.34 ***	0.13 **	0.17 ***	-0.22 ***	0.06	0.16 ***
Race (White/POC)	0.61	0.49	-0.64 ***	-0.71 ***	-0.16 ***	0.49 ***	-0.23 ***	0.01	-0.32 ***	-0.19 ***	-0.28 ***
Education (<Master's Degree/>Master's)	0.53	0.50	0.45 ***	0.45 ***	0.15 ***	-0.34 ***	0.19 ***	-0.03	0.27 ***	0.10 **	0.21 ***
Income (1 < \$20K to 12 > \$150 K)	6.57	2.40	0.10 *	0.07	-0.01	-0.08	0.19 ***	-0.02	0.12 *	0.06	0.03
EU Ability Measures											
CORE	0.73	0.25	—								
STEUB	0.44	0.24	0.86 ***	—							
Coping											
Adaptive Coping	3.28	0.62	0.21 ***	0.22 ***	—						
Maladaptive Coping	2.45	0.84	-0.61 ***	-0.61 ***	-0.17 ***	—					
Well-Being Measures											
Emotional Exhaustion	3.57	1.48	0.14 **	0.22 ***	-0.04	0.05	—				
Job Satisfaction	4.60	1.04	0.12 **	0.07	0.23 ***	-0.09	-0.47 ***	—			
Emotional Labor	4.00	0.75	0.39 ***	0.48 ***	0.12 *	-0.16 ***	0.26 ***	0.12 *	—		
Compassion Fatigue	2.97	1.18	-0.34 ***	-0.32 ***	-0.02	0.48 ***	0.40 ***	-0.18 ***	0.10 *	—	
Meaning and Purpose	4.09	0.76	0.33 ***	0.33 ***	0.36 ***	-0.23 ***	-0.15 **	0.49 ***	0.30 ***	-0.18 ***	—
Emotion Mindset	3.57	0.78	0.44 ***	0.34 ***	0.31 ***	-0.40 ***	-0.21 ***	0.24 ***	0.16 ***	-0.31 ***	0.42 ***

Note. *n*18 = 306–460. EU = emotion understanding. CORE = Core Relational Themes of Emotion Test. STEUB = Situational Test of Emotion Understanding-Brief. Emotion Mindset = malleable versus fixed emotion mindset. For the CORE, STEUB, and outcome variables, we entered CFA-derived factor scores into the correlations. The reference group for binary variables is the last group in all cases. The mean and standard deviation values in the table reflect variable manifest means (not factor scores) for interpretability. * *p* < .05 ** *p* < .01 *** *p* < .001.

12. Results

12.1. Demographic Correlations

Like Study 2, age ($r = 0.34, p < .001$) and female gender ($r = 0.34, p < .001$) were positively associated with CORE performance (see Table 4). Unlike Study 2, an inverse correlation between POC identity and CORE performance was found ($r = -0.64, p < .001$), and education level also was positively associated with CORE scores ($r = 0.45, p < .001$). The income–CORE association was small ($r = 0.10, p < .05$). Overall, these effects are similar to those found with other EI ability tests, noting there is limited research on the role race plays in EI abilities and EU ability specifically (Joseph and Newman 2010; Mayer et al. 2008a, 2008b).

12.2. Evidence of Test-Criterion Relationships

The multiple regression analyses, including demographic covariates in the model, indicated that the CORE was positively associated with adaptive coping ($\beta = 0.18, p < .01$), job satisfaction ($\beta = 0.24, p < .001$), meaning and purpose ($\beta = 0.40, p < .001$), and a malleable emotion mindset ($\beta = 0.43, p < .001$) (see Table 4 for zero-order correlations). Also, the CORE was negatively associated with maladaptive coping ($\beta = -0.46, p < .001$) and compassion fatigue ($\beta = -0.38, p < .001$). Counter to prediction, the CORE was unrelated to emotional exhaustion ($\beta = -0.04$), and it was positively related to emotional labor ($\beta = 0.27, p < .001$).

12.3. Incremental Validity

Adding the CORE to a multiple regression model with demographics and the STEU-B produced a significant R^2 increase for five of eight outcomes (see Tables 5 and 6). Supporting incremental validity, the CORE remained associated in expected directions with meaning and purpose ($\beta = 0.41, p < .001$), a malleable emotion mindset ($\beta = 0.54, p < .001$), maladaptive coping ($\beta = -0.39, p < .001$), and compassion fatigue ($\beta = -0.37, p < .001$), with demographics and the STEU-B in the same model.²⁴ The effect for emotional labor remained significant (in the inverse direction of prediction) for the CORE ($\beta = 0.22, p = .04$) and the STEU-B ($\beta = 0.33, p < .01$) (reasons for this are offered in the General Discussion). In contrast, with the CORE included in the model, five significant STEU-B associations with the outcomes became non-significant and one association decreased (see Tables 5 and 6).

Table 5. Study 3: Multiple Regression Analyses Testing Incremental Validity of the CORE Above Demographic Factors and the STEU-B with Outcomes Measuring Adaptive Functioning (Using Latent Factor Scores).

Step	DV: Adaptive Coping			DV: Job Satisfaction			DV: Meaning and Purpose			DV: Emotion Mindset		
	β	t	SE	β	t	SE	β	t	SE	B	t	SE
<i>Step 1</i>												
(Constant)		-0.26	0.28		-1.56	0.34		-0.01	0.32		0.24	0.24
Age	-0.00	-0.03	0.01	0.09	1.34	0.01	0.00	-0.00	0.01	0.01	0.19	0.01
Gender	0.07	1.09	0.11	0.04	0.60	0.13	-0.04	-0.69	0.13	0.02	0.33	0.10
Race	0.07	0.92	0.14	0.11	1.38	0.17	0.08	1.03	0.16	-0.07	-0.91	0.12
Education	0.14 *	2.10	0.11	-0.12	-1.73	0.13	-0.01	-0.20	0.13	0.02	0.31	0.10
Income	-0.13 *	-2.24	0.02	-0.03	-0.43	0.03	-0.00	-0.08	0.03	-0.07	-1.20	0.02
STEU-B	0.20 *	2.37	0.08	0.16	1.87	0.10	0.42 ***	5.20	0.09	0.27 ***	3.33	0.07
R^2		0.08			0.03			0.12			0.12	
<i>Step 2</i>												
(Constant)		-0.24	0.28		-1.45	0.34		0.24	0.31		0.59	0.24
Age	0.00	-0.07	0.01	0.07	1.16	0.01	-0.02	-0.39	0.01	-0.02	-0.32	0.01
Gender	0.07	1.09	0.11	0.04	0.60	0.13	-0.04	-0.69	0.12	0.02	0.35	0.09
Race	0.08	0.97	0.14	0.14	1.70	0.17	0.14	1.76	0.16	0.00	0.05	0.12
Education	0.14 *	2.04	0.11	-0.13	-1.93	0.13	-0.04	-0.63	0.12	-0.02	-0.24	0.09

Table 5. Cont.

Step	DV: Adaptive Coping			DV: Job Satisfaction			DV: Meaning and Purpose			DV: Emotion Mindset		
	β	<i>t</i>	SE	β	<i>t</i>	SE	β	<i>t</i>	SE	<i>B</i>	<i>t</i>	SE
Income	-0.13 *	-2.21	0.02	-0.02	-0.33	0.03	0.01	0.13	0.02	-0.06	-0.97	0.02
STEU-B	0.17	1.45	0.11	0.01	0.12	0.14	0.13	1.12	0.13	-0.11	-1.04	0.10
CORE	0.04	0.34	0.11	0.20	1.73	0.13	0.41 ***	3.72	0.12	0.54 ***	4.97	0.09
R ² /R ² change	0.08/0.00			0.04/0.01			0.16/0.04 ***			0.19/0.07 ***		
	F (7, 293) = 3.69 **			F (7, 293) = 1.67			F (7, 293) = 8.16 ***			F (7, 293) = 9.78 ***		

Note. STEU-B = Situational Test of Emotional Understanding-Brief; CORE = Core Relational Themes of Emotion Test. Emotion Mindset = malleable versus fixed emotion mindset. For the CORE, STEU-B, and outcome variables, we entered CFA-derived factor scores into the regression models. A separate regression model was conducted for each outcome given the intercorrelations between variables. Gender (male = 0, female = 1); race (White = 0, POC = 1); and education (less than four-year college degree = 0, 1 = four-year college degree or higher). The reference group for binary variables is the last group in all cases. * $p < .05$ ** $p < .01$ *** $p < .001$.

Table 6. Study 3: Multiple Regression Analyses Testing Incremental Validity of the CORE Above Demographic Factors and the STEU-B with Outcomes Measuring Maladaptive Functioning (Using Latent Factor Scores).

Step	DV: Maladaptive Coping			DV: Emotional Exhaustion			DV: Emotional Labor			DV: Compassion Fatigue		
	β	<i>t</i>	SE	β	<i>t</i>	SE	β	<i>t</i>	SE	β	<i>t</i>	SE
<i>Step 1</i>												
(Constant)		1.95	0.22		0.22	0.31		-0.31	0.27		0.07	0.31
Age	-0.04	-0.89	0.01	-0.13 *	-2.15	0.01	-0.02	-0.35	0.01	-0.04	-0.71	0.01
Gender	-0.20 ***	-4.18	0.09	0.05	0.86	0.12	0.00	0.04	0.11	-0.13 *	-2.24	0.12
Race	0.10	1.50	0.11	-0.05	-0.62	0.15	0.05	0.73	0.14	0.11	1.38	0.15
Education	-0.08	-1.56	0.09	0.07	1.08	0.12	0.07	1.17	0.11	0.10	1.63	0.12
Income	-0.02	-0.49	0.02	0.22 ***	3.74	0.02	0.05	0.86	0.02	0.08	1.32	0.02
STEU-B	-0.42 ***	-6.36	0.06	0.16	1.95	0.09	0.49 ***	6.44	0.08	-0.23 **	-2.86	0.09
R ²	0.43			0.11			0.24			0.14		
<i>Step 2</i>												
(Constant)		1.71	0.21		0.19	0.31		-0.17	0.27		-0.16	0.30
Age	-0.02	-0.45	0.01	-0.13 *	-2.09	0.01	-0.03	-0.58	0.01	-0.02	-0.36	0.01
Gender	-0.20 ***	-4.32	0.08	0.05	0.85	0.12	0.00	0.04	0.10	-0.13 *	-2.29	0.12
Race	0.04	0.64	0.11	-0.06	-0.71	0.16	0.08	1.13	0.14	0.06	0.71	0.15
Education	-0.06	-1.09	0.09	0.07	1.13	0.12	0.06	0.93	0.11	0.13 *	2.03	0.12
Income	-0.03	-0.75	0.02	0.22 ***	3.70	0.02	0.05	0.98	0.02	0.07	1.16	0.02
STEU-B	-0.14	-1.55	0.09	0.20	1.75	0.13	0.33 **	3.11	0.11	0.03	0.31	0.12
CORE	-0.39 ***	-4.43	0.08	-0.06	-0.52	0.12	0.22 *	2.12	0.10	-0.37 ***	-3.38	0.11
R ² /R ² change	0.47/0.04 ***			0.11/0.00			0.25/0.01 *			0.17/0.03 **		
	F (7, 293) = 36.66 ***			F (7, 293) = 4.97 ***			F (7, 293) = 13.87 ***			F (7, 293) = 8.65 ***		

Note. STEU-B = Situational Test of Emotional Understanding-Brief; CORE = Core Relational Themes of Emotion Test. For the CORE, STEU-B, and outcome variables, we entered CFA-derived factor scores into the regression models. A separate regression model was conducted for each outcome given the intercorrelations between the variables. Gender (male = 0, female = 1); race (White = 0, POC = 1); and education (less than four-year college degree = 0, 1 = four-year college degree or higher). The reference group for binary variables is the last group in all cases. * $p < .05$ ** $p < .01$ *** $p < .001$.

13. Discussion

In Study 3, demographic factors (age, gender, race, education) were associated with the CORE, largely in expected directions based on prior research (Joseph and Newman 2010; Mayer et al. 2008a, 2008b), noting POC identity showed an inverse relationship. The CORE also was moderately associated with theoretically relevant outcomes, including healthy coping and multiple indicators of well-being, accounting for demographic factors. These results are consistent with our predictions that the ability to identify core relational themes would be associated with effective emotion regulation and psychological well-being, supporting the Cascading Model of EI (Joseph and Newman 2010) and work on the

protective effects of EU ability (Kashdan et al. 2015; Tugade et al. 2004). Notably, the CORE was related to certain criterion outcomes, even with demographic factors and the STEU-B in the model, providing some evidence in support of the CORE's incremental validity.

14. General Discussion

Understanding the causes and consequences of emotions, the differences between emotions, and the rich granularity inherent in emotion language is a valuable human ability (Castro et al. 2016; Mayer et al. 2016). We developed and presented validity evidence for a new test of EU ability—the CORE—which taps knowledge of primary meanings underlying a variety of emotions (i.e., core relational themes; Lazarus 1991). In Study 1, we developed the CORE items using the emotion literature to identify emotions with empirically supported themes (see Table 1), an expert panel, and a confusion matrix. In Study 2, the CORE showed high reliability (internal consistency) and a unidimensional factor structure. We also found evidence that the CORE converged with existing EU ability tests (i.e., the MSCEIT and STEU), and to an extent diverged from verbal intelligence and demographic variables, supporting its initial construct validity (AERA et al. 2014; Cronbach and Meehl 1955; Smith 2005). Further, we found a moderate to large negative link between the CORE and relational conflict, suggesting that people who better understand key semantic themes underlying emotions may experience less conflict, perhaps because they better understand why they and others feel the way they do (e.g., Sbarra and Coan 2018). This effect held with demographics and the MSCEIT or STEU in the model, indicating that the CORE may offer incremental validity, which few EU ability tests show. The CORE was found to be economical as well, taking between five to seven minutes to complete.

In Study 3, the CORE was positively related to adaptive coping, job satisfaction, meaning and purpose, and a mindset that emotions are malleable. The CORE also was negatively related to maladaptive coping and compassion fatigue, though it was unrelated to emotional exhaustion. Emotional exhaustion perhaps was driven more by factors outside of educators' control during the pandemic, such as an increased workload and decreased boundaries between work and home (Steiner and Woo 2021). Prior studies suggest that structural demands and personal resources play a role in educator burnout and well-being (Granziera et al. 2021). Future studies could examine whether the CORE is associated with burnout when there is not a pandemic. Additionally, the CORE and STEU-B were positively related to emotional labor, counter to prediction. Those who better understand emotions may be more likely to identify aspects of work as emotional labor, and approach that labor, as they have skills to navigate it. Supporting this idea, adaptive coping—which is largely characterized by strategies to engage with emotional challenges—was positively related to emotional labor, and maladaptive coping—which is largely characterized by not processing emotional challenges—was negatively related to emotional labor (see Table 4; Carver 1997; Webb et al. 2012). Finally, the CORE remained associated with a set of outcomes in predicted directions, accounting for variance from demographic covariates and the STEU-B, offering further support of the CORE's incremental validity.

14.1. Theoretical Contributions

14.1.1. Core Relational Themes for 24 Emotions and Support for Semantic Space Theory

Recent research supports the existence of 20 or more human emotions (e.g., Keltner et al. 2023). Yet, researchers have not examined whether people can reliably distinguish between core relational themes for this many emotions. In Study 1, respondents were given 24 different emotions to match to specific relational themes. Participants performed consistently above chance in matching the 24 emotions to the target theme. This included making distinctions within valence (e.g., pride from hope or anger from anxiety), and even among emotions from the same emotion family (e.g., shame from guilt or gratitude from love). Not only did people reliably identify the best answer, but their other responses were not picked at random. Participants' non-target answers also were selected above chance on most items. Upon inspection, these answers appear to reflect the degrees of semantic

overlap found in recent studies on emotion concepts (e.g., jealousy was a common answer for envy items). In this way, the results support Semantic Space Theory (Cowen and Keltner 2021; Keltner et al. 2023) and notions about emotion families (e.g., Sauter 2017), which propose that emotions are structured in a complex semantic network. Emotions similar in meaning are closer together in the network—without fully overlapping—and those different in meaning are farther apart. Importantly, this network structure of emotion appears to be more organized by substantive links between specific emotions than by shared valence and arousal levels (Cowen et al. 2019; Toivonen et al. 2012; cf. Jackson et al. 2019).

14.1.2. Support for The Cascading Model of EI and Emotion Granularity Theories

The Cascading Model of EI (Joseph and Newman 2010) and recent theorizing by emotional granularity researchers (Kashdan et al. 2015; Tugade et al. 2004) propose that the ability to differentiate between positive and negative emotion experiences should facilitate more targeted and thus successful emotion regulation. Further, the Cascading Model and emotion granularity theories hold that EU should be associated with higher performance and greater well-being to the extent that it enables more effective emotion regulation (Joseph and Newman 2010; Kashdan et al. 2015; Tugade et al. 2004). We found some support for these ideas. Individuals who more accurately identified relational themes on the CORE, reported engaging in coping strategies thought to support emotional health more often (e.g., acceptance and reappraisal), and they reported engaging in coping strategies considered deleterious less often (e.g., denial and substance use). CORE performance also was associated with a range of social-emotional (e.g., less conflict with friends, family, and romantic partners) and well-being outcomes (e.g., more meaning and purpose and lower compassion fatigue). Future research should test whether emotion regulation mediates the link between EU ability and key outcomes employing the CORE.

14.1.3. The Generalizability of EU as an Ability and Its Predictive Value

Most tests of EU ability were developed and validated with White, college-attending or college-graduate populations (see Table 2). This could limit the generalizability of the evidence supporting EU test validity (AERA et al. 2014). The CORE results suggest that EU ability can be reliably measured in demographically diverse U.S. adults, and that it is associated with healthier coping and social-emotional functioning across groups. These results help to generalize findings on EU ability, at least regarding the skill of identifying core relational themes underlying emotions. This is important as scholars propose that some features of emotion knowledge are universal; however, many tools to test these ideas have been validated only with select subpopulations, making it hard to substantiate such claims. Our research adds to the accumulation of data on central features of emotion concepts, including relational themes, suggesting that certain aspects of emotion knowledge may be shared by a wide variety of people (Jackson et al. 2019; Keltner et al. 2023). That said, more EU research with diverse participants is needed to confirm this is the case.

14.2. *Methodological Contributions*

14.2.1. Increasing Measurement Precision in Assessing EU Ability

Numerous dimensions of EU ability have been proposed, while only a few have been measured (Castro et al. 2016; Mayer et al. 2016). Among those that have been measured, other than the STEU, most EU tests combine scores across a few facets of EU (or offer scores for specific facets but do not validate tests for this purpose; see Table 2). Although providing general EU ability scores is useful for offering initial evidence of construct validity and test-criterion relationships, it limits measurement precision (Maul 2012). Testing theories of EU ability requires measurement approaches that permit examinations of EU's component parts and their interrelations (Castro et al. 2016; Mayer et al. 2016). Also, measures that differentiate between specific facets of EU ability will help to unpack which EU skills are linked to other emotion abilities and outcomes. We developed and validated a new performance measure of EU ability that assesses *one* dimension of EU in depth. We hope

that the CORE will help to isolate the associations unique to knowledge about relational themes and their value in predicting criterion-related outcomes. This level of construct representation may support next stage theory-testing in EU ability research.

14.2.2. Emotion Knowledge Can Be Measured Directly

Current EU ability tests rely primarily on context-based vignettes to tap EU (see Table 2). Such tests provide useful information about one's knowledge relevant to a specific situation or domain (Hoemann et al. 2021a; Libbrecht and Lievens 2012). Yet, these tests measure emotion knowledge indirectly by asking people to infer how others might feel or react in certain situations. They also assume that people will interpret the situations similarly, and so if one understands emotions, they can report how others would feel. Given the wide variability in social norms and cultural standards influencing how people appraise the same situation or emotional stimulus (e.g., Cordaro et al. 2016a; Keltner et al. 2023; Moors 2020; van Rijn and Larrouy-Maestri 2023), using contextualized methods exclusively may limit knowledge in the field, and partially confound EU test performance with knowledge of sociocultural rules. The CORE was developed based on core relational themes that were identified across the literature and thought to represent shared meanings of emotions that are largely context-independent (see Table 1). These themes reflect how people make sense of emotional events and, we contend, are not as reliant on specific features of socially or culturally bound settings (noting cross-cultural studies on the CORE are needed). This approach affords the chance to study emotion knowledge directly.

14.2.3. The Value of Capturing Complexity with Progressive Scoring Approaches

Recent massive-scale efforts supported by machine learning provide accumulating evidence that many features of emotions vary along multiple continuous dimensions, including emotion concepts (Cowen and Keltner 2017, 2021; Keltner et al. 2023). These findings diverge from notions that emotions are only "basic" (e.g., Ekman 1992), "discrete" (e.g., Roseman 2013), or "cultural constructions" of primal arousal and valence categories (Barrett 2017). They indicate that emotions have unique features which distinguish them, but they also share overlap, suggesting there are emotion families that are connected by *degrees of semantic relatedness* (Keltner and Cowen 2021; Sauter 2017). We developed and validated the CORE using a progressive scoring approach (e.g., Castro et al. 2015) to reflect this graded, meaning-based network structure of emotion concepts. To our knowledge, the CORE is the first EU ability test for adults in English that assesses degrees of correctness with answers rooted in theory and prior work. The CORE shows evidence of incremental validity over the most widely used measures of EU ability (MSCEIT and STEU), supporting the value of this method. In the development of new EU tests, this approach may help to better capture the complexity of emotional expertise (Hoemann et al. 2021a).

14.3. Research Limitations and Future Directions

The present research has limitations. In Studies 2 and 3, most participants performed above the mid-point on the CORE, suggesting the test may not capture the full range of ability. EI ability tests have faced challenges establishing defensible correctness criteria for test items that are easy, moderate, and difficult to answer (Fiori et al. 2014; Maul 2012; Miners et al. 2018). Ways to make the test more difficult may add construct-irrelevant variance (see AERA et al. 2014). We afford half credit for responses that are not the target response but are theoretically and empirically close to the target response, rather than oversimplifying emotion knowledge into dichotomies of correctness. We also used simple language, did not include complex social scenarios, and only measured one facet of EU ability versus measuring multiple facets. These steps may have reduced test difficulty, but perhaps did so (in part) by removing construct-irrelevant factors that influence test performance. We found evidence of test-criterion relationships between the CORE and multiple outcomes, accounting for other explanatory variables and measures of EU ability, so the test appears to capture variance that is psychologically meaningful. More research is

needed on the semantic features of emotions to identify ways to validly capture EU ability among people with low, medium, and high emotional skill (Hoemann et al. 2021a).

We took steps to minimize the role of demographic factors in test performance, including recruiting diverse samples for test construction and construct validation, and adding demographics to our analytic models (AERA et al. 2014). Associations between age, gender, and education with the CORE are akin to those found in other EU and EI ability studies. However, though race was unrelated to the CORE in Study 2, there was an inverse correlation between POC identity and the CORE in Study 3. To probe this result, we ran additional analyses (see Supplemental Materials). Part of this association came from third variables shared by race and CORE performance (e.g., education, extra work hours). To test whether the CORE was uniquely related to race in Study 3, we ran a multiple regression including these third variables and the STEU-B in the model. Then, POC identity only showed a small link to the CORE ($\beta = -0.12, p < .01$). As such, the association appears not to be unique to the CORE. To some extent, EU ability tests may reflect systemic inequities in education (AERA et al. 2014; Mahoney et al. 2021), and perhaps POC underrepresentation in psychological science (Buchanan et al. 2021; Roberts et al. 2020). A review of general EI ability tests indicates that this could be the case (see Joseph and Newman 2010). Important next steps include testing the CORE's measurement invariance across race, other demographic and cultural groups, and intersectional identities, along with convening a fairness panel with relevant expertise and backgrounds to evaluate the CORE and recommend ways to make it more equitable (AERA et al. 2014). More broadly, it is important for researchers to examine how structural and social marginalization may influence EI abilities.

Additionally, we validated the CORE only in the U.S. with English-speaking samples. Future research could translate the tool and test its psychometric properties internationally to permit cross-cultural work on emotion concepts (e.g., Keltner et al. 2023). Research is needed that tests the universality of core relational themes, and the role they play in EU abilities in different cultural contexts (e.g., Castro et al. 2016). This work could be paired with studies of demographically diverse participants who work in various settings in the U.S. and abroad to test the generalizability of our findings (AERA et al. 2014). It will be important to determine the link between CORE performance and personality as well, and whether the CORE is related to outcomes beyond personality measures. Likewise, it will be helpful to test whether the CORE is associated with key outcomes independently of other mental abilities and intelligences given the overlap in these constructs. We also used self-reported relational conflict, coping, and well-being outcomes to gather evidence of the CORE's test-criterion relationships. It would be useful to determine whether the CORE is related to second-person (e.g., job performance ratings) and third-person outcomes (e.g., cooperative behavior or physiological markers of stress) that tap social-emotional functioning, and more theoretically distal outcomes, along with measures of coping that reflect cultural differences in emotion regulation. Finally, all studies were cross-sectional in design, so to formally test the Cascading Model of EI with the CORE, longitudinal studies are needed that temporally separate EU ability, coping, and well-being.

14.4. Implications for Research and Practice

The ability model of EI was published over 30 years ago (Salovey and Mayer 1990). For years, the only performance measure of EU ability was the MSCEIT-Understanding subtest (Mayer et al. 2002), followed by the STEU (MacCann and Roberts 2008). Although, more recently, the GECO, GEMOK, and NEAT were developed, most of what is known about EU is still from the MSCEIT and STEU. When there are few adopted measures of a phenomena, it limits progress. Distinctions between construct and measurement variance are hard to make, and findings that may reflect how EU is measured may be mistaken for properties of the construct, or vice versa. This is particularly the case when only certain facets of a construct are assessed but are used to represent the entire phenomena, or when multiple facets are assessed but are averaged across, reducing measurement precision. We hope that by adding a new test to the field which measures a single facet of EU ability in

depth, with evidence of reliability and validity, we help to improve the study of EU ability by representing the complexity of the phenomenon with increased precision.

To increase accessibility, the CORE is available free of charge to researchers. This may help to stimulate further research on EU ability. Although the CORE was related to healthy coping patterns and well-being outcomes in working professionals, more studies are needed to determine whether the CORE can validly operate as a formative assessment in the world, in addition to serving as a summative research tool (see AERA et al. 2014). If such evidence is found, organizations interested in supporting the development of EU might use the CORE. Either way, we hope that the development of the CORE adds momentum to efforts to better understand EU ability inside and outside of the laboratory.

15. Conclusions

Across three studies, with demographically diverse participants, we developed and provided validity evidence on the CORE. The CORE is a new EU ability measure that tests whether people can identify core relational themes (primary meanings) of 19 positive and negative emotions. The CORE employs progressive (degrees of correctness) scoring that is rooted in theory and prior research, aligning the test with developments in understanding the complex, interrelated structure of emotion concepts. Performance on the CORE was associated with more adaptive and less maladaptive coping, less relationship conflict and lower compassion fatigue, a greater sense of meaning and purpose, and a mindset that people can change their emotions. The CORE also captured unique variance in EU ability not measured by current EU tests, and it was related to theoretically relevant outcomes beyond variance accounted for by other tests. The CORE advances the study of EU ability by expanding the repertoire of reliable and valid performance tests in the field.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/jintelligence11100195/s1>, Table S1: Study 1: Additional EU Ability Measures for Adults (not Developed and Validated in English); Table S2: Study 1: Participant Demographic Characteristics; Table S3: Study 1: Item-Level Raw Hit Rate (Item Difficulty) on the CORE Test (Confusion Matrix); Table S4: Study 1: Emotion-Level Raw Hit Rate (Item Difficulty) on the CORE Test (Confusion Matrix); Table S5: Study 1: Item-Level Chance-Adjusted Hit Rate (Item Difficulty) on the CORE Test (Confusion Matrix); Table S6: Study 1: Emotion-Level Chance-Adjusted Hit Rate (Item Difficulty) on the CORE Test (Confusion Matrix); Table S7: Full Item Set and Scoring Key for the Core Relational Themes of Emotion (CORE) Test; Figure S1: Screenshots of the Core Relational Themes of Emotion (CORE) Test Instructions; Table S8: Study 2: Participant Demographic Characteristics; Table S9: Study 2: Factor Loadings from a One-Factor Confirmatory Factor Analysis (CFA) of the CORE; Table S10: Study 2: Zero-Order Correlations Among Key Study Variables and Covariates (Mean Values); Table S11: Study 3: Participant Demographic Characteristics; Table S12: Study 3: Zero-Order Correlations Among Key Study Variables and Covariates (Mean Values); Table S13: Study 3: Multiple Regression Analyses Testing Incremental Validity of the CORE Above Demographics and the STEU-B with Outcomes Measuring Adaptive Functioning (Mean Values); Table S14: Study 3: Multiple Regression Testing Incremental Validity of the CORE Above Demographics and the STEU-B with Outcomes Measuring Maladaptive Functioning (Mean Values).

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Notes

- 1 We refer to the test as “the CORE” throughout the paper.
- 2 There is necessary overlap between emotion appraisals and relational themes. There are different levels of analysis of emotional meaning (Smith and Lazarus 1993). For some emotions, multiple levels of analysis do not exist, and so the appraisal is the same as the relational theme, such as “unexpectedness” for surprise (Roseman 2013). For many emotions, however, appraisals and relational themes can be distinguished.
- 3 We note that semantic relations among emotions are likely structured in networks determined by multidimensional gradients of meaning, and appear not to be categorical entities with rigid boundaries (Cowen and Keltner 2017, 2021; Keltner et al. 2023).
- 4 A list of other EU ability tests validated in languages other than English is in the Supplemental Materials (see Table S1).
- 5 The Levels of Emotional Awareness Scale (LEAS; Lane et al. 1990) also may tap emotion knowledge to some extent, but it is thought to measure emotional awareness more than emotion understanding from the ability EI view (see Lane and Smith 2021).
- 6 Researchers, professors, and doctoral student members of the International Society for Research on Emotion.
- 7 There also are benefits to context-specific measures, as they may tap meaningful, socioculturally-embedded knowledge, which by some accounts, may be an inherent part of emotion concepts (e.g., see Hoemann et al. 2021a).
- 8 The MSCEIT-Understanding subtest and NEAT use weighted scoring that is non-binary, but it is based on expert ratings.
- 9 In accordance with the APA (2021) Inclusive Language Guidelines, these terms are intended to represent the following racial/ethnic categories, but are referred to with shorter labels for economy: Asian/Asian American, Black/African American, Latinx/Hispanic, and White/European American. We also use the word “race” to convey race and ethnicity.
- 10 We use the term “hit rate” hereafter for *pi* to make the results easier to interpret.
- 11 We reverse-scored this measure, so that higher scores indicate greater degrees of test interest/engagement.
- 12 Removing an emotion as a basis for an item did not preclude it from inclusion in the response set.
- 13 As EU ability is part of emotional intelligence, and intelligences correlate, we expected the CORE to overlap with cognitive intelligence, especially with verbal ability, as EU is particularly language-based (Mayer et al. 2016). However, we did not expect performance on the CORE to be redundant with verbal intelligence (Joseph and Newman 2010; Mayer et al. 2008a, 2008b).
- 14 For the sake of thoroughness, we also ran convergent, discriminant, and test-criterion relationship analyses using mean values (see the Supplemental Materials). The results did not substantively change, nor did our study conclusions.
- 15 People or Persons of Color (POC) (APA 2021).
- 16 Participants were randomized to complete either the MSCEIT-Understanding subtest or the STEU.
- 17 Given the high CORE-MSCEIT and STEU correlations, we checked for multicollinearity. Collinearity diagnostics for a model with all demographics, the CORE, and the MSCEIT were: VIF = 3.34 and tolerance = 0.30. Results for the same model with the STEU were: VIF = 3.85 and tolerance = 0.26. VIFs above 5 to 10 and tolerances below 0.1 to 0.2 indicate multicollinearity (Kim 2019; Kock and Lynn 2012). This did not appear to be an issue.
- 18 The STEU was selected as it is an established EU ability measure, and it measures facets of emotion appraisals that may overlap to an extent with core relational themes (on some items; see Table 2). It thus offers a more rigorous test of incremental validity.
- 19 The coping and emotion regulation literatures suggest that the extent to which a strategy is “adaptive” or “maladaptive” may be person, situation, and culture-specific (e.g., Bonanno and Burton 2013; Matsumoto et al. 2008). Yet, overall, meta-analytic studies suggest certain strategies are more versus less related to beneficial outcomes, including well-being and job performance (e.g., Webb et al. 2012). We thus use the terms adaptive and maladaptive coping based on these findings, keeping this caveat in mind, and noting that this study sample is from a Western individualistic culture.
- 20 A higher percentage of U.S. teachers hold master’s degrees than the general population (NCES 2023; U.S. Census Bureau 2020b).

- 21 The STEU-B was administered separately (two months prior) from the other Study 3 variables, noting ability EI is stable (e.g., Mayer et al. 2003).
- 22 Religion was dropped from the adaptive coping factor, and the distraction and venting items were dropped from the maladaptive coping factor, as their standardized loadings on their respective factors were ≤ 0.20 . The reliability coefficients reflect these changes.
- 23 As with Study 2, we also report the results of all analyses in Study 3 using mean values in the Supplemental Materials. These analyses show the same general pattern of results as the factor score-based analyses, and do not change the study conclusions.
- 24 Given the high correlation of the CORE with the STEU-B, we checked for multicollinearity. Collinearity diagnostics for a model with all demographics, the CORE, and STEU-B were: VIF = 2.23 and tolerance = 0.45. Multicollinearity did not seem to be present (Kim 2019).

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Article

Exploring Actual and Presumed Links between Accurately Inferring Contents of Other People’s Minds and Prosocial Outcomes

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Abstract: The term “empathic accuracy” has been applied to people’s ability to infer the contents of other people’s minds—that is, other people’s varying feelings and/or thoughts over the course of a social interaction. However, despite the ease of intuitively linking this skill to competence in helping professions such as counseling, the “empathic” prefix in its name may have contributed to overestimating its association with prosocial traits and behaviors. Accuracy in reading others’ thoughts and feelings, like many other skills, can be used toward prosocial—but also malevolent or morally neutral—ends. Prosocial intentions can direct attention towards other people’s thoughts and feelings, which may, in turn, increase accuracy in inferring those thoughts and feelings, but attention to others’ thoughts and feelings does not necessarily heighten prosocial intentions, let alone outcomes.

Keywords: interpersonal sensitivity; empathic accuracy; mentalizing; prosocial behavior

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1. Introduction

The term “empathic accuracy” has been applied to the accurate inference of the dynamically changing contents of other people’s minds or the “subjectively perceived mental events of another person as they occur over time” (Hodges et al. 2015, p. 319). As research on this topic has grown, the empathic prefix on this term has proven problematic. It suggests that accurately knowing others’ thoughts and feelings is part of having their best interests at heart, caring for them, or, more generally, being “good”. However, the name seems to carry more prosocial promise than this form of interpersonal accuracy delivers. Furthermore, the empathic label appears to have guided assumptions about what “should” be correlated with this form of accuracy and has driven the contexts in which it has been studied. Researchers of this form of accuracy may be a little guilty of looking under the lamppost—disproportionately studying accuracy at inferring other people’s thoughts and feelings in participants who would have reason to care for and feel compassion for the people whose thoughts and feelings they are inferring. However, to foreshadow, we also think there may be some bias in positioning the lamppost to highlight and feature certain results and obscure others.

At first blush, the prosocial nature of the term empathic accuracy seems intuitive and fitting: Other people who can accurately read our minds and infer our thoughts and feelings would seem to have access to our inner selves—access that allows them to understand us in a way that resembles their understanding of their own selves. Indeed, previous research on “empathic accuracy” involves one person recognizing and contemplating another person’s perspective, feelings, and experience with at least some of the attention and *possibly* the

favor that the first person habitually applies to themselves. However, the empathic prefix in “empathic accuracy” primes assumptions of caring and benevolent motivations and intentions destined for prosocial outcomes along with that accuracy. Recognition and contemplation of another person’s thoughts and feelings, even if they yield accurate inferences, do not always assure compassionate understanding or action to help that other person. To emphasize this point and to establish a more neutral starting point from which to explore the relationship between accuracy in inferring others’ thoughts and feelings and prosocial outcomes, we will use the term “thought-feeling accuracy” throughout this paper, unless we are intentionally referring to the historical trajectory this construct passed through as “empathic accuracy”.

We will also limit our focus to research using a paradigm initially billed as capturing “empathic accuracy” that measures dynamic thought-feeling accuracy in ongoing social communication. In this paradigm, perceivers’ inferences of a target person’s thoughts and feelings are scored for accuracy using the target person’s own reports as the criterion. Thus, this thought-feeling accuracy is an ability-related state, not a personality trait. As an ability measured within interpersonal interactions, thought-feeling accuracy involves, among other things, being able to perceive, access, generate, and understand emotions, all components of emotional intelligence, as the construct was initially outlined by Mayer and Salovey (1997). Notably, the term “empathic accuracy” has been applied beyond its original, intended meaning to refer to other ability-related measures of emotional intelligence, specifically standardized tests measuring the ability to decode emotion expressions and nonverbal cues, particularly ones using items that require the test-taker to identify posed emotion expressions. The overlapping elements of thought-feeling accuracy and accuracy at decoding nonverbal and affective cues have earned both forms of accuracy a place in the discussion of “emotional intelligence”. Furthermore, and of relevance for this Special Issue (see Mortillaro and Schlegel 2023), both forms of accuracy are measures of ability rather than personality traits. Emotion decoding accuracy has also been linked—although not consistently in empirical results—to prosocial behavior and (often self-reported) measures of empathy-related constructs (see Hodges and Wise 2016; Mayukha et al. 2020; Olderbak and Wilhelm 2017; Schlegel 2020).

However, thought-feeling accuracy and emotion decoding accuracy also differ; among other things, the latter is generally measured using static stimuli (e.g., a photo of a facial expression), often made from actors posing emotional expressions outside of natural social interactions (e.g., Gur et al. 2002; Nowicki and Duke 1994; Schlegel et al. 2014) or posing for other purposes (e.g., for advertisements, such as the Reading the Mind in Eyes Task (RMET)¹, (Baron-Cohen et al. 2001); but there are some exceptions, e.g., (Costanzo and Archer 1989)). Additional coverage of some measures of emotion recognition and nonverbal decoding, along with their applications to emotional intelligence, appears elsewhere (e.g., Buck et al. 2017) and in this issue (e.g., Mortillaro and Schlegel 2023).

In what follows, we first provide some background about measuring thought-feeling accuracy in social interactions. We then examine why a clever and enduring paradigm for measuring thought-feeling accuracy both set the table and tilted it towards assumptions of “empathic” accuracy, which helped create and perpetuate persistent assumptions that have affected the direction of research and conclusions that followed. Next, we consider potential realms of thought-feeling accuracy that are unrelated to prosocial behavior—or even related to harmful behaviors—and finally, we consider directions for future study.

2. Measuring Thought-Feeling Accuracy

William Ickes, the researcher who initially popularized the term empathic accuracy, has also referred to it as everyday mindreading (e.g., Ickes 2003). Although talking about mindreading runs the danger of evoking a woo-woo element of psychic abilities, it does capture key defining elements of the specific type of interpersonal accuracy we address here: a perceiver inferring a target person’s dynamic thoughts and feelings as they unfold over time in the context of a social interaction. Measures of thought-feeling accuracy share

similarities with other measures of interpersonal accuracy, such as accuracy in assessing people's personality traits (e.g., Letzring 2008). However, unlike thoughts and feelings, personality traits change less, and when they do, they change relatively slowly. In addition, the criterion for accuracy in assessing another person's personality traits may come from the target's self-report, informant reports, or other personality measures (including projective or physiological measures). In contrast, due to the subjective nature of thoughts and feelings, the criterion for thought-feeling accuracy, more or less by necessity, has to be provided by the target person who has them.

The original "empathic accuracy" paradigm, as developed by Ickes and colleagues (e.g., Ickes et al. 1990), entails video-recording a *target* person who is taking part in a conversation or responding to questions. The target then watches the video recording, which is stopped at specific points (either those selected by the target or at arbitrary time intervals), and the target is asked to report what they were thinking and feeling at each stop point. The video recording is then shown to *perceivers*, the people whose accuracy is being measured, and it is stopped at the same stop points, where perceivers are asked to provide their best guess of what the target was thinking or feeling. Independent coders then compare the target's reported thoughts and feelings to the perceiver's inferences and rate them for accuracy using a 3- or 4-point scale (Ickes et al. 1990; Hodges et al. 2015). The Ickes paradigm is further divided into two sub-paradigms: the *Standard Stimulus* sub-paradigm, in which perceivers who were not part of the original interaction see stimuli that were recorded earlier, and the *Dyadic Interaction* sub-paradigm, in which the perceiver is one of the interactants in the recorded interaction. In the Dyadic Interaction sub-paradigm, participants may be both targets and perceivers—both recording their own thoughts and feelings and also inferring those of the other person in the dyad. This method also highlights how individual thoughts and feelings (not just perceivers) may be used as an interesting unit of analysis.

Another paradigm introduced by Levenson and Ruef (1992) yields what has been called "empathic accuracy" but is considerably narrower, focusing on accuracy at perceiving changes in the valence of the target's affect (not thoughts). It has been used more recently by Zaki and colleagues (e.g., Zaki et al. 2008) and adapted in various ways by others (e.g., to capture changes in specific emotions like anger or happiness—see Eckland et al. 2020; McKenzie et al. 2022). It also involves a video recording, usually of a target describing an emotional experience. The target then views this video recording and is given a continuously adjustable slider or dial on which to rate the valence of their affect on a multi-point (e.g., 9-point) scale from extremely negative to extremely positive. Perceivers watch the same videos and also continuously rate what they believe is the valence of the target's affect. Accuracy is either the correlation or difference scores between the target's self-ratings of affect valence and the perceiver's inferred ratings of the target's affect across time. To use terminology borrowed from the other (Ickes) paradigm, the Levenson–Ruef–Zaki paradigm generally uses "Standard Stimuli" (i.e., videos that are a few minutes long), although the method could be used with a video of an interacting dyad (e.g., by instructing perceivers to focus on guessing the valence of affect for the other person in the dyad, as in Lewis 2014).

Thus, both the Ickes and the Levenson–Ruef–Zaki paradigms capture elements of the subjective and dynamic experience of what is going through another person's mind, and they both track these changing mental states in concert with what the target is outwardly sharing. However, the Ickes and the Levenson–Ruef–Zaki paradigms also differ from each other. Interestingly, in one study, we know that when a researcher measured both and looked at the correlation between the two, they were uncorrelated (Lewis 2014). The Levenson–Ruef–Zaki method tracks changes in what the target is experiencing but prioritizes accuracy in seeing changes in the valence of affect. In contrast, the Ickes method arguably more closely resembles what people naturally find themselves thinking about when wondering what others think. The Ickes method measures perceivers' ability to accurately capture something akin to the director's commentary in a movie—except in

this case, that commentary is about the “life-movie” that runs through a target’s head. The Ickes method gives perceivers credit for being accurate at knowing what the target is thinking about and which emotion the target is feeling, not just for knowing how positive or negative the target is feeling. Because the Ickes method tackles this more detailed form of “mindreading”, we concentrate primarily on the Ickes method throughout the rest of this paper.

Lay assumptions about accuracy in an ongoing social interaction seem to rely a lot on nonverbal decoding (i.e., reading body language). However, thought-feeling accuracy has been demonstrated in past studies to rely more heavily on the target’s verbal responses than nonverbal ones (Gesn and Ickes 1999; Hall and Schmid Mast 2007; Hodges and Kezer 2021). To be clear, we are not dismissing the value of being able to accurately decode nonverbal emotion cues; only that this ability is not synonymous with thought-feeling accuracy, which draws on additional other cues as well. Notably, in the few studies we know of that measure both, accuracy for reading other people’s dynamic thoughts and feelings has been found to be unrelated to common tests of nonverbal decoding (e.g., Flykt et al. 2021).

3. The Central Question

When Ickes developed this popular method for measuring thought-feeling accuracy, there was nothing in the methodology that limited accuracy to serving prosocial ends: accuracy was accuracy, not “empathic” accuracy. Indeed, one of the very first studies using the paradigm (Ickes et al. 1990) demonstrated that people are more accurate at inferring the thoughts and feelings of people they found attractive (and were interested in), something that would be hard to characterize as prototypically prosocial and is more easily viewed as self-serving (e.g., “I want to know what’s going on in that pretty little head of yours”). So why was this skill labeled empathic accuracy and not, for example, exploitative accuracy? We will provide six answers to that question in the second half of this paper. First, though, consistent with our central thesis that thought-feeling accuracy far from guarantees prosociality, we argue that what separates empathic accuracy and exploitative accuracy (which are likely two poles along a continuum) is *why* the perceiver tries to infer the target’s thoughts and feelings.

4. Motivation and Room for Improvement

Motivation would appear to play a key role in the relationship between thought-feeling accuracy and prosociality. The question of whether greater motivation leads to greater accuracy has yielded mixed results, showing both improvement and impediment attributed to motivation (e.g., see Berlamont et al. 2023; Ickes et al. 1990; Klein and Hodges 2001; Lawless DesJardins and Hodges 2015; Simpson et al. 1995; Thomas and Maio 2008). Rather than looking for a linear relationship between motivation and accuracy, where each unit increase in motivation produces a corresponding increase in accuracy, it may instead be more fruitful to think about the critical level of motivation needed to trigger attempts to infer others’ thoughts and feelings.

However, the important motivation question in relation to prosocial outcomes may be less “How motivated is the perceiver?” and more the question of “Motivated to do what?” In addition to the motivation simply to be accurate, the perceiver may also be motivated to accomplish other goals or support a particular belief. As is the case with many aspects of social perception, people are more likely to see (or, in this case, infer) what they want. For example, Simpson et al. (1995) found that people whose relationships were threatened by discussing how physically attractive other people were to their partners were more inaccurate at reading their romantic partners’ thoughts and feelings. We do not know from Simpson et al.’s results that participants’ inaccuracies were specifically of the sort that involved inferring that their partners were less attracted to these other people than the partners actually were, but the results would be consistent with this.

As simplistic as it sounds, we think that it is these different motives that figure largely in a model of when thought-feeling accuracy is related to prosocial or “empathic” behavior. As we will argue later, research exploring this “motivated to do what?” question has been limited because of the bias to look primarily for examples of “empathic” accuracy. An analogy to general intelligence seems apt: There is nothing inherently prosocial about intelligence, and the same seems to be true for accurately inferring others’ thoughts and feelings. Some people apply their gifts of intellect towards prosocial aims (e.g., coming up with ways to distribute healthcare resources to those who need them); others apply them to destructive and hurtful goals (e.g., figuring out ways to take other people’s money); a lot of people probably do at least a little bit of both. Similarly, the accurate apprehension of others’ thoughts and feelings can be put toward benevolent or malevolent goals, and the person who always infers thoughts and feelings for one reason or the other is likely rare.

However, there are two caveats about how this analogy with general intelligence potentially breaks down. First, thought-feeling accuracy may be less “impartial” than the broad trait of general intelligence. Thought-feeling accuracy—because it is a specialized skill uniquely suited for interpersonal interactions and coordination—might predispose prosocial outcomes because it is deployed in situations that are critical for securing social belonging, something critical for our well-being (e.g., Baumeister and Leary 1995). Thought-feeling accuracy might be a bit like having accurate knowledge of what makes plants grow—this knowledge could be used for evil, but because the preponderance of intentional plant growth outcomes are good for humans, a green thumb is considered “good”.

Second, there is the question of whether thought-feeling accuracy shows stable individual differences like intelligence does. There is less evidence for this than there is for the broader skill of emotion decoding (often a key component of emotional intelligence). At least two studies have shown some amount of variance in people’s thought-feeling inference scores that is attributable to perceivers across different targets (Lewis et al. 2012; Marangoni et al. 1995), which would be consistent with there being individual differences in thought-feeling accuracy. However, although these studies used multiple targets, there were some similarities in the targets’ situations. Thus, the variance that has been attributed to perceivers’ ability might be more attributable to the perceivers’ knowledge about or interest in a certain kind of target. Perhaps more importantly, few reliable correlates of thought-feeling accuracy have been found using the Ickes paradigm (see Hodges et al. 2015). In contrast, a variety of desirable traits have been associated with the more general skill of accurately perceiving emotions (see Hodges and Wise 2016, for a review). Furthermore, unlike nonverbal emotion decoding, where there is evidence that people can be trained to get better (e.g., Blanch-Hartigan et al. 2012; Schlegel et al. 2017), few interventions (with the possible exception of providing feedback—e.g., Barone et al. 2005; Lobchuk et al. 2016; Lobchuk et al. 2018; Lorimer and Jowett 2010a; Marangoni et al. 1995) have been identified that make people more accurate at inferring dynamic thoughts and feelings.

Not being able to solidly claim that thought-feeling accuracy is a stable individual difference also undermines the ability to claim that people who would theoretically be more accurate would also be more prosocial. However, it is possible that more attempts at deploying accuracy (across different target individuals, as an individual difference) may lead to more prosocial outcomes. Unlike reading people’s emotional displays or listening to their words, there is no outward correlate with the contents of other people’s minds. Thus, inferring a person’s thoughts and feelings involves the integration of a variety of cues (including the target’s emotion displays and words—see Gesn and Ickes 1999; Hall and Schmid Mast 2007) and a fair amount of construction based on what we know about people in general (including the self); other people who are like the target (e.g., in terms of group membership or specific experiences); and any personal knowledge about a particular target’s history or idiosyncrasies.

Taken together, there is a situation-specificity of the types of information and cues that can be used to inform inferences—and even of the kinds of integrations that need to be made and how much work is involved. Speculatively, thought-feeling accuracy may

be connected to the broader idea of emotional intelligence in that emotionally intelligent people may know when it may be useful to try to infer others' thoughts and feelings and also know a variety of tools that can be used to do this. Accuracy in inferring other people's thoughts and feelings may be analogous to memorizing phone numbers: some people are better than others at doing it, but the more important variable in whether it happens or not may be whether people are moved to attempt it in the first place. It may be better to think about thought-feeling accuracy less as an individual difference that emerges across contexts and more as a tool that gets deployed in specific instances when a particular person finds it useful. Just as it would be cognitively taxing in ways that would prevent us from doing other things if we were to memorize every phone number we encountered, it similarly would not seem adaptive to infer the thoughts and feelings of every person we encounter. Fortunately, just as we do not *need* to memorize every phone number we encounter, there are a lot of things that go through other people's minds that we do not need to infer—for any reason, let alone reasons aimed at being prosocial.

5. Acquiring an (Undeserved?) Prosocial Glow

What has led psychology researchers and laypeople alike to gravitate towards the view that people will use their “mindreading” skills for good? The belief that interpersonal sensitivity (including thought-feeling accuracy) is related to prosociality is pervasive and robustly recurrent—something the current group of authors have all encountered and have tried in various papers (sometimes collectively) to question. A chapter reviewing the relationship between prosocial behavior and a wide variety of ways to be interpersonally accurate (e.g., accuracy at emotion decoding; accurately identifying people's traits, such as personality traits; and accuracy for other details such as what a person was wearing) suggested a much narrower and less robust relationship than commonly assumed (Hodges and Wise 2016). Similarly, a simple relationship between prosociality and perspective taking, the latter of which is frequently associated with both thought-feeling accuracy *and* the broad and prosocial concept of “empathy”, has also been questioned (see Sassenrath et al. 2022). Finally, specifically within the literature on thought-feeling accuracy that uses the Ickes paradigm, the idea that such accuracy can be used for less than prosocial goals has been raised but relatively neglected—perhaps because of the “empathic” label in the commonly used name for this paradigm (see Hall et al. 2021). So, why does the belief that thought-feeling accuracy is predictive of prosocial behavior seem to be stronger than the existing research evidence for such a link? We speculate about six reasons.

5.1. Reason 1: Thought-Feeling Accuracy Implies a Focus on Other People

The first reason is simple: attempts at thought-feeling accuracy share features with being “empathic”, a broad umbrella term used to describe separable and, quite frankly, often orthogonal components that are nonetheless intuitively associated (see Davis 1983; Hodges and Myers 2007; Zaki and Ochsner 2012). Interrupting our habitual self-focus to focus on another person's thoughts and feelings may interrupt more self-centered and self-serving scheming. When this focus on another person lands on someone in need or distress, if we are accurate at inferring the other person's thoughts and feelings (and the person has not otherwise told us what is wrong and why), those inferences will facilitate (though by no means guarantee) our ability to care for or help the other person. Moreover, given clear connections between perceived or expressed understanding and prosocial outcomes such as liking and feeling liked (e.g., Goldstein et al. 2014; Livingstone et al. 2020; Murray et al. 2002), it may seem natural to assume similar connections between *actual* understanding and such outcomes.

One of the key components under the empathic umbrella is perspective taking, and indeed, inferring another person's thoughts and feelings at a specific moment does involve an attempt to apprehend part of their perspective, although perspective taking can also refer to attempts to capture someone else's global opinions or general schemas. An act of perspective taking (or at least perspective consideration) is essentially built right into the

process of inferring another person's thoughts or feelings. Importantly, perspective taking plays a role in other constructs under the "empathic" umbrella. Manipulating perspective taking—or perhaps, as McAuliffe et al.'s (2020) meta-analysis suggests, manipulating the suppression of perspective taking (see also McAuliffe et al. 2018)—is thought to affect other constructs imbued with prosocial themes, particularly the "empathic concern" (also called sympathy and compassion) felt for another person and the helping and even altruistic behaviors that stem from feeling empathic concern (e.g., Batson et al. 2002; Batson et al. 2007). This is especially true when taking the perspective of targets who are objectively experiencing hardship (Coke et al. 1978). However, as we will see, attending to and accurately inferring another person's thoughts and feelings does not always lead to compassion and helping, nor do effortful and conscious efforts to imagine another person's point of view or imagine oneself in another's place—see Sassenrath et al. 2022.

5.2. Reason 2: There Are Instances When Thought-Feeling Accuracy and Prosociality Are Positively Correlated

We are not saying that there is *no* connection between thought-feeling accuracy and prosocial responding ("prosocial" is used here—and often elsewhere—broadly and inclusively, including everything from saying and doing nice things to incurring personal sacrifice to help others). However, the simple notion that people who can read other people well will also be helpful and kind to them may not be the best way to describe it. Before we elaborate more on what might be a better description, we want to acknowledge that we found a number of studies that could be seen as supportive of this association.

Around the time we started writing this piece, we had reason (for another purpose) to compile a list of empirical articles that were indexed in PsycINFO, Medline/PubMed, and/or EBSCOhost and that both (1) mentioned empathic accuracy and (2) also used some variation of the Ickes paradigm (i.e., target reporting open response thoughts and feelings at specific time points; perceiver inferring those thoughts and feelings). While this list was not intended as a meta-analysis, nor was it exhaustive (for example, studies that used variants of the Ickes paradigm but did not label them as "empathic accuracy" were not included), it yielded an interesting set of 79 papers. We then went through the list, looking for studies that connected thought-feeling accuracy scores with prosocial outcomes—for which we used a very inclusive criterion. We came back with an assortment of 14 papers that documented a relationship between some variation of the Ickes paradigm and some outcome that could be seen as making things better for someone other than just the perceiver. (In some cases, this meant making things better for the target of accuracy; however, in other cases, prosocial outcomes were measured in different contexts or via trait measures.) Several of these prosocial outcomes were positive forms of support or responsiveness in romantic couples' interactions (e.g., Hinnekens et al. 2018; Verhofstadt et al. 2016). Two papers used slightly more prototypical prosocial outcomes—e.g., coming up with a helpful accommodation for a health issue (Sened et al. 2020) or delivering effective counseling (Kwon and Jo 2012). Five papers (including two pairs of studies that each appeared to use the same samples) might be better described as measuring prosociality by looking for lower levels of antisocial behavior in the form of lower levels of reported aggression (e.g., Clements et al. 2007; Schweinle et al. 2002).

Among the 14 papers with broadly prosocial outcomes, 13 showed either that higher levels of thought-feeling accuracy were correlated with more prosociality (e.g., Haas et al. 2015) or that lower levels of thought-feeling accuracy were related to aggression or being unsupportive. Only one of the 14 papers showed that a higher level of thought-feeling accuracy was related to a less prosocial outcome (specifically, more blaming—see Hinnekens et al. 2016). Among the 13 papers supporting the relationship, often there was some moderator or condition on the correlation (e.g., thought-feeling accuracy was related to higher scores on one subscale of an empathy measure but not other subscales—see Namba et al. 2021; or a result was present for male perceivers but not female ones—see Clements et al. 2007).

Thus, in studies where both thought-feeling accuracy and some measure of prosociality (very broadly defined) are collected, the correlation is generally positive. However, that said, we think assuming that being attuned to others predicts prosocial behavior in a causal sense (an assumption some of us have frequently encountered when discussing our research: that a trait related to one definition of empathy is thought to bring about behavior related to another definition of empathy) probably does not do the best job of describing the association. Flipping the order may help a little²: valuing being (or just being) habitually helpful and nice as a broadly construed trait may lead one to have greater thought-feeling accuracy. Even then, empirical demonstrations of the relationship—causal or even just correlational—are often not straightforward (e.g., see Ickes et al. 1990; Issner et al. 2012; Namba et al. 2021; Verhofstadt et al. 2016; Zaki et al. 2008). A further possibility is that there are third variables, such as similarity or shared group membership between perceivers and targets, that independently help with thought-feeling accuracy and predict prosocial behavior towards the target.

We think people try to maximize thought-feeling accuracy in moments when it matters to them. Prosocial people strive for thought-feeling accuracy when it affords them an opportunity to be prosocial because that is what they care about (see, for example, Winczewski et al. 2016; but consider also Izhaki-Costi and Schul 2011). But there is not an exclusive relationship between prosociality and thought-feeling accuracy: people high in relationship anxiety are more accurate in contexts that are threatening (indeed, see, for example, Simpson et al. 1999); people with a high need for achievement would be expected to be more accurate in contexts that might allow for achievement. Thus, it is perhaps not so surprising that trait measures of prosociality predict thought-feeling accuracy only inconsistently (as we have noted above). Individual differences on empathy and prosociality scales may do a better job of predicting thought-feeling accuracy in contexts where there are opportunities to be prosocial (e.g., listening to someone who has asked for advice or helping someone who is in distress)—and these instances would support an association between accuracy and prosocial behavior. Thus, there are other methodological refinements, such as collecting accuracy measures across different targets and different circumstances, that might better define the association.

5.3. Reason 3: Prosocial People Use Accuracy for Prosocial Ends

Our third reason why thought-feeling accuracy is assumed to correlate with prosocial behavior is a variation on the second reason. Just as prosocial people may engage in accuracy attempts in order to fulfill their prosocial goals, prosocial people have also probably learned techniques to increase accuracy that support their prosocial ways—just as they have learned to use other tools and strategies to support prosocial ends. For example, healthcare workers who are committed to healing others will have learned that listening carefully as another person describes symptoms leads to more effective healing attempts—a strategy that is consistent with the finding that perceivers whose attention is focused on a target’s words show better thought-feeling accuracy (attention to the verbal channel was manipulated in studies by (Gesn and Ickes 1999; Hall and Schmid Mast 2007); in a study by (Hodges and Kezer 2021), it was measured by examining how closely perceivers’ inferences matched what targets said out loud). Or a therapist may have learned over years of experience the benefits of drawing on generalizations about what people with a certain mental disorder think and feel (i.e., stereotypes—see also Lewis et al. 2012) to help treat a client who has that disorder.

The important thing to remember is that people with other goals or orientations, even ones that may conflict with prosociality (e.g., self-serving goals), have probably also learned to be more accurate in support of those goals. For example, a salesperson trying to maximize her commissions may also carefully listen to a client or use generalizations about what members of certain groups tend to think when considering their product (e.g., “When people who work at the university buy a house, they always have concerns about which schools the house is zoned for. . .”) in order to increase the chances of closing

a sale. There is nothing necessarily wrong or immoral about attending to or drawing on information that can make us more accurate in inferring the thoughts of others for self-serving purposes. However, it does highlight how there is nothing inherently prosocial about being accurate.

5.4. Reason 4: Thought-Feeling Accuracy Has Been Studied in Prosocially Relevant Contexts

Our second and third reasons drew heavily on examples examining thought-feeling accuracy in contexts involving counseling or couples. Our fourth reason directly addresses this bias: research has disproportionately focused on specific contexts and relationships where accurate inference can clearly contribute to compassion and helpful behavior. Dubbing what has been studied extensively as “empathic accuracy” thus makes sense, given that much of the work has been done in settings where accuracy would likely be associated with caring and concern. Returning again to the list we compiled of 79 studies using the Ickes paradigm, we found that 30% (24 papers) measured thought-feeling accuracy in romantic couples (e.g., Berlamont et al. 2022; Crenshaw et al. 2019; Gadassi et al. 2011; Rafaeli et al. 2017; Sels et al. 2021). Another six papers measured it in perceivers who were caregivers or counselors (e.g., O’Brien and Haaga 2015; Reese et al. 2016), generally with targets who were experiencing some level of distress. Another line of research explored thought-feeling accuracy in perhaps the slightly less compassionate but still guidance-heavy relationship that occurs between coaches and athletes (e.g., Lorimer and Jowett 2009a, 2010b, 2011).

In close relationships, significant others seem to read our minds to empathically deliver just what we need. This might mean picking out the perfect movie or takeout food on a particular Friday night, maneuvering an interaction with an acquaintance to get us out of a social situation that we would hate, or providing convincing reassurance about the exact thing we are worried about—all actions that make us feel like our loved ones “get” us. Misreading or being oblivious to the thoughts and feelings of one’s romantic partner seems like a recipe for a rocky relationship (although, interestingly, over time, accuracy appears to grow less important—Kilpatrick et al. 2002; Thomas et al. 1997)—or perhaps inaccuracy is better seen as an indication that the relationship has ceased to be a priority, which is no doubt accompanied by a number of other factors that foretell relationship dissolution.

Similarly, whether or not caregivers are habitually “empathic” (in the compassionate sense), they need to understand and then attend to their charges’ needs. Skilled therapists need to correctly infer their clients’ thoughts and feelings and use this knowledge to validate the clients’ experiences and to suggest more adaptive mindsets and behaviors that can help ease mental distress. We expect the causal arrows to go both ways: dispositionally empathic people seek out caregiving opportunities, and caregiving settings call upon the people within them to behave in empathic ways.

Thus, thought-feeling accuracy has been frequently studied in settings and relationships where it is highly likely that perceivers will already care about the targets—because targets are the perceivers’ romantic partners or because it is the perceivers’ literal job to care for the targets. There is also a third variable in these settings, which is both correlated with caring and has been shown to be related to thought-feeling accuracy: romantic partners and therapists *know* the targets (therapists know the targets—including quite personal details—through intake interviews and an ongoing therapeutic relationship). One of the earliest studies using the Ickes paradigm showed that perceivers who were close to targets were more accurate in making inferences about thoughts and feelings than strangers were (Stinson and Ickes 1992), and that furthermore, this advantage was mediated by the perceivers’ knowledge of what the target was talking about. When the target made references to “another place and time”, it provided more information to close others than strangers. (This may help explain why the close acquaintance advantage has not always been found when people are inferring the thoughts of close acquaintances when those close acquaintances are talking to other people—see Hancock and Ickes 1996; Thomas and Fletcher 2003) Over time, people in a romantic or therapeutic relationship may also come

to share motives (e.g., saving money for a house down payment or trying to reduce the risk of relapse)—or possibly just to assume that they share these things (see Thomas et al. 1997). Paradoxically, contexts that constrain caring and sharing to high levels may limit variance and thus make it harder to demonstrate significant correlations between accurate inference and prosocial outcomes.

5.5. Reason 5: Prosocial May Be in the Eye of the Beholder

While our fourth reason why thought-feeling accuracy is assumed to be “empathic” had to do with over-attention to certain contexts, our fifth proposed reason has to do with under-attention to certain outcomes. Studies of thought-feeling accuracy have rarely assessed outcomes experienced by targets—people who may be well-placed (indeed, arguably in the best position) to assess prosocial outcomes³. In the studies we discussed above that linked greater thought-feeling accuracy with prosocial outcomes, those outcomes were generally coded by a research team (e.g., supportive behavior in a couple) or evaluated by someone other than the target (e.g., successful outcomes in counseling). With a few exceptions, even in Ickes’ Dyadic Interaction paradigm, targets are generally not asked, “How well did the perceiver understand you?” And of course, in various contexts related to thought-feeling accuracy, targets could be asked not just about how well understood they felt but a host of other variables related to prosocial outcomes: how much they had been helped; whether they felt included; whether they were treated with compassion; positive changes in mood or well-being, etc.

It is worth remembering that in an ongoing dyadic interaction, targets may have some control over the perceivers’ accuracy, including how useful the cues are that the target sends. If targets sense that the perceiver is not understanding them, they can say so (“No, no—it’s not that. . .”) and provide more explanation about what they are thinking and feeling. Alternatively, targets could be put off by the perceiver’s obliviousness, which may not only affect what the target further shares but also the overall tenor and outcome of the interaction. Targets’ perceptions of how helpful or understanding perceivers are may well be driven by variables other than accurate inference of discrete thoughts and feelings—for example, whether the perceiver tries to establish common ground or shared experience with the target (see, e.g., Hinnekens et al. 2020a).

5.6. Reason 6: Confirmatory Instances Are Overrepresented in Memory

Sixth and finally, instances that fall into the present–present cell—i.e., the combination of the presence of thought-feeling accuracy and the presence of prosocial outcomes—may be easier to generate and more memorable than other combinations (as discussed in Hodges and Wise 2016). People tend to overestimate the co-occurrence of things that seem to belong together (i.e., illusory correlations; Nisbett and Ross 1980) and also assume that people with one positive characteristic will possess other positive characteristics (i.e., the halo effect; Feingold 1992). Among other things, thought-feeling accuracy and demonstrating warmth and nurturance are both associated with the female gender role (see Hodges and Wise 2016). On the flip side, people who are perceived as uncaring can be incorrectly believed to be inaccurate at inferring others’ thoughts and feelings as well (see Fernandez-Duque et al. 2010).

Similarly, people may not be well attuned to register the combination where thought-feeling accuracy is present, but outcomes are neutral (or even negative) in terms of prosocial tendencies. There is not really much to notice when a person is accurate at inferring our thoughts and feelings but does not perform any actions that follow from these inferences. And in instances when someone is accurate and then behaves selfishly or unkindly towards us, it may be most important (and perhaps most adaptive) to pay attention to the harmful behavior—not whether or not that person was able to accurately infer our thoughts or feelings beforehand.

6. When Thought-Feeling Accuracy Does Nothing . . . or Worse

After presenting six reasons why we think the link between thought-feeling accuracy and prosocial outcomes may be overestimated (likely by researchers and laypeople), we venture into the less explored territory where they are theoretically unrelated or even negatively correlated. As a first step in decoupling thought-feeling accuracy and prosociality, we note that such accuracy is not a requirement for being—or merely being perceived as—prosocial. People can be caring and provide competent help without necessarily having to resort to using subtle cues to accurately infer what an individual target is thinking or feeling. In many social interactions, targets and other observers may be entirely unaware of how accurate (or inaccurate) perceivers may be—so inaccuracy will often go undetected and thus will not necessarily lead to targets feeling misunderstood. As we noted earlier, inferring the contents of another person’s mind can require constructing something from cues that are not always directly accessible. These construction projects are too cognitively costly to engage in continuously, and furthermore, they are not our default method of communicating and coordinating with others—directly asking and telling is much more efficient (a point we will return to later).

Unless perceivers verbally share inferences about what they believe the target is thinking and feeling or if perceivers act on their inferences in ways that reveal them, targets and others around them may be blissfully oblivious to rampant misassumptions by perceivers (Myers and Hodges 2009). What is not well known is how much “empathic” extra credit is earned for prosocial behaviors that appear to stem from correctly inferring and taking into account targets’ individualized thoughts and feelings. However, we do suspect that someone who reveals inaccuracy in inferring others’ thoughts and feelings may limit the degree to which their related actions will be seen as interpersonally sensitive, even if the intentions behind the actions were prosocial. In some extreme cases, the actions of an openly inaccurate perceiver may even be viewed antagonistically. The uncle who expects us to be excited about a gift of expensive opera tickets despite the fact that we have told him how we hate opera can, at best, be seen as generous—but probably will not be described as “empathic”. The co-worker who fails to realize our fear of big city driving may have meant well when giving us directions right through downtown as the most efficient route to a destination, but she likely will not be perceived as helpful. Even correctly inferring that someone is in distress but misreading the source of the distress may result in a considerable deduction in compassion points.

Our second step toward disassociating thought-feeling accuracy and prosociality presents an even greater challenge to the empathic prefix in the term “empathic accuracy”: Accurate inference in no way guarantees that the information gained will be used for prosocial ends. As our first illustration of this, consider all the professions that would seem to benefit from or require thought-feeling accuracy but for which prosocial goals are irrelevant to job success or even incompatible with it. For example, human resources officers and recruiters need to assess what job candidates are thinking and feeling during job interviews. The candidates’ records may provide objective performance evidence, but often, people are hired on the aspirational basis that they can and will learn the new job. Do they really feel comfortable using Python as a programming language? Are they excited about supervising a team of eight assistants? Will they be able to handle greeting walk-in clients while also keeping up with intake calls? Extracting the real picture from a job candidate’s answers requires thought-feeling accuracy on the part of the interviewer-as-perceiver, and the conclusions drawn may be entirely independent of the interviewer’s prosocial motives (for example, wanting to give the job to a member of an underrepresented minority) or may even conflict with prosocial motives (e.g., wanting to give the job to a candidate who desperately needs it—but knowing the person is seriously underqualified).

Even in professions where helpful behaviors are expected (e.g., therapists), thought-feeling accuracy can direct people to act in ways that appear to be un-compassionate or that require suppressing compassionate responses to the distress that a target is perceived to be feeling. For example, in the medical arena, accurate inference of a patient’s craving for a

painkiller or of a patient's experience of certain symptoms may be the key to healing these patients or saving their lives, but it may also lead to denying them certain palliative care or to ordering highly invasive treatments in the process. And then there are the professions where accuracy is most decidedly not associated with prosocial aims. In competitive contexts like the military, law, business, and other negotiation settings, knowing what one's competitor is thinking or feeling can be used to best them—whether that is leading an attack that will maximally demoralize them, discrediting their star witness, or stealing their marketing ideas. This kind of Machiavellian accuracy (see Hodges and Myers 2007) is definitely *un-*“empathic” and is found outside occupational transactions as well. For example, in dysfunctional family and romantic relationships (or even in moments of discord in functional relationships), the accurate inference of another person's fears can be put to use in heightening their anxiety, or the accurate inference of positive anticipation can be used to create disappointment.

The practice of gaslighting (American Psychological Association n.d.) is another example of thought-feeling accuracy being used for harm: The gaslighter must first have an accurate assessment of what the victims are thinking and feeling in order to make the victims doubt themselves. Other sinister users of not-so-“empathic” accuracy include con artists and even child sexual abuse offenders, whose ability to accurately infer victims' thoughts and feelings may be part of grooming the victims (McAlinden 2006). More petty but still unkind behaviors may also involve exploitation of thought-feeling accuracy—e.g., purposefully grabbing the seat in a meeting where we inferred someone else was intending to sit. Using another person's thoughts and feelings to personalize acts of aggression against them can greatly intensify the hostility.

Although we can easily generate anecdotes of thought-feeling accuracy serving antisocial goals, empirical examples are currently fairly limited. This could mean that dark uses of this form of accuracy are rare or that they are hard to study because of social desirability concerns—or perhaps a combination of the two. Creating opportunities for dark behaviors to occur also has its ethical limits. Probing the circumstances in which thought-feeling accuracy is used for nefarious purposes constitutes an important and intriguing direction for future research.

We suspect that although thought-feeling accuracy can be used for purposes that hurt others, more often it is used simply for self-serving purposes that are neutral to others or, at any rate, are not considered immoral. People use accuracy to understand things they wonder about and to figure out how to coordinate with other people to get what they want. This would suggest that (independently of any relationship to prosociality), a perceiver's thought-feeling accuracy generally benefits them—and there are some empirical studies that demonstrate positive outcomes for people who are more accurate in this way (e.g., Blanke et al. 2016; Gleason et al. 2009; Lorimer and Jowett 2009b). Thought-feeling accuracy may deliver benefits, particularly in the realm of *metaperceptions*. Systematic biases have been identified in people's perceptions of others' thoughts and feelings that exaggerate how much others have critical thoughts about them (e.g., perceiving them as socially inept or badly dressed). Broadly in line with research by Hinnekens et al. (2020b) that links specific mind-reading errors to lower overall accuracy, being more accurate may protect perceivers against these painful negative perceived evaluations.

The benefits of accuracy for perceivers may be even more significant in the context of intergroup interactions between members of advantaged majority and disadvantaged minority groups. Vorauer and colleagues' work (e.g., Vorauer and Kumhyr 2001; Vorauer et al. 1998, 2009) vividly illustrates the possible pitfalls of exaggerated negative metaperceptions—or other metaperceptual errors (Vorauer and Sakamoto 2006)—in intergroup exchanges (see also Bergsieker et al. 2010; Kteily et al. 2016). Majority group perceivers may erroneously infer that minority group targets perceive them as prejudiced, and such inferences can lead to more negative self-evaluations as well as dampen enthusiasm for pursuing already fragile intergroup relations.

However, we are somewhat surprised there are not more studies demonstrating the rewards of accurately inferring others' thoughts and feelings—both generally and in specific contexts. Thinking of accuracy more as a useful tool to deploy when needed and less as a trait or talent helps explain this mystery: A can opener is really handy if one needs to open a can of beans, but can opener operation does not consume our attention for most of the day, and the advantages of owning a can opener do not generalize across broad swathes of our lives.

Greater thought-feeling accuracy can also have some downsides for the perceiver (for an excellent review of the potential downsides of accuracy in reading affective cues—some of which are shared with thought-feeling accuracy—see Schlegel 2020). Just as is the case for the benefits of thought-feeling accuracy, these downsides are likely specific to particular instances and do not confer some generalized disadvantage. Chief among the negative consequences is finding out someone is thinking or feeling something the perceiver does not want to know. This unwanted knowledge is often about the self: that they dislike you, they think those pants make you look fat, or they found your pun bad.

Another compelling example of the dangers of accurate inference can be found in Simpson et al.'s (2003) work, which demonstrates that accurately inferring that one's partner finds another person attractive may reduce feelings of closeness in the relationship. To make things worse, partners who are insecure about the relationship (because, for example, they have an anxious attachment style) may be particularly vigilant and accurate when it comes to reading their partner's thoughts about other people's attractiveness (Simpson et al. 1999).

Not all unwanted outcomes resulting from accurate inferences reflect badly on aspects of the perceiver. The target could also be experiencing negative affect (generally not pleasant for perceivers to infer except maybe in cases of *schadenfreude*) or having thoughts about a negative aspect of the world (e.g., the target is not surprised a peer falsified their data or the target believes there really is no chance of escaping a recession this next year). Jobs that involve a lot of inference of unpleasant thoughts seem ripe for leading to burnout: for example, therapists working with suicidal clients (whose thoughts are about self-destruction) or teachers working with school administrators who have no resources (whose thoughts about budget woes have consequences for the teachers). Encountering thoughts that are contrary to one's own may be existentially challenging (Hodges et al. 2018), and if one spends time inferring multiple people's thoughts, the cacophony of viewpoints may also be disturbing.

There are also the simple opportunity costs of devoting time and effort to being accurate. These costs are not limited to times when perceivers are accurate; they are present whenever a perceiver directs attention away from other topics in order to try to infer a target's thoughts and feelings. Use of the Ickes paradigm (especially the dyadic interaction version) yields better than chance but not especially impressive levels of thought-feeling accuracy (see Hodges et al. 2015), so attention directed toward trying to read someone's mind may not be worth the effort. And although we know of no empirical research on this topic, we suspect that there could be interpersonal costs to being perceived as someone who expends extensive effort to "mindread"—visible efforts might be viewed as odd, indicating poor social skills, or creepily threatening.

7. Concluding Thoughts

This last point brings us to a final idea that we think is an intriguing future direction for thought-feeling accuracy research and is also relevant to its connection to prosocial behavior. The most effective and efficient way for humans to know each other's minds is, fortunately, *not* via inference. Humans have developed a highly advanced and direct communication system for getting perspectives—in the form of words and language. No inference is required if one simply asks the target what they are thinking and feeling. Consistent with this idea, Eyal et al. (2018) encourage the use of perspective *getting* through conversation

over perspective *taking* through inference as a more effective route to understanding other people's minds.

Humans can also quickly communicate simple but critical emotion-relevant messages nonverbally that may be processed with minimal or no inference required (messages along the lines of "I'm going to attack you"; "Something else is going to attack us both"; "The baby is in pain"; and "You're pretty cute"), something we share with other species. If we really needed to know what was in people's minds that they were not telling us with their words or emotion displays, maybe we would have evolved thought receptors. Instead, it may have been more adaptive to have the option of thinking about some things privately without them being accessible to others.

When we think about the instances when we most desire accuracy, it is often when targets are not telling us what is on their mind. Maybe this is because they are not entirely sure of these thoughts and feelings themselves. Or maybe they are embarrassed about what they are thinking or feeling, they do not want to upset us or think their thoughts and feelings will cause an argument, or they are lying to us or want to use privileged information to their own advantage. In these cases, just how prosocial is it for perceivers to pursue thought-feeling accuracy? A few studies have already indirectly explored questions about how much targets want their thoughts to be known or how much perceivers really want to know them (e.g., Lawless Desjardins and Hodges (2015), who studied interactions between strangers who might be lying, and Simpson et al. (1995), who studied romantic couples who seemed to avoid accurately seeing that their partner might be attracted to someone to protect the relationship). We think targets' desire not to share some thoughts and feelings and perceivers' desire to probe them anyway may be some of the most interesting variables to study when it comes to accuracy in inferring others' thoughts and feelings.

For now, though, studying thought-feeling accuracy in contexts where targets may not want their thoughts and feelings to be known remains understudied. Almost certainly, part of the reason for this is that this research would be challenging to conduct. Already, the Ickes paradigm is complex to run and requires small armies of research assistants to collect data and code inferences; augmenting potentially socially undesirable themes in thoughts and inferences would further complicate matters. However, we suspect a further impediment to studying the inference of thoughts that targets are reluctant to share is the remarkably persistent assumption the current quartet of authors has encountered in our research lives: that thought-feeling accuracy is something "nice" and prosocial that "empathic" people do. Challenging that assumption—as we hope we have accomplished here—may open ways to contemplate and appreciate new aspects of human social cognition and what it means to be emotionally intelligent.

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Notes

- ¹ The RMET is often referred to as a measure of theory of mind—see review by Kittel et al. (2022)—but is better described as a measure of emotional decoding.
- ² We want to be absolutely clear that we are solely "playing" with theoretical models and are not pretending to present evidence that could speak to the causal direction—if any—between these two constructs.

³ Targets also have a privileged and unique perspective on perceiver accuracy, as they alone have provided the criterion for accuracy. When targets rate the accuracy of perceivers' inferences, they give higher accuracy ratings than "objective" coders and are not as highly correlated with objective coders as other objective coders are with each other (Hodges et al. 2015).

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Review

State Emotional Clarity Is an Indicator of Fluid Emotional Intelligence Ability

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Abstract: Emotional clarity is one facet of emotional intelligence that refers to one's meta-understanding of and ability to identify and describe feelings. The existing research has largely focused on trait emotional clarity and its benefits for greater psychological well-being, more successful emotion regulation/coping, and diminished psychopathology. Researchers have begun to examine state or momentary emotional clarity in daily life. In this paper, we situate emotional clarity within the larger literature on emotional intelligence abilities. Then, we argue that state clarity relies on the ability to incorporate information from the dynamic contexts that emotions unfold in and should more closely reflect one's emotional intelligence ability relative to traditional trait measures. In addition, we review and make recommendations for measuring state emotional clarity in daily life and propose future research directions, focusing on how state emotional clarity could inform the study of emotion regulation, decision making, and goal pursuit in daily life.

Keywords: emotional clarity; emotional intelligence; experience sampling

1. Introduction

Conceptions of emotional intelligence frequently involve sets of abilities related to one's own and others' emotions. Among the abilities proposed to comprise emotional intelligence, abilities related to perceiving emotions, understanding emotions, and using/regulating emotions are some of the most frequently cited (Salovey et al. 1995; Mayer et al. 2002; Joseph and Newman 2010). Emotional clarity is the ability to identify and describe one's emotional experiences (Gohm and Clore 2000; Salovey et al. 1995) and is thought to encompass one's meta-perceptions about their emotions (Boden and Thompson 2017). We argue that emotional clarity should be considered an integral ability for emotional intelligence and that measures of state emotional clarity will give the greatest insights into one's access to that ability in daily life.

Like emotional intelligence, emotional clarity has received attention across disciplines in psychology, including, but not limited to, clinical, cognitive, personality, social, and industrial/organizational psychology. Though emotional clarity can be understood as a standalone construct, it is also a dimension of several multidimensional constructs, including alexithymia (i.e., a condition characterized by difficulty identifying and describing feelings; Bagby et al. 1994), emotional awareness (Boden and Thompson 2015; Eckland and Berenbaum 2021), and sometimes emotional intelligence (or "perceived emotional intelligence"; Salovey et al. 2002). The broad interest in emotional clarity is unsurprising given its importance for processing emotional experiences (Gohm 2003) and links to several healthy outcomes (e.g., subjective well-being; Gohm and Clore 2002).

In the present paper, we first discuss why emotional clarity should be considered a key ability involved in emotional intelligence. Second, we propose that the emerging research on state emotional clarity suggests it is an indicator of emotional intelligence ability. Third, we review and make recommendations for measuring state emotional clarity. Fourth, we posit that intra-individual variation in state emotional clarity reflects access

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to emotional intelligence ability and we describe sources of this variation. Finally, we present directions for future research involving state emotional clarity, focusing on emotion regulation, decision making, and goal pursuit.

2. Emotional Clarity and Emotional Intelligence Ability

Several frameworks of emotional intelligence ability, including Mayer et al.'s (2002) four-branch ability model and Joseph and Newman's (2010) cascading model, cite emotion perception and understanding as key emotional intelligence abilities. Emotion perception has been defined as the ability to recognize emotions in the self, others, and in other stimuli such as art and media (Mayer et al. 2002). Emotion understanding has been defined as the ability to understand and appreciate emotional information, such as how more complex emotions may be blends of more simple emotions and how emotions vary in intensity (Mayer et al. 2002). As a construct, emotional clarity is relevant to both perceiving and understanding emotions. Emotional clarity is thought to involve creating a clear mental representation of one's emotional experience based on perceived stimuli from the body and external context, which can then be translated from a mental representation into a verbal representation (Hoemann et al. 2021). To be emotionally clear is to have perceived and understood one's emotions.

Despite conceptual overlap, measures of emotional clarity (most frequently measured with the Trait Meta-Mood Scale [TMMS]; Salovey et al. 1995) and ability-based emotional intelligence (often assessed by the Mayer-Salovey-Caruso Emotional Intelligence Test [MSCEIT]; Mayer et al. 2002) have tenuous links. Studies find that emotional clarity is either uncorrelated (Lopes et al. 2003) or positively correlated only to a small degree (Koven and Max 2014) with total MSCEIT scores, MSCEIT perceiving, and MSCEIT understanding scores. Emotional clarity, as it is typically measured through self-report, has sometimes been labeled as "perceived" emotional intelligence (Salovey et al. 2002). Perceived emotional intelligence has also been critiqued as being difficult to separate from personality, though some work demonstrates that personality variables account for large amounts of the variance in performance in emotional intelligence ability tests (Fiori and Antonakis 2011; Schulte et al. 2004). There are several possible explanations for this lack of coherence among self-report and performance-based measures.

In the MSCEIT, emotion perception is tested with two tests: identifying emotions in pictures of faces (the Faces test) and identifying emotions conveyed through pictures of artwork and landscapes (the Pictures test). The understanding facet of emotional intelligence is also measured with two tests: identifying emotions that are intensifications of other emotions (the Changes test) and identifying emotions that are blends of other emotions (the Blends test). Though the emotion perception facet is defined as being the ability to recognize emotions in the self, others, and other stimuli, the MSCEIT only measures the ability to recognize emotions on static faces and in stimuli such as landscapes. Likewise, the emotion understanding tests do not test the ability to identify changes in intensity or blends of emotions in the self. However, this issue is not unique to the MSCEIT. Other tests of emotion perception (e.g., the Geneva Emotion Recognition Test; Schlegel et al. 2014) and emotion understanding (e.g., the Situational Test of Emotion Understanding; MacCann and Roberts 2008) similarly focus on recognizing the emotions of others or identifying how one "should" feel given a hypothetical situation, rather than testing one's ability to perceive and understand their own emotions. Accurate emotion recognition and clearly perceiving one's own emotions are modestly linked, but are by no means the same skill (Eckland et al. 2018). Thus, within the current literature on emotional intelligence abilities, a gap exists between what one may know about identifying emotions (i.e., what is measured) versus the experience of identifying emotions in oneself (i.e., what is not measured).

These emotional intelligence ability tests likely reflect one's declarative knowledge about emotion categories, but not necessarily one's procedural knowledge of identifying their own emotions. This is further underscored by work showing that MSCEIT scores are

more strongly related to crystallized, versus fluid, intelligence (Farrelly and Austin 2007), indicating that the MSCEIT may be drawing upon acquired knowledge rather than pure ability. Fiori et al. (2014) also found that the MSCEIT tests better discriminate persons with low emotional intelligence, but are likely not challenging enough to persons that are high in emotional intelligence. As evidenced by clinical interventions to increase emotional clarity (Linehan 2015), a conceptual understanding of emotions can be used as a building block for the more challenging skill of perceiving and understanding one's own emotions as they unfold in day-to-day life. The MSCEIT and other tests of emotional intelligence ability are measures of maximal emotional intelligence performance (i.e., it is a performance measure given under "ideal" conditions) rather than typical performance, which relates to one's ability/access to abilities in everyday life. Thus, the current emotional intelligence ability measures are likely testing crystalized emotion knowledge, but not how well a person can access, use, and apply that knowledge in the real world. This is also illustrated by Montgomery et al.'s (2010) study of autistic young adults, who did not score significantly different from neurotypical young adults on total MSCEIT emotional intelligence ability, but self-reported significantly lower emotional intelligence. In contrast, measures of emotional clarity focus on one's perception of emotions in the self under typical conditions (i.e., trait measures) or under current contextual demands (i.e., state measures and states in daily life).

3. Emotional Clarity as an Indicator of Fluid Emotional Intelligence Ability

Fiori and Vesely-Maillefer (2018), Fiori et al. (2021), drawing on the Cattell-Horn-Carol model of crystallized and fluid intelligence (Schneider and McGrew 2012), proposes a distinction between crystallized emotional intelligence ability and fluid emotional intelligence ability. Crystallized emotional intelligence ability is what is captured in tests, such as the MSCEIT, that draw upon declarative knowledge about emotions, whereas fluid emotional intelligence ability involves the processing of emotional information. Ortony et al. (2007) proposed that a fluid component of emotional intelligence is necessary and should include experiential measures rather than measures that more exclusively reflect declarative knowledge about emotions.

We believe that emotional clarity, reflecting one's ability to create a clear mental (and verbal) representation of their emotional experiences, should be considered an indicator of fluid emotional intelligence ability. Empirical evidence suggests that emotional clarity facilitates the healthy processing of emotional experience. Higher emotional clarity has been linked to faster processing of negative emotional information (Fisher et al. 2010). Lower emotional clarity has been linked to indicators of poorer emotional information processing such as less prosocial moral decision making (Koven 2011), reduced meaning in life in the face of existential threat (Abeyta et al. 2015), and difficulty using affective information to inform judgment (Gohm 2003).

Research has also unambiguously linked trait emotional clarity to a host of psychological processes and outcomes that one would expect a facet of emotional intelligence to be linked to. Low trait emotional clarity has been linked to several indicators of psychopathology, including depression (Boden and Thompson 2015; Eckland et al. 2021; Vine and Aldao 2014), worry (Eckland and Berenbaum 2021; McLaughlin et al. 2007), panic (Park and Naragon-Gainey 2019; Salters-Pedneault et al. 2006; Tull and Roemer 2007), and problematic alcohol use (Vine and Aldao 2014). Higher emotional clarity has been linked to several indicators of well-being, including problem-solving (Gohm and Clore 2002), life satisfaction (Eckland and Berenbaum 2023; Lischetzke et al. 2012), meaning in life (Abeyta et al. 2015), successful down regulation of negative affect (Wilkowski and Robinson 2008), and use of putatively adaptive emotion regulation strategies (e.g., reappraisal and acceptance; Boden and Thompson 2015).

Despite primarily being studied as a trait, emotional clarity is a dynamic process (Eckland and Berenbaum 2021; Lischetzke et al. 2011; Park and Naragon-Gainey 2019; Thompson and Boden 2019). That is, emotional clarity can fluctuate in daily life, varying over time and across situations for an individual. Trait emotional clarity refers to the extent

to which one typically understands their emotions, whereas state emotional clarity refers to the extent to which one clearly understands their emotions at shorter time scales (e.g., emotional clarity over the course of a day, hour, or in the moment). Though abilities are thought to be largely static, and are thus measured through maximal performance, in daily life, persons interact with psychological and environmental contexts that may limit or facilitate their access to these abilities (van Vianen 2018). Zeidner et al. (2008) argued that this also describes emotional intelligence. Though the correlates of trait emotional clarity converge with emotional intelligence ability, the traits measured through self-report involve retrospecting over large swaths of time and can be influenced by other sources, such as one's self-perceptions (Paulhus and Vazire 2007). In contrast, leveraging methods, such as experience sampling, has allowed researchers to begin to understand how emotional clarity states fluctuate across time and situations, giving insights into how emotions are perceived and understood in daily life.

We argue that fluctuations in emotional clarity may be especially important to study because they could also reflect differential access to one's fluid emotional intelligence abilities across various contexts. Reports of state or momentary emotional clarity rely on the abilities to incorporate information from various sources at a given time (e.g., the dynamic contexts that emotions unfold in) and indicate one's online ability to clearly represent their emotional experiences.

4. Measuring State Emotional Clarity

To date, only a handful of studies have assessed state emotional clarity in daily life. Below, we review how state emotional clarity has been operationally defined and measured across these studies. We also provide recommendations for measurement and situate these measurement issues within the emotional intelligence ability field.

4.1. Direct Measures

Direct measures of examining state emotional clarity involve relatively straightforward self-reporting about one's experience. These measures prioritize face-validity (i.e., it is clear to the respondent what they are asked to report on; Paulhus and Vazire 2007). In the context of measuring state emotional clarity in experience sampling research, item selection is an important design decision as it is rare to adapt an entire subscale to an experience sampling protocol. Below, we review the current body of available research directly measuring emotional clarity in daily life.

Eight studies (Bailen et al. 2019; Eckland and Berenbaum 2021; Eckland and English 2023; Eisele et al. 2023; Park and Naragon-Gainey 2019; Springstein et al. 2023; Thompson and Boden 2019; Tuck et al. 2023) have used face-valid items to assess state (e.g., momentary, daily) levels of emotional clarity. In most cases, these items were modified versions of trait items selected for having the highest factor loading on a trait measure of emotional clarity. For example, Thompson and Boden (2019) and Bailen et al. (2019), who utilized the same sample (N = 79), assessed momentary emotional clarity using the item "At the time of the beep, I was clear about my feelings". They modified the item of the emotional clarity of feelings subscale of the TMMS that had the highest factor loading (Salovey et al. 1995) by adding "at the time of the beep", and changing the sentence structure to past tense. Springstein et al. (2023), Eckland and English (2023), and Tuck et al. (2023) administered the same item to assess momentary emotional clarity in three experience sampling studies (Springstein et al. 2023: 10 days, N = 277; Eckland and English 2023: 9 days, N = 219; Tuck et al. 2023: 14 days, N = 206). Park and Naragon-Gainey (2019) measured state emotional clarity using event-contingent experience sampling (i.e., participants, N = 129, completed a survey when they had a strong or significant emotion episode) by having participants rate the "extent to which they were able to clearly identify the emotions" during a strong emotion episode. Eckland and Berenbaum (2021) measured emotional clarity during a seven-day daily diary study (N = 212) using the items: "Today my emotions were clear" and "Today I was confused about how I felt". Finally, Eisele et al. (2023) measured momentary

emotional clarity in a two-week experience sampling study (N = 163) with an item that they developed: “I found it difficult to indicate in a number how I was feeling”. As state emotional clarity could refer to many time frames (e.g., momentary/“at the time of the beep”, past hour/“over the last hour”, daily/“today”, during a specific emotion episode, or since the last survey), it is important to consider the time frame that the item stem refers to when designing an experience sampling study.

To test the assumption that momentary and trait emotional clarity assess the same latent construct, some of the studies described above have reported associations between the trait measures of emotional clarity and state/momentary measures. Thompson and Boden (2019) and Bailen et al. (2019) found a positive, but not statistically significant, relationship between emotional clarity at the momentary and trait level. More specifically, their momentary emotional clarity item was not significantly associated with the trait measure of emotional clarity, which was assessed as recommended by Palmieri et al. (2009). However, Park and Naragon-Gainey (2019) and Eckland and Berenbaum (2021) found moderate to strong associations between trait and state measures. Park and Naragon-Gainey (2019) reported significant associations between trait emotional clarity (using the Toronto Alexithymia Scale [TAS-20]; Bagby et al. 1994) and state emotional clarity during strong emotion episodes. Eckland and Berenbaum (2021) also found a significant association between trait (using the TMMS) and daily emotional clarity. These findings suggest that state and trait measures of emotional clarity are likely assessing the same construct, but there may be some circumstances that produce greater correspondence.

Across these studies, the time-anchors for the state emotional clarity item differed (Thompson and Boden: “at the time of the beep”; Park and Naragon-Gainey (2019): in response to strong emotional event; Eckland and Berenbaum (2021): reflecting over course of day). Emotional clarity should vary in daily life according to when significant or emotional events occur (e.g., Thompson and Boden (2019) found momentary emotional clarity was higher after a significant positive event). Thus, it is possible that heterogeneity in the magnitude of the association between state and trait measures of emotional clarity may be due to the window of time that one is retrospectively over and whether significant or emotional events can be used to ground those ratings. With regard to reporting on emotional experience, Robinson and Clore (2002) found that when reflecting over shorter spans of time, participants rely more on episodic memory, but for longer spans of time participants rely more on semantic memory. It may be that the window of time that one is reporting emotional clarity over could also activate different types of memory (e.g., reporting over a few hours to a day may activate more semantic than recent episodic memory), which could affect the coherence with trait measures (which may rely more on semantic memory). Thus, ratings of emotional clarity in the moment may have less correspondence with trait levels than ratings made by reflecting over longer windows of time. More empirical work is needed to identify the conditions when state and trait measures do and do not correspond.

Another way in which these measures of state emotional clarity vary across studies is in the length of the response scales and whether the scales were unipolar or bipolar. Momentary emotional clarity items frequently use 5-point scales (Bailen et al. 2019; Park and Naragon-Gainey 2019; Thompson and Boden 2019; Tuck et al. 2023) or 7-point scales (e.g., Eckland and Berenbaum 2021; Eckland and English 2023; Eisele et al. 2023; Springstein et al. 2023). Using a 5-point scale is consistent with three of the widely used trait emotional clarity scales (i.e., TMMS, TAS, and Difficulties in Emotion Regulation Scale [DERS; Gratz and Roemer 2004]), which use 5-point scales, whereas the Mood Awareness Scale (MAS; Swinkels and Giuliano 1995) uses a 6-point scale. Most of these studies examined momentary emotional clarity using a unipolar scale. That is, the left anchor of the scale indicated some variation of no emotional clarity (e.g., “not clearly at all”; Park and Naragon-Gainey 2019). In contrast, Eckland and Berenbaum (2021) presented participants with statements which were rated using a bipolar Likert scale (1 = disagree strongly, 7 = agree strongly). The TMSS and TAS also use bipolar Likert scales (i.e., rating agreement with a statement

from strongly disagree to strongly agree), and the DERS uses a 5-point unipolar scale to assess how often an item applies to them (1 = almost never [0–10% of the time], 5 = almost always [91–100% of the time]). The literature on psychometrics suggests that there are reasons to prefer a 7-point scale over a 5-point scale (e.g., increased sensitivity; Finstad 2010). However, it is a complex issue, with some data suggesting 5- and 7-point measures produce nearly identical means, skewness, and kurtosis when rescaled to the same scale (Dawes 2008). A 5-point scale may be advantageous as it is more consistent with trait measures, possibly increasing the comparability of state and trait findings. Further, a 5-point scale has some practical advantages when assessing momentary emotional clarity in an experience sampling study (e.g., more likely to fit a mobile device screen). Thus, study design decisions should be weighed carefully to balance practical concerns, psychometric scale properties, and consistency with extant state and trait emotional clarity measures.

The extent to which state emotional clarity depends on one's trait levels may in part be reflected in the proportion of variance in state emotional clarity that is within-subjects (at the level of moments/situations) versus between-subjects (at the person level). Each of these studies examined the proportion of variance of the momentary emotional clarity was at the within- versus between-person levels using the intraclass correlation (ICC). Bailen et al. (2019) and Thompson and Boden (2019) both reported an ICC of .53 for their EMA item, meaning that 53% of the variance in momentary emotional clarity was at the between-person level and 47% of the variance was at the within-person level. Using the same item, both Springstein et al. (2023) and Eckland and English (2023) reported an ICC of .51 for their one-item emotional clarity measure and Tuck et al. (2023) reported an ICC of .40. Park and Naragon-Gainey (2019) reported an ICC of .34 for their 1-item emotional clarity measure. Finally, Eckland and Berenbaum (2021) found an ICC of .46 for their 2-item emotional clarity scale. Across these studies, about one-half to two-thirds of the variance in momentary emotional clarity was due to within-person variance, indicating that emotional clarity has a significant within-person component that fluctuates over time.

A final concern regarding measuring state emotional clarity over the course of an experience sampling study is whether being asked to report on one's emotions and one's level of emotional clarity will systematically increase the emotional clarity over the course of the study. Eisele et al. (2023) report that, qualitatively, participants reported becoming more aware of their emotions during the experience sampling study. However, their quantitative analyses did not suggest that the emotional clarity increased during the experience sampling period. Like Eisele et al. (2023), Springstein et al. (2023) did not find any effects of time in the study on the levels of emotional clarity reported. Taken together, research has not found systematic time effects on emotional clarity, illustrating that participation in an experience sampling study is unlikely to increase one's levels of emotional clarity.

To illustrate the lack of systematic time effects on momentary emotional clarity, we present data from 12 randomly selected participants from the authors' most recent experience sampling study. Figure 1 shows the levels of state emotional clarity across 70 prompts of experience sampling (five prompts per day for 14 days). These data come from an unselected community sample of 18–65-year-olds responding to the item "During the last hour, my emotions were clear" using a 5-point bipolar Likert scale (1 = Strongly disagree, 5 = Strongly agree).



Figure 1. Levels of State Emotional Clarity across a Two-Week Experience Sampling period. Each panel (A–L) shows one participant’s levels of state emotional clarity reported during two weeks of experience sampling. Each dot represents an experience sampling prompt. Dotted lines represent lines of best fit for that participant’s levels of emotional clarity as a function of time. Across participants, consistent time effects do not emerge as a result of reporting emotional clarity during an experience sampling study.

4.2. *Indirect Measures*

Indirect measures of state emotional clarity capture the performance or speed of information processing that is relevant to a target characteristic (Robinson and Neighbors 2006). These measures are especially useful when a target characteristic may be socially desirable (e.g., it may be socially desirable to be someone who is “emotionally intelligent”).

Lischetzke et al. (2005) proposed and validated a measure of momentary emotional clarity that only relies on reports of current emotions. This measure of momentary emotional clarity is derived from the reaction time (RT) it takes for one to rate their emotions. Drawing on research using RTs as a measure of attitude strength (Bassili 1996) and work, demonstrating longer RTs for making judgments about ambiguous stimuli vs. unambiguous stimuli, they argue that RTs should be shorter for clearer, less ambiguous emotional experiences. Lischetzke et al. (2011) recommend statistically controlling for the baseline reading speed, and Thompson et al. (2015) controlled for the baseline RT to non-emotion items. This measure is related to trait measures of emotional clarity in some studies (Lischetzke et al. 2005, 2011), but not consistently in others (Thompson et al. 2015). In addition, it has the advantage of being parsed by valence (Thompson et al. 2015).

Although RT has the advantage of being unobtrusive and less subject to desirability bias, this measure of state emotional clarity has some important limitations. First, clear data processing rules are needed when working with RTs (Lachaud and Renaud 2011); for example, rules for distinguishing between longer RTs due to low emotional clarity vs. inattention when completing the survey prompt. RTs gathered in daily life may also be noisier than those gathered in a controlled lab setting. Implicit measures, more broadly,

tend to show lower test-retest reliability and greater temporal instability relative to the corresponding explicit measures (Gawronski et al. 2017). Thus, RT measures may reflect state emotional clarity to a lesser extent than they reflect trait emotional clarity.

4.3. Recommendations for State and Momentary Measures

When measuring state emotional clarity, several factors should be considered. Given the brevity of state and momentary measures, they are unable to capture the same amount of construct coverage that longer trait scales can. Consequently, measuring state emotional clarity using a combination of direct and indirect measures may be superior to using either in isolation. When using direct measures, single-item measures strongly limit how broadly and reliably a construct can be measured (Nunnally 1978), which ultimately limit its potential to predict important outcomes (Flake et al. 2017). Whenever possible, using more items to measure state emotional clarity can produce a more reliable, useful measure. Only one of the studies reviewed above included a measure of state clarity with more than one item (Eckland and Berenbaum 2021). One advantage of indirect measures is that they are relatively unobtrusive to collect. Thus, combining multiple measures (e.g., 1–2 direct questions, RTs to emotion items) may produce a stronger, multi-approach measure of state emotional clarity without increasing the burden in studies such as intensive longitudinal designs. For measures using multiple items, reporting between- and within-person reliability and a discussion of how the items were selected are essential steps for continuing to validate the construct of state emotional clarity across the literature.

Though self-report items have typically been avoided in the assessment of emotional intelligence abilities, it may be necessary to include this method in bridging fluid and crystallized emotional intelligence. In avoiding a self-report methodology, the current measures of emotional intelligence ability (e.g., the MSCEIT, STEU) are unable to assess the experiential employment of emotional intelligence. Ortony et al. (2007) note that a critical implication of this gap in the assessment is that intelligent machines can use algorithms to score highly on measures of emotional intelligence without experiencing emotions at all. They urge researchers to expand the methods used to assess emotional intelligence to include self-report, informant-report, interviews, physiology, and behavior to capture a fuller understanding of emotional intelligence.

5. Within-Person Variability in State Emotional Clarity

Within-person approaches to understanding psychological phenomena are becoming increasingly popular for explaining behavior (e.g., Dalal et al. 2020; Myin-Germeys et al. 2009). Empirical evidence suggests that phenomena previously considered to be “fixed”, like personality, are dynamic and fluctuate across time and situations. For example, for even the most (typically) extraverted person, some situations, like studying at a library, may produce trait-inconsistent behavior. However, it is not only personality traits that can be dynamic within persons—abilities, or access to one’s abilities, can also fluctuate in different settings. Cognitive abilities also appear to fluctuate within persons in daily life. Campbell et al. (2020) found that performance in ambulatory neurocognitive tests varied in daily life as a function of activities that the participants reported engaging in. Their results indicate that it may be easier to engage one’s cognitive abilities in a cognitively demanding task when one is already involved in mentally engaging activities (versus having to move from a state of disengagement to engagement). In other words, mentally engaging situations may facilitate access to one’s cognitive abilities. Within organizational psychology, Fit theory (van Vianen 2018) has also been used to explain how certain (e.g., work) environments facilitate the use of one’s abilities (i.e., person-environment fit), whereas others do not. Thus, it is reasonable to then expect that access to one’s emotional intelligence abilities may also be limited or enhanced across situations.

As described above, the current body of studies examining state emotional clarity estimate that about one-half to two-thirds of the variance in emotional clarity is at the within-person level. This indicates that, on average, each person’s state or momentary

emotional clarity varies across time and contexts. Fluctuations in momentary emotional clarity likely reflect the extent to which one’s abilities to be clear in the moment are either enhanced or hindered by factors such as the context in which emotions are unfolding.

The broader literature on personality traits and states provides some clues as to why people vary in emotional clarity and how to understand the relation between the trait and state levels. Whole trait theory (Fleeson and Jayawickreme 2015) argues two key points that may explain why emotional clarity fluctuates. First, traits are made up of the density distributions of states. People’s understanding of their emotions will vary moment-to-moment based on situational elicitors of emotional response. In some situations, people with typically high levels of emotional clarity will have great confusion about what they feel. Conversely, people with typically low levels of emotional clarity will, in some situations, clearly understand what they feel. Density distributions should also reflect individual differences in the trait level and states that individuals tend to experience. For those with less fluctuation in their state levels, their within-person standard deviations should be smaller. For those with higher trait levels of emotional clarity, their density distribution may have a negative skew (though higher trait levels could also be represented by a normal distribution with a higher mean). Figure 2 demonstrates the variability in the distributions of this ability in daily life with the frequency and density distributions of state emotional clarity across two weeks of experience sampling from the same randomly selected participants whose data are presented in Figure 1.

A second assertion from whole trait theory that helps to characterize fluctuations in emotional clarity is that the stable mean of the density distribution reflects a descriptive trait level, while the spread of states reflects the influence of social-cognitive mechanisms (e.g., goals, beliefs, values) that rise in response to one’s situation/context. The process of clearly identifying one’s emotional state is one of signal detection (Klein and Robinson 2021). To perceive one’s emotional state, the emotional signal must be clearly identified amongst all the contextual noise around that signal. State (and momentary) emotional clarity in daily life then represents one’s ability to detect signals through the various sources of quotidian noise. Below, we describe several contextual factors that may enhance or mask emotional signals in daily life.

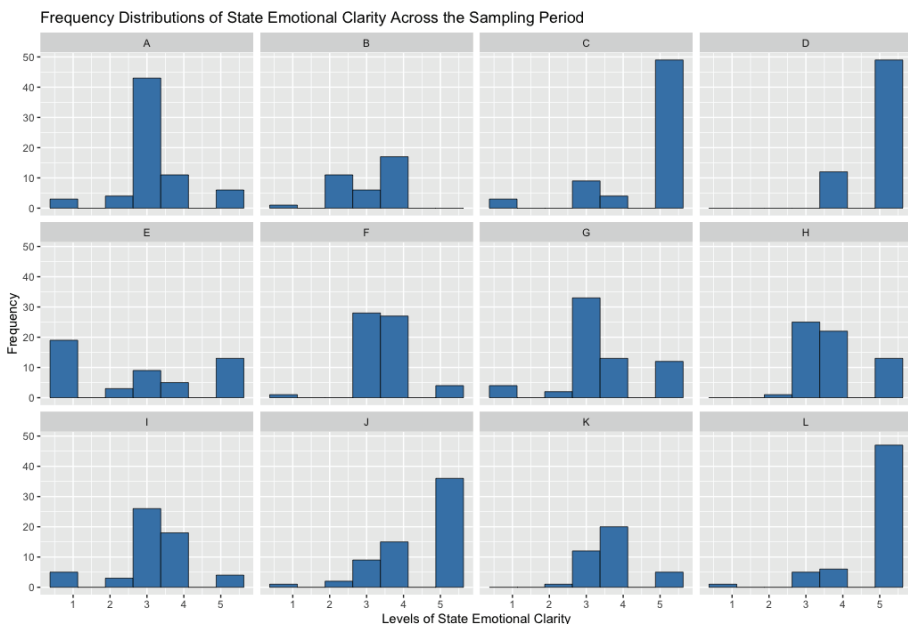


Figure 2. *Cont.*

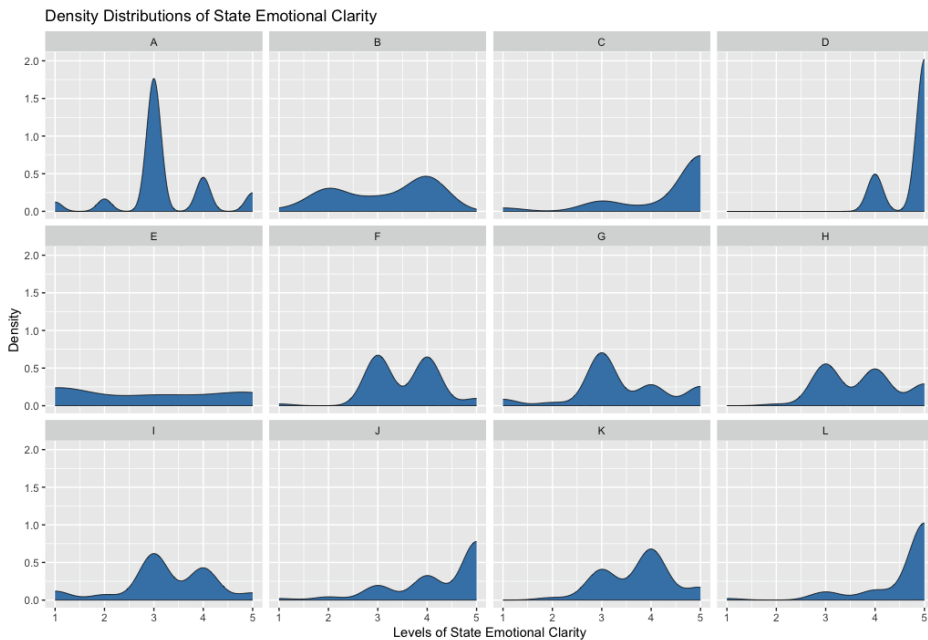


Figure 2. Frequency (**top**) and Density (**bottom**) Distributions of State Emotional Clarity across Two Weeks of Experience Sampling. Each panel (A–L) shows one participant’s frequency (**top**) and density (**bottom**) distributions of state emotional clarity reported during two weeks of experience sampling. Participants vary in the shape, center, and spread of reported levels of state emotional clarity across a two-week period. The same participants are shown in the top and bottom panel plots (e.g., Participant A’s frequency distribution is shown at the top and their density distribution is shown at the bottom).

5.1. Contextual Factors Influencing Levels of State Emotional Clarity

5.1.1. Affect Intensity

The extent to which one can clearly understand their emotions should be linked to how intense those emotions are. When examining RTs to emotion items, Thompson et al. (2015) found that both positive and negative emotional intensity were linearly associated with longer RTs (i.e., more intense affect was associated with less emotional clarity). Arndt et al. (2018) further tested this by including both linear and quadratic associations between emotional intensity and RTs to emotion items. They found that an inverse-U shaped curve best characterized this association. In other words, momentary levels of emotional clarity, as indexed by faster RTs to responding to emotion items, are higher when the emotional intensity is either lower or higher. Furthermore, Arndt et al. (2018) found that confidence in emotion ratings followed a U-shaped pattern when plotted against emotional intensity, such that people were more confident (i.e., clearer) at lower and higher levels of emotional intensity. Using face-valid emotional clarity items, Thompson and Boden (2019) replicated this pattern of association, such that emotional clarity was highest at lower and higher levels of emotional intensity.

Emotional clarity should vary based on the intensity of the emotional signal that one is detecting (Klein and Robinson 2021). Clearer signals should be available at very low levels of affect intensity (i.e., detecting whether or not the signal is even present) and at very high levels of affect intensity (i.e., detecting ceiling levels of a signal). Thus, at more moderate levels of an emotion, emotional intensity may be a more ambiguous, less helpful, signal, and other factors may take precedence in determining the levels of state emotional clarity.

5.1.2. Social Situations

Social interactions often elicit emotions, and emotions impact social interaction (Van Kleef 2016). Therefore, having a greater momentary understanding of one's emotions should facilitate adaptive social behavior. Prospective longitudinal studies further suggest that deficits in emotional clarity are linked to poorer social functioning and maladaptive social behavior among adolescents (Rudolph et al. 2020). Two experience sampling studies (Thompson and Boden 2019; Tuck et al. 2023) indicate that momentary emotional clarity is higher during prompts where participants also reported having social interactions. Tuck et al. (2023) further elucidates this pattern by showing that the association between momentary emotional clarity and being in a social interaction is moderated such that momentary emotional clarity is even higher when interacting with close others. In social contexts, especially social contexts where one is highly motivated to maintain social harmony (e.g., with close others), people may be more motivated to understand their emotions as they are unfolding and make greater efforts to understand how they feel.

5.1.3. Familiar Situations

Appraisal theories (e.g., Ortony et al. 1988) argue that emotions, in part, arise out of meaning that is made from situations. Among the many ways situations can be appraised is the extent to which they are experienced as familiar (versus unfamiliar). One's mental representation of their current emotional state will be impacted by a variety of factors, including past feelings in similar situations (Barrett et al. 2007). Thus, in more familiar situations, emotions may become clearer because there is greater reliance on concepts such as how one typically feels in those situations. There is emerging direct empirical support for emotional clarity being higher in familiar situations. Two studies found that momentary emotional clarity is higher in more familiar situations in daily life (Springstein et al. 2023; Eckland and English 2023).

5.1.4. Sources of Emotions

State emotional clarity concerning the type of emotion one feels may in part depend on how clear the source of that emotion is. Boden and Berenbaum (2011) distinguished two types of emotional clarity: clarity of type (i.e., understanding the types of emotions one feels) and clarity of source (i.e., understanding the causes of one's emotions). The vast majority of the emotional clarity literature focuses on emotional clarity of type. However, we argue that understanding the sources of emotions will help with identifying the types of emotions one feels. A wealth of studies indicate that being aware of the sources of information impacts how that information is processed (Keltner et al. 1993). For example, Schwarz and Clore (1983) demonstrate that unpleasant emotional information can impact judgments of life satisfaction, but this effect is mitigated by bringing the source of negative information into awareness. Appraisals of emotional sources differentially activate needs, goals, and concerns that impact the types of emotions people feel (Frijda 1986; Ortony et al. 1988; Siemer et al. 2007). For example, an argument with one's spouse may elicit a variety of emotions, like anger or anxiety, but the specific type may depend on the concerns made salient by the argument. In the case of an argument with one's spouse, identifying that one's emotions are coming from feeling disrespected may help one identify that they are angry. On the other hand, identifying that the source of one's feelings are thoughts such as "my spouse might leave me" may help one identify that they are fearful or anxious. Depending on the source and type of emotion, one may have different behavioral responses (e.g., taking a moment to cool off). Sources that are more ambiguous or difficult to interpret may lead to subsequent confusion about what one feels in the moment and what can be done about those feelings.

5.1.5. Interoceptive Cues

Interoception refers to the processing and representation of bodily signals (Quigley et al. 2021). Emotions involve physiological components, such as changes in heart rate,

temperature, sweating, and muscle contractions/tension (Kreibig 2010). Individuals differ in their levels of interoceptive awareness and the accuracy with which they decipher interoceptive cues (Ludwick-Rosenthal and Neufeld 1985; Murphy et al. 2019). For those with greater interoceptive awareness, momentary emotional clarity may depend on appraisals of physiological changes. For example, a highly interoceptive person may detect increases in their heart rate and more clearly identify momentary levels of anxiety or excitement. However, physiological changes may signal a variety of emotions (e.g., increased heart rate could signal anxiety or excitement or both); thus, other contextual factors might be needed for clearly identifying what one feels in the moment.

The usefulness of interoceptive cues may also depend on age. The physiological hypothesis of emotional aging (MacCormack et al. 2022) argues that, as part of the aging process, there is greater afferent noise from body signals to the brain. Therefore, the brain's representations of emotions rely more on external cues and experience rather than interoceptive cues. As people get older, state and momentary levels of emotional clarity may depend less on interoceptive body cues.

5.1.6. Significant Events

Functional theories of emotions (Keltner and Gross 1999) propose that emotions help to coordinate attention and action in response to events that are salient to one's goals, needs, and values. Goal attainment (Emmons 1986), need fulfillment (Tay and Diener 2011), and value-congruent action (Luoma et al. 2007) have been linked to enhanced subjective well-being. Therefore, being able to understand one's emotions in the moment should be helpful for facilitating action that promotes well-being. In line with this reasoning, Thompson and Boden (2019) found that following significant positive events, participants in an experience sampling study reported higher levels of momentary emotional clarity. In the context of significant events, people may have greater motivation to make sense out of their emotions in the moment to facilitate meaningful action.

5.2. *Why Does Context Matter?*

Understanding the variability and fluctuations in one's ability to clearly understand their emotions has important implications. Over the last two decades, many efforts have been made to increase socioemotional skills and emotional intelligence abilities (e.g., including formal education in school settings; Durlak et al. 2011). In addition to interventions for socio-emotional skills, psychotherapy interventions such as cognitive behavioral therapy have demonstrated effectiveness for increasing the ability to clearly identify one's feelings (Baker et al. 2012; Berking et al. 2013). Further identification of contexts that support, or inhibit, the ability to clearly identify emotions in the moment could enhance socio-emotional skills and psychotherapy interventions and provide greater specificity about circumstances when more effort may be needed to become clear.

6. Future Directions in State Emotional Clarity Research

Thus far, the research examining state emotional clarity has mostly focused on how momentary emotional clarity is related to the momentary experience of emotion. That is, the existing research has examined its associations with momentary negative and positive affect (e.g., Arndt et al. 2018; Lischetzke et al. 2011). Though this is an important area of work, state emotional clarity has relevance to other psychological processes that unfold in everyday life. Below, we discuss how state emotional clarity could be incorporated into the study of the other psychological processes that draw on one's emotional intelligence abilities.

6.1. *Emotion Regulation*

Prominent models of emotional intelligence include the successful management or regulation of emotions as a critical skill for emotionally intelligent people to have (Joseph and Newman 2010; Mayer et al. 2002). Despite a consistent designation of emotional clarity

as part of the emotion regulation process, empirical work has yet to elucidate the specific ways in which emotional clarity enhances emotion regulation. Examining state emotional clarity, especially in daily life, may explicate how the ability to clearly perceive one's emotions facilitates emotion regulation. Cybernetic models such as Larsen's (2000) model of mood regulation suggest that a clear perception of emotions is needed for determining the need to regulate. The extended process model of emotion regulation (Gross 2015), another cybernetic model, also suggests that emotional clarity may be useful at several points in the emotion regulatory process, including in the identification of the need to regulate and in the selection of strategies to address one's regulatory needs. Furthermore, Gratz and Roemer (2004) include deficits in emotional clarity as a contributor to difficulties in regulating emotions. Though these models do not explicitly refer to state or momentary emotional clarity, they imply that as the emotion regulatory process unfolds, a momentary understanding of emotions is critical for supporting successful emotion regulation.

In line with these theories, emerging evidence suggests that state emotional clarity has links with successful emotion regulation and coping in daily life. Park and Naragon-Gainey (2019) found that diminished momentary emotional clarity was associated with greater subsequent internalizing symptoms via less successful emotion regulation in an experience sampling study of people seeking treatment for internalizing disorders. Eckland and Berenbaum (2021) found that on days when participants reported greater emotional clarity than was typical for them, they also reported increased active coping with daily problems. Drawing upon these models of emotion regulation, we propose that future studies of emotional experience in daily life should continue to examine how momentary emotional clarity fits into the emotion regulation process.

Both of the models by Larsen (2000) and Gross (2015) imply that momentary emotional clarity may help with determining needs to regulate or the decision of whether to regulate one's emotions. Empirical work is needed to test whether momentary emotional clarity is associated with (a) one's appraisals of their need to regulate emotions in the moment and (b) decisions not to regulate emotions. Gross (2015) further describes the possibility that momentary emotional clarity may facilitate strategy selection. Thus, empirical work is needed to test whether momentary emotional clarity helps with selecting strategies that fit one's context/situation, regulation needs (i.e., the strategy is effective for the specific emotion being regulated), or adjusting the use of strategies that are not working. Finally, further replication is needed of state/momentary emotional clarity's link to emotion regulation success, including testing the boundaries of this effect. Is emotional clarity always needed in the moment to successfully regulate emotions? Under what conditions does momentary emotional clarity contribute to emotion regulation success or not?

6.2. *Decision Making*

Under the four-branch model (Mayer et al. 2002), using emotions to facilitate thinking processes (e.g., decision making) is considered a marker of emotionally intelligent people. Several theoretical models and empirical accounts demonstrate that momentary emotional clarity can help with decisions of whether to regulate one's emotions or not. Larsen's (2000) control-process model of mood regulation suggests that emotional clarity is needed for recognizing discrepancies between one's current and baseline mood. Discrepancies are compared with one's current goals or concerns so that one can decide whether to engage in mood regulating behavior. In the extended process model (Gross 2015), emotional clarity is thought to be important for both determining a need to regulate (similar to Larsen's model) as well as in deciding which strategy to engage in. Emotion is thought to serve as a barometer of one's goal progress (Carver and Scheier 1990); therefore, a clear understanding of one's emotions should facilitate making decisions to continue or re-orient goal pursuit. Having higher trait and momentary emotional clarity should have implications for the availability of cognitive resources. Higher trait emotional clarity would allow one to use fewer resources in the moment to determine one's feelings, while higher momentary

emotional clarity allows for more cognitive resources to be devoted to responding to the demands of one's situation.

Emotions that are integral (i.e., related to a decision-making situation) and incidental (i.e., present during a decision-making situation, but unrelated to the situation itself) have both been shown to impact the decision-making process (Lerner et al. 2015). In situations where the emotion is integral to the decision, momentary emotional clarity may facilitate making decisions with greater speed or certainty because situation-relevant information from one's emotions is more easily available. Lab-based studies have demonstrated that people with a greater understanding of their emotions show less bias in their decision making from incidental emotions (Yip and Côté 2013). Future research should test the generalizability of these findings to everyday life. For example, does state emotional clarity in daily life have the same buffering effects against bias from incidental emotions in everyday decisions? For what types of decisions (e.g., the personal relevance, the importance of the decision) is state/momentary emotional clarity helpful? In what types of situations (e.g., ambiguous, social, low-risk) is state/momentary emotional clarity especially helpful?

6.3. Goals

Behavior is directed by goals (internal representations of desired states; Austin and Vancouver 1996). Dweck (2017) proposes that our day-to-day goals stem from core psychological needs and the fulfillment of those goals promotes our psychological well-being. Carver and Scheier (1990) applied a control-process model to goal pursuit and suggested that emotions arise to help in judging discrepancies between one's desired state (i.e., their goal) and their current state. When our goals/needs are met, pleasant emotion is elicited. When our goals/needs are not being met, unpleasant emotion is elicited. Emotions can serve as a barometer of whether our goals are being met or whether we are moving closer or further away from meeting our goals (Carver and Scheier 1990; Larsen 2000). Momentary levels of clarity should therefore be helpful in pursuing and attaining goals.

The affect-as-information approach (Clore et al. 2001; Gohm 2003; Gohm and Clore 2002; Storbeck and Clore 2008) suggests that our affective (e.g., emotional, mood, liking/disliking) reactions provide salient information about a range of important considerations, such as our environment, situation, and/or goal progress. Thus, what someone understands about their emotions may provide a range of information about their goals. For example, could low state emotional clarity (i.e., one understands that they feel "bad" but may not be able to identify their emotions more specifically) lead one to conclude that they are not making progress in their goal? Alternatively, does higher momentary emotional clarity of negative affect (e.g., being able to clearly identify frustration in the moment) lead one to conclude that they need to change their approach to the goal?

7. Conclusions

In contrast to the substantial body of work examining trait emotional clarity, the literature surrounding state emotional clarity is still in its nascency. While the research on trait emotional clarity has established its importance for well-being, psychopathology, and many psychological processes, we view research examining state and momentary emotional clarity as a crucial next step in integrating emotional intelligence abilities into the study of psychological processes in daily life. Research further testing contexts which support (or inhibit) this ability and the downstream effects that being clear in the moment have will be important for understanding how to best cultivate the ability to be emotionally clear.

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Review

Resilience as the Ability to Maintain Well-Being: An Allostatic Active Inference Model

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Abstract: Resilience is often characterized as the outcome of well-being maintenance despite threats to that well-being. We suggest that resilience can also be characterized as an emotional-intelligence-related ability to obtain this outcome. We formulate an allostatic active inference model that outlines the primary tools of this resilience ability as monitoring well-being, maintaining stable well-being beliefs while updating situational beliefs and flexibly prioritizing actions that are expected to lead to well-being maintenance or gathering the information needed to discern what those actions could be. This model helps to explain the role of positive emotions in resilience as well as how people high in resilience ability use regulatory flexibility in the service of maintaining well-being and provides a starting point for assessing resilience as an ability.

Keywords: resilience; well-being; allostasis; active inference

1. Introduction

The author CW has a friend (we will call him “Bob”) who is really gifted in carpentry—he makes beautiful furniture. One day, CW asked him about his secret and he responded that building furniture requires the right tools. So, over the course of several years, CW spent too much money buying cool tools. Alas, CW’s furniture never quite compared to Bob’s. Bob further explained that one also needs the ability to use those tools effectively, so CW watched YouTube videos and practiced, and although he was able to cut wood and attach it to other pieces of wood better, his furniture was still not quite as good as Bob’s. Finally, it dawned on CW that Bob’s skill at using those tools effectively went beyond accomplishing the subgoals of cutting and drilling to serve a well-visualized end product or outcome that he was trying to achieve. So, good carpentry is about having the right tools and having the ability to use those tools to accomplish a well-visualized outcome.

It is inarguable that crafting a beautiful piece of furniture involves one’s abilities, but what about crafting a resilient life? Surprisingly, this is a little less clear because investigators have been inconsistent with conceptualizing resilience as the properties/abilities of the person (Block and Kremen 1996) or as the outcome of a process (Masten 2001). An example of the former is Block’s characterization of resilience as “the dynamic capacity of an individual to modify a characteristic level of ego-control, in either direction, as a function of the demand characteristics of the environmental context. . . (Block and Kremen 1996, p. 351).” For resilience researchers like Block, resilience is characterized as the ability of the person to adapt to their environment. On the other hand, an example of the latter conceptualization of resilience as a process comes from stress researchers who define resilience as a relative stability in functioning from before to after some adverse event (e.g., Bonanno et al. 2002; Masten 2001). Returning to our furniture metaphor, resilience has been treated both as the ability to use tools to make the furniture and as the furniture itself.

One reason for this confusion is that resilience can be appropriately conceptualized as both an ability and an outcome in the same way that intelligence can. An intelligent person, like Albert Einstein, has the ability to create intelligent outcomes, like the theory of

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relativity. Similarly, a resilient person, like John McCain, has the ability to create resilient outcomes, like successfully surviving and thriving after being held as a prisoner of war for over 5 years. However, conceptualizing resilience as both the ability and the outcome yields circular reasoning that X ability necessarily leads to X outcomes and X outcomes are necessarily produced by X ability. To avoid this circular reasoning, we must recharacterize either the resilience ability or resilient outcome. There are many ways to accomplish this, but in the spirit of this special issue on emotional intelligence, we will focus on resilience as an ability and recharacterize resilient outcomes.

2. Resilience as an Ability

To characterize resilience as an ability, we begin with research on emotional intelligence (EI), which provides nice guidelines for understanding what constitutes emotion-related abilities (Mayer et al. 2016). According to EI, an “ability” is the capacity to enact the behaviors required to accomplish some goal and/or solve some problem. For example, the four-branch model of EI proposes a hierarchical organization of problem-solving areas. From the most computationally basic to the most complex, these consist of perceiving emotions, facilitating thought using emotions, understanding emotions and managing emotions (Mayer et al. 2016). Furthermore, for each of these problem-solving areas, there exists a collection of abilities that are associated with high emotional intelligence (see Table 1 in Mayer et al. 2016). If EI is a collection of abilities, as the four-branch model proposes, then maximum performance measures should provide a better measure of EI ability than individuals’ self-reported EI. Consistent with this logic, scores from the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT), a well-validated performance measure of EI, but not self-ratings from the Self-Rated Emotional Intelligence Scale, are associated with measures of social competence and the two measures of EI are only weakly correlated with each other (Brackett et al. 2006). Therefore, the conceptualization of resilience as an ability may be aided by the development of new performance measures in addition to the existing self-report measures (such as trait scales: Block and Kremen 1996).

Some researchers have suggested that EI is a core ability underlying resilience (Salovey et al. 1999), which prompts the question of whether we need to define resilience as a separate ability at all. Indeed, the skills associated with EI, such as managing and understanding emotions, can help people cope successfully (Salovey et al. 1999). For example, self-reported EI has been shown to predict decreased stress responses to life stressors (Armstrong et al. 2011) and EI is measured as an ability correlated with a better response to a laboratory stressor (Schneider et al. 2013). However, the link between EI and resilience does not seem to be as strong as to suggest that they might be the same ability. First, EI is not universally related to positive outcomes after stress. One study showed that EI ability did not predict social stress responses (Matthews et al. 2006). Second, the link between EI and good stress responding appears to be moderated by other vulnerabilities (Davis and Nichols 2016). For example, having high emotion perception (a component of EI ability) led to a stronger relationship between hassles and depression (Ciarrochi et al. 2002) and high EI predicted increased cortisol reactivity and prolonged stress recovery for those high in basal testosterone (Bechtoldt and Schneider 2016). Summing up these mixed findings, Zeidner et al. 2006 suggest that successful adaptation and resilience is a multivariate outcome and that EI may be just one component.

We feel justified then in characterizing resilience as its own ability that features EI as one of the skills that helps enable people to be resilient. Further, it is useful to use the ability approach of EI to craft this characterization of resilience ability. One tenet of this approach is that because having an ability enables the enactment of behaviors, this ability exists outside of and must precede the enactment of those behaviors. In other words, to accomplish an emotionally intelligent behavior like understanding that one’s partner is feeling frustrated, one must first be emotionally intelligent and able to understand others’ emotions. If resilience can be characterized as an ability, we must accept that people have “resilience-ability” before they accomplish resilient outcomes. Consistent with this idea,

researchers who have treated resilience as a relatively stable trait (e.g., Block and Kremen 1996) found that reporting higher trait resilience on a scale at one time point predicted reduced depression after a national tragedy like the terrorist attacks on the US on 9/11 (Fredrickson et al. 2003) and successful stress recovery in the lab (Tugade and Fredrickson 2004). Importantly, characterizing resilience as a trait-like ability suggests that it might be relatively stable like other traits, but, like other abilities, it can be developed and learned in those who may not yet have resilience ability (Vaugh and Koster 2015). For example, stress inoculation research suggests that resilience can be developed in childhood through experiencing mild stressors in a supportive environment (Seery et al. 2010). Resilience can also be developed in adulthood (Vaugh and Koster 2015); researchers have found that the ability to flexibly express emotions subsequently predicts decreased distress during the first two years of college (Bonanno et al. 2004) and emotional expressivity is an ability that can be improved (Giese-Davis et al. 2002).

The second tenet of this ability approach to resilience is that an ability is the capacity to enact certain behaviors to solve problems and accomplish goals. As noted before, it is circular reasoning, and therefore unhelpful, to say that the ability to be resilient is related to the capacity to have resilient outcomes. So, we must more precisely define what constitutes a “resilient outcome” to characterize the goals that a high resilience ability can achieve. We start with the typical way of defining resilient outcomes. In common parlance, resilience is thought of as the ability to “bounce back” from adverse events (e.g., <https://positivepsychology.com/what-is-resilience/>, accessed on 7 March 2023). Indeed, the word resilience is originally a metallurgy term that characterizes the ability of a metal to “bounce back” to its original shape after being bent. Similarly, Bonanno and colleagues have defined resilience trajectories after trauma as those in which people exhibit no significant change to their pretrauma levels of functioning (Bonanno 2004).

Furthermore, resilience is associated with and characterized by having high well-being and good functioning in spite of threats to that functioning (Masten 2001). One of the original longitudinal studies on resilience in the children of Kauai is powerful because it describes how well they are able to function and exhibit high well-being despite their desolate living conditions (Werner and Smith 1992). Bonanno and colleagues differentiated those who had stable patterns of good functioning (resilient) from those who had stable patterns of poor functioning (chronic dysfunction) from pre- to posttrauma (Bonanno 2004).

Next, “high levels of functioning” feels a little vague/broad. Technically, if we leave the definition of resilience broad, then the maintenance of any type of good functioning could count. For example, one might be physically resilient if one is able to maintain the functioning of one’s overall health after an illness. In this article, we are focusing on resilience in the realm of mental health, so high levels of functioning should reflect that (although, see conceptualizations that draw parallels between physical and mental resilience: Davydov et al. 2010). Well-being is a good candidate given that well-being reflects high levels of mental health functioning and is a common outcome measured in studies on resilience (e.g., Fredrickson et al. 2003). In the next section, we more fully unpack this formulation, but in the meantime, our characterization of resilience ability is “the ability to maintain high well-being in spite of threats to that well-being.”

Returning to EI, it is clear that EI predicts well-being, so is it that different from resilience ability as defined above? We contend that resilience is a higher-order ability that includes EI. Whereas EI ability is made up of constituent lower-order skills (emotion management, emotional perception, etc.) that tend to predict high well-being (Sánchez-Álvarez et al. 2016), resilience is the ability to maintain well-being by using whatever lower-order skills are necessary (including, but not exclusively limited to, EI; Zeidner et al. 2006). Because EI and resilience ability are hierarchically situated, EI skills form part of the suite of resilience skills.

In the next sections, we flesh out our characterization of resilience as an ability. We also provide some preliminary suggestions on ways to assess resilience ability. We must note that, because we are putting forth a novel characterization of resilience ability, most of

these assessments have not been fully validated as tests of this new characterization and some have not been tested at all. However, we hope that these ideas may be fruitful for future investigations into resilience ability.

3. Well-Being Maintenance

Well-being has been traditionally characterized in terms of hedonic/subjective well-being and eudaimonic well-being. Subjective well-being consists of life satisfaction, a cognitive component relating to one's overall evaluation of how one's life is going, as well as overall high levels of positive emotion and low levels of negative emotion (Diener et al. 1999). Alternatively, eudaimonic well-being consists of meaning-related processes like autonomy and mastery (Ryan and Deci 2001) as well as self-acceptance and purpose in life (Ryff and Keyes 1995).

Hedonic and eudaimonic well-being may be more related to each other than was historically theorized (Kashdan et al. 2008) and, although a full treatment of this debate is beyond the scope of this article, we have found it useful to focus on "positive appraisal" as a mechanism common to both types of well-being. Specifically, we (and others; Caprara et al. 2010) have suggested that well-being can be construed in terms of positive appraisals/evaluations of one's overall life (life satisfaction) and circumstances (positive emotions), which map onto subjective well-being, as well as positive appraisals/evaluations of one's goals (purpose/meaning) and relationships (belonging), which map onto eudaimonic well-being (Waugh 2023).

One of the, perhaps, surprising conclusions that resilience researchers have drawn in the last couple of decades is that resilience seems to be quite common (Bonanno 2004; Masten 2001), and they have come to this conclusion because they have found that the maintenance of well-being is quite common (Diener and Diener 1996). Numerous studies have found that, on average, well-being is quite stable over time (Eid and Diener 2004), even when accounting for potentially life-changing events (Costa et al. 1987). This stability has also caused investigators to question the prevalence of actual posttraumatic growth—a reliable increase in well-being after a severe stressor or traumatic event—suggesting instead that most of this phenomenon as currently measured is due to people's beliefs that they have grown and less to actual lasting changes in their well-being (Jayawickreme and Infurna 2021).

Well-being tends to be stable because it tends to be more related to people's stable characteristics and traits than to temporary states (Eid and Diener 2004; Hudson et al. 2020). Well-being is quite strongly associated with lower neuroticism and higher extraversion (Steel et al. 2008), higher optimism (Scheier and Carver 1992) and has a strong hereditary component (Keyes et al. 2010). When making judgments about how life is going overall, people tend to use chronically accessible information about themselves (e.g., identity, life goals) that are commensurate with their personality traits rather than use more temporarily accessible information (e.g., the weather) that is more variable (Robinson and Clore 2002; Schimmack and Oishi 2005).

It is important to distinguish well-being as a global, relatively stable evaluation/appraisal of one's life from moods and emotions, which are temporary responses to life events. When assessed as a global evaluation, well-being has been shown to be more stable than "occasion-specific" states (Eid and Diener 2004) such as moods (Gadermann and Zumbo 2007; Hudson et al. 2020) or well-being assessments that are anchored to the moment (Busseri and Newman 2022; Sonnentag 2015). Even when assessing positive and negative affect as a component of subjective well-being (Diener et al. 1999), there is a stronger relationship between global life satisfaction and measures that assess positive affect over the course of a considerable amount of time (e.g., two weeks) than in the moment (Hudson et al. 2022).

Although well-being seems to be stable on average, there are important individual differences in that stability. First, some major life events challenge people's well-being stability more than others. For example, although people tend to return to a well-being

set-point (their prior levels of well-being) after marriage, people's well-being tends to decrease and not return to a set-point after severe disability (Lucas 2007). Furthermore, when examining within-person well-being trajectories from before to after major life events, there appears to be substantial between-person variability (Lucas 2007).

We argue that individual differences in resilience ability produce these individual differences in well-being stability. Lower variability in well-being is associated with higher conscientiousness, perceived support and lower negative mood (Gadermann and Zumbo 2007). Also, those higher in well-being before a major life event tend to exhibit more stable well-being after that event (Lucas 2007). We contend, therefore, that the degree to which these characteristics predict well-being stability, especially in times of adversity, are characteristics of resilience ability. For example, conscientiousness is associated with the ability to solve problems effectively, which, in turn, is crucial to the ability to maintain well-being during adversity (Campbell-Sills et al. 2006).

Assessing Well-Being Maintenance

Researchers in EI have made compelling cases for the value of performance-based metrics of EI that do not rely on someone just reporting that they think that they have EI (Mayer et al. 2016). It would therefore be beneficial if researchers were able to construct similar performance-based metrics to assess the ability to maintain well-being in the face of well-being threats. However, measuring well-being maintenance with performance-based metrics would be difficult. Because EI is a form of intelligence, the performance metrics involve the tester administering problems that the test-taker solves (e.g., identifying an emotional expression or describing when the most appropriate time would be to regulate an emotion). For resilience, this is difficult because the problem being administered would have to be "threats to one's well-being" and there are significant ethical and moral problems with manipulating such a threat on a scale that could genuinely impact people's overall well-being (and not just their momentary mood). Therefore, for assessing the ability to maintain well-being despite threats to that well-being, we must be satisfied with self-reports of well-being in the context of naturally occurring life events, which we describe below. That said, we propose in later sections how to potentially assess the skills/tools that underlie this well-being maintenance ability using more traditional performance metrics.

Measuring the maintenance of high well-being could be as simple as assessing someone's (in)variance of well-being over some particular time frame (Lucas 2007). Common metrics for measuring (in)variance are standard deviations and root-mean-successive-squared difference (Dejonckheere et al. 2019). Importantly, however, this suggests that just measuring well-being at one time point is not sufficient to demonstrate resilience ability and that to get a good metric of variability would likely require many samples of well-being (Lucas 2007). An important goal of future research would be to determine what the timing of those well-being samples would be to capture their stability and distinguish them from more momentary contextual emotions and moods. Also, this suggests that measuring well-being longitudinally, whereby the primary dependent variable is well-being at one time point, controlling for well-being at prior time points does not reflect resilience ability per se. Indeed, if an individual has high resilience ability, then they should show stability in their well-being over time, not necessarily improvements that are unrelated to prior well-being states. Positivity interventions, those designed to improve well-being (Parks and Biswas-Diener 2013), are therefore not resilience interventions unless they can also show that they lead to greater stability in people's well-being.

This stability of well-being is only valuable in so far as it is paired with having high well-being, otherwise, we might capture chronic and stable distress (Bonanno 2004). Thus, measurements of resilience ability must account for the mean level of well-being in a way that also factors in its (in)variance. One avenue for future research is identifying the type of relationship between (in)variance and mean well-being (e.g., ratio? combinatorial?) as well as the weight put on each metric (e.g., equal weight? greater weight towards the mean?) that accurately captures resilience ability.

Lastly, resilience ability measurements need to assess threats to well-being. Often, these threats are assessed in one of several ways: a specific, identifiable adverse event (e.g., mass shooting), a culmination of life experiences (e.g., poverty) and/or a self-report assessment of life stressors (Holmes and Rahe 1967). Measuring life stress is a complicated process and scientists should aim to assess it as independently as possible from psychological responses to that stress (Monroe and Harkness 2005), through structured interviews (Monroe and Harkness 2005) and/or life event checklists that are standardized to established norms (e.g., Holmes and Rahe 1967), while taking into account cultural differences in those norms (Troy et al. 2023). Once life stress is measured, then one may be able to calculate within-person slopes that represent the relationship between stress and well-being maintenance over time as an indicator of resilience ability (Figure 1; Mroczek and Almeida 2004).

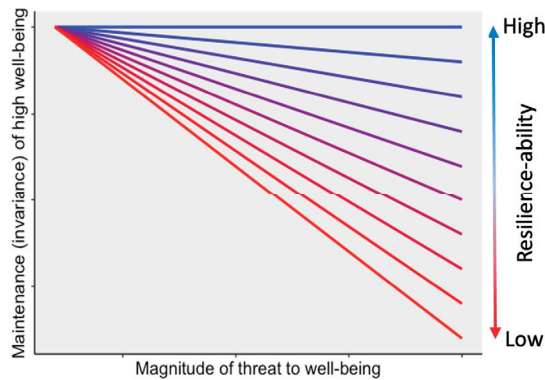


Figure 1. The proposed relationship between maintenance of high well-being and magnitude of the threat to well-being as a function of resilience ability. Note that this graph only portrays the maintenance of high well-being, because low well-being would just represent low resilience ability regardless of the magnitude of threat to well-being.

4. Resilience Tools to Maintain Well-Being: An Allostatic Active Inference Model

We have, so far, posited that resilience ability is the ability to maintain well-being in spite of threats to that well-being. To exercise this ability would require people to use various tools and strategies. Therefore, maintenance of well-being is not just accomplished via homeostasis—maintaining a set-point through local mechanisms—but rather through allostasis—maintaining stability through change (McEwen 1998). Instead of thinking about stress, or “threats to well-being”, as negative, allostasis offers an alternative model in which stress induces psychological and physiological responses, which can be adaptive because they provide the energy and altered cellular functioning needed to address the demands elicited by the stressor. For example, one’s heart rate rises during physical exertion to provide blood and oxygen to the muscles and organs needed to successfully do that exercise.

Allostasis is an active system in which the brain strategically deploys energy to prepare responses to predicted stressors. This active system requires the ability to enact those allostatic strategies, and it has been proposed that resilience is essentially this ability (Karatsoreos and McEwen 2011). Indeed, if we reframe allostasis as “maintaining well-being stability through change” then we have a framing that is quite close to our definition of resilience ability. Thus, the principles of allostasis can inform the tools and strategies underlying resilience ability.

One principle of allostasis is that it is a predictive system (Sterling 2012). Organisms monitor potential demands from the environment and if a demand is expected, they change their physiological and psychological response systems to prepare for it. Back to our heart

rate example, this predictive system is why our heart rate increases in anticipation of psychological and physical stressors (Waugh et al. 2010).

Active inference is a framework that can speak to how this monitoring and predictive responding occurs (Barrett 2017; Friston et al. 2017; Smith et al. 2022). At the heart of active inference is the principle that people are always making predictions of the future state of the world and monitoring how their actual observations of the state of the world compare with their predictions. Furthermore, when choosing among several possible actions, individuals can simulate the states of the world that are likely to follow each possible action. This internal probabilistic model allows them to select the action that will lead to a preferred outcome. Following action selection, the individual must update their model of the world in a fashion that minimizes the difference between their predicted and observed experiences, referred to as the prediction error.

As an example, imagine that a ball player is at bat with a full count of three balls and two strikes. The batter knows that they must select an action (to swing or to not swing) before they have full sensory information and must therefore base their decision on predictions about the upcoming state of the world. As the pitcher begins to release the pitch, the batter notices the arm angle of the pitcher and does some quick calculations about where the pitch will be. In this case, they decide to refrain from swinging, predicting that the pitch will land outside of the strike zone. If the pitcher does in fact throw outside of the strike zone, the difference between the batter's predicted outcome and the observed outcome will be small, requiring very little updating of the internal model. However, if the pitcher throws a strike and the batter strikes out, there is a larger discrepancy between the predicted and observed outcomes. The batter must then update their predictive model so that when they are next in this situation, they will select a more optimal action. In the context of our current discussion, resilience ability reflects the capacity to monitor well-being, predict potential threats to well-being and enact the actions needed to minimize the extent to which these changes occur.

According to the active inference framework, selecting the best course of action requires minimizing two forms of "free energy" at different stages in the process. When there are multiple sets of updated beliefs that could minimize prediction error, minimizing variational free energy (VFE) involves balancing the minimization of prediction errors while seeking parsimony, or the least drastic belief change possible. In the batting example, the batter's prediction was wrong, but they need to balance updating that prediction given their understanding of pitching mechanics with other extraneous variables that could have impacted the pitch (e.g., wind or a bad call by the umpire).

In terms of well-being maintenance, we suggest that this trade-off between belief stability and updating is hierarchical (Figure 2). At the top level are overall beliefs about one's well-being—those positive appraisals of one's past, present and especially one's future. At this top level, resilience ability should be associated with minimizing VFE mostly by maintaining stable beliefs about one's well-being, which is essentially the argument we made in the prior section. Constantly updating one's belief about well-being due to minor prediction errors would cause instability in well-being and poor resilient functioning. But what about major well-being prediction errors (i.e., things are worse off than people expected them to be; not necessarily misprediction of the event's occurrence) like divorce, death of a loved one, etc.? We know that those major prediction errors can and do affect people's levels of well-being (Lucas 2007), but not for those at higher levels of resilience ability (Bonanno et al. 2002). There are a couple of possible explanations. First, it could be that this negative event does not represent a prediction error because they expect negative things to generally occur. However, this explanation would be inconsistent with the finding that resilience is associated with optimism—the expectation that positive events will occur in the future, despite significant evidence that a prediction error has occurred. This might represent a delusion if people had the belief that only great things can occur and that to maintain their well-being they have to deny this event occurred. Alternatively, if they believe that things tend to work out fine and that they can have good well-being despite

these major life events, then these events would not represent well-being prediction errors per se. Evidence suggests that resilience is indeed associated with these types of optimistic beliefs (Segovia et al. 2012) that persist even in response to significant major life events (Leslie-Miller et al. 2021).

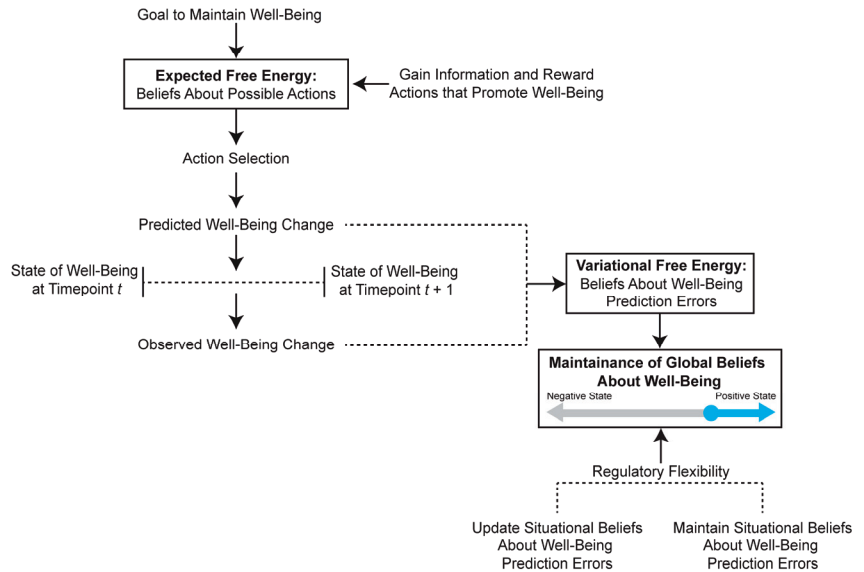


Figure 2. An allostatic active interference model of well-being. To achieve the goal of high well-being, individuals select actions that promote positive well-being changes and information gain, known as minimizing expected free energy. During this action selection, an internal model estimates the likelihood of well-being change outcomes, allowing the individual to make predictions. After performing the action, individuals observe how the actions impacted their well-being and must update their predictive model to minimize the degree to which the model predicts the wrong outcome in the future. This prediction error along with a valuation of parsimony is known as the variational free energy (VFE). Individuals with high resilience ability maintain stably positive global beliefs about well-being in the face of threats and flexibly regulate when to update and when to maintain situational beliefs about well-being.

At the next level are those momentary positive and negative mood states that predict well-being. At this level, because those mood states reflect current situational and physiological conditions that need to be navigated to promote well-being, resilience ability should be associated with appropriately balancing updating belief states with maintaining belief states. For example, if an individual has a mild argument with a good friend, it might be more adaptive to maintain positive beliefs about this friend than to update the beliefs to be more negative. Doing so would likely increase the likelihood that this friend is able to contribute to one’s well-being in the future. However, if an individual finds out something nefarious about this friend (e.g., they run a dog-fighting ring), then updating one’s belief about them might be the best path to maintaining one’s future well-being. This hierarchical minimization of VFE (Figure 2) suggests that, whereas these higher-level mental models of well-being update slowly and reflect the association between resilience and well-being stability, the lower-level mental models are updated more flexibly in response to the environment, reflecting the association between resilience and flexible emotional and physiological responding to environmental challenges (Bonanno et al. 2004; Waugh et al. 2011).

4.1. Assessment of the Active Inference Model: Well-Being Beliefs and Forecasts

A key facet of maintaining stable positive well-being in the face of threats is the ability to make fairly accurate predictions about likely well-being changes. This process, known as affective forecasting, is central to resilience ability, such that individuals who form accurate models of how and when their well-being changes will be more likely to maintain positive well-being in the face of threats. Therefore, existing measures of affective forecasting, especially those that measure the forecasting of more global well-being changes (Dunn et al. 2003), might be a good performance measure for resilience ability. For example, scores from the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; see Mayer et al. 2002), a performance measure of EI, but not self-reported measures of EI, significantly predict affective forecasting, with the management of emotion domain as the best predictor (Dunn et al. 2007). Thus, components of the allostatic active inference model may be captured by existing performance measures of EI.

Also critical to the allostatic active inference model is that VFE and the associated well-being beliefs are hierarchically situated, with stable well-being beliefs at the top and situationally flexible beliefs at the bottom. Reinforcement learning paradigms may be one promising type of measure for this VFE because they allow for the computation of moment-by-moment fluctuations in emotional responses to events as well as the overall stability of expected values of future decisions (Rutledge et al. 2014). Another promising measure might be to revise and extend the “strategic emotional intelligence” subscore of the MSCEIT to focus more on understanding well-being: beliefs about well-being (how stable it is, how easy it is to obtain and maintain, future expectancies of having well-being) and about the management of well-being (knowing when to adjust vs. maintain beliefs).

4.2. Assessment of Active Inference Model: Attentional Control and Updating

A potential foundational cognitive mechanism for how people can achieve this adaptive balance of well-being stability and emotional flexibility is attentional shifting. As our behavioral goals change, we must update the focus of attention or switch the prioritization of tasks held in working memory. While some environments require frequent updating, such as when navigating an unfamiliar environment, others require prolonged stable sustained selection, such as reading a book in a noisy coffee shop. These states of high and low switching readiness are referred to as cognitive flexibility and cognitive stability, respectively. Individuals possess the ability to harness previous experiences to learn to anticipate upcoming cognitive demands and adapt switching readiness accordingly, meaning that the cost associated with executing a shift of attention (Sali et al. 2015, 2020, 2022) or with executing a task switch (Chiu and Egnér 2017; Dreisbach and Haider 2006) is smaller in contexts associated with a high likelihood of switching than in those with a low likelihood of switching. Although the relationship between individual differences in this metaflexibility of attentional control and in measures of well-being/emotional flexibility is not yet well understood, existing research has linked impairments in attentional control to trait anxiety (Eysenck et al. 2007). Thus, an important area for future study is whether metaflexibility in core processes like attention is associated with metaflexibility in processes associated with well-being maintenance.

The potential role of attention as an underlying cognitive mechanism in our model also provides a link to current models of EI. As noted above, one popular model suggests that EI is reflected in a hierarchical organization of four branches that range from basic information processing to more complex regulatory processes (Mayer et al. 2016). Recently, others have proposed emotional attention regulation as an additional ability associated with EI (Elfenbein et al. 2016; Elfenbein and MacCann 2017) and validated the Tuning in to and out of Nonverbal Cues of Emotion (TIONCE) as a measure of this ability (Elfenbein et al. 2016; Elfenbein and MacCann 2017). The TIONCE is a combination of auditory and visual Stroop tests in which participants must either direct selective attention to nonverbal emotion information (e.g., the vocal tone of a speaker’s voice) while ignoring the semantic content of the stimulus or ignore the nonverbal emotion information while attending to the semantic

content. As noted above, an interesting question for future research is the degree to which metaflexibility of attention (e.g., regulating shift readiness across changing environmental context) is associated with resilience ability. The TIONCE offers one possible measure for studying when and how individuals direct selective attention to emotion cues and how directing attention away from emotion cues may in some circumstances aid in the stable maintenance of high well-being.

4.3. *Assessment of Active Inference Model: Computational Modeling*

Lastly, there have been nice computational models that reflect this hierarchical organization of stability and flexibility. One such model is the attractor model (Kuppens et al. 2010), which assesses how people's affect tends to fluctuate over time (variability) and return to (or "be attracted to") a "home base," a relatively stable affective state. This affective home base is consistent with our notion of well-being maintenance, which is supported by findings that this home base is positive for those high in positive affect and life satisfaction (Kuppens et al. 2010). We would therefore expect it to be positive for those high in resilience ability as well. Lastly, the fluctuating affective states return to the affective home base with a certain "attractor strength," which reflects the regulatory processes that we address in the next section.

5. Resilience Tools to Maintain Well-Being: Regulatory Flexibility

Whereas VFE is about belief and prediction updating, expected free energy (EFE) is about basing actions on predictions. Minimizing EFE involves maximizing the expected reward and/or information gained from a particular action (Smith et al. 2022). The batter did not swing because the expected reward from the predicted nonhittable pitch was to get on base and potentially score. Individuals with strong resilience ability should possess the capacity to select actions that maximize both reward and the information gained about their current environment in the service of maintaining well-being.

Maximizing reward in a given moment typically reflects the maximization of expected positive emotions and the minimization of expected negative emotions from a given action. This characterization is not as helpful when considering resilience ability, however, because although resilience tends to be associated with increased positive emotions (Waugh et al. 2011) even in response to threats to well-being (Fredrickson et al. 2003), it is not consistently associated with decreased negative emotions (Fredrickson et al. 2003; Waugh et al. 2011). Also, sometimes maximizing positive emotions and minimizing negative emotions might not be adaptive—as in the case of addiction and avoidance, respectively. More useful is to think of maximizing reward as enacting those actions that have the greatest likelihood of maintaining well-being. In this case, the "reward" is the maintenance of well-being itself. This allows for resilience ability to instead be associated with effective and adaptive affect regulation when confronted with a threat to well-being (Troy et al. 2023) that is tailored to the situation in such a way as to provide the greatest possible chance of leading to the maintenance of well-being.

This "strategy-situation" fit in coping is the current gold standard for understanding how different strategies can be effective in different types of situations (Park et al. 2001). For example, in high-control situations, strategies that focus on solving the problem tend to be more effective than those that only focus on changing one's thoughts (O'Mara et al. 2011). Those high in resilience ability are able to successfully match the regulatory strategies to fit the situation (Bonanno and Burton 2013; Cheng et al. 2014). Resilient people exhibit adaptive affect regulation because they detect possible threats in their environment (as in our allostatic active inference model), select a candidate strategy from a repertoire of possible regulatory strategies and then maintain that strategy if effective or switch to another strategy if not (Bonanno and Burton 2013). Sometimes, these strategies might even promote negative emotions (Bonanno et al. 2004; Tamir et al. 2008; Waugh et al. 2011) as long as those negative emotions in the moment can serve to promote the maintenance of well-being in the long term (e.g., Westphal et al. 2010). For example, being angry and

disappointed in your dog-fighting friend might improve your well-being over the long term by energizing your split from them.

The other aspect of minimizing EFE is maximizing information gain (Smith et al. 2022). This balance of reward and information gain suggests that if an individual with high resilience ability does not know which actions will promote well-being in a particular context, they will select the action that allows them to maximally learn about their environment. Once they have learned more about their environment, they can then select actions that maximally promote well-being maintenance. This information-gathering behavior is consistent with research showing that one of the most reliable predictors of resilience in children is their competence and self-efficacy (Masten 2001). Resilient children are able to collect information about their environment, process it deeply and then formulate solutions to problems (Masten and Coatsworth 1998). This environmental mastery then allows for resilient people to prevent or manage the stressor itself (problem-focused coping; Stratta et al. 2015) and/or understand the specific demands of the stressor in order to select the appropriate coping strategy (Bonanno and Burton 2013).

Assessment of Regulatory Flexibility

We point readers to Bonanno and Burton (2013) for a comprehensive regulatory flexibility model and suggestions on how to assess each component. Our notion of “information-gathering” in our model is akin to their notion of “context sensitivity (evaluating demands and opportunities in the environment” and our notion of “maximizing expected rewards” is akin to their notion of “feedback (monitoring how well coping strategies are working and modifying as needed).” In addition, their model provides a nice process for how resilient people are able to balance these two sources of EFE. The “emotion management” module in the MSCEIT would also provide a good companion measure of general emotion regulation ability.

Note, however, that our notion of regulatory flexibility does not necessarily include specific regulatory strategies that have often been associated with well-being such as positive reappraisal (changing the one way thinks about a stressor in order to feel better about it; McRae and Mauss 2016) or positive distraction (taking time out from a stressor to do something pleasant; Waugh et al. 2020). These are not “resilience tools” per se because they are strategies that may or may not work given a particular situation, so they are just part of a toolbox that may also include other seemingly maladaptive (tending to be negatively associated with well-being) strategies like avoidance and suppression (Waugh et al. 2023). We contend that these “adaptive” sets of tools seem to be related to resilience because the situations they fit tend to be experienced more often than the situations in which they do not fit, and vice versa for the “maladaptive” sets of tools. Therefore, habitual use of these adaptive and maladaptive tools tends to predict good and poor outcomes, respectively. However, this conceptualization also leaves open the possibility that the “maladaptive” tools may be adaptive in some situations (e.g., denial at the beginning of a tragedy: Lazarus 1983) and that if someone experiences a particular set of situations more often than others, then the habitual “adaptiveness” of these tool sets may shift accordingly (e.g., threat-sensitivity in abused children: Thompson et al. 2014).

6. Resilience Tools to Maintain Well-Being: Positive Emotion as a Special Case

One of the most consistent findings in resilience research is that people who exhibit resilient outcomes tend to experience greater positive emotions in times of stress (Folkman 2008) such as responding to national tragedies (Fredrickson et al. 2003), coping with illness (Moskowitz 2003) and caregiving for ill people (Moskowitz et al. 1996). This prevalence of positive emotions has spurred models of resilience that argue that positive emotions and the positive appraisals that cause them are the primary mechanism behind resilience (Kalisch et al. 2014; Waugh and Koster 2015). Given their importance to resilience, positive emotions must fit into our resilience ability model, but how?

First, as we mentioned before, the shared mechanism of all forms of well-being is positive appraisal (Caprara et al. 2010; Waugh 2023). Hedonic well-being is a positive appraisal of one's life and circumstances and eudaimonic well-being is a positive appraisal of one's goal and meaning. Therefore, when we posit that resilience ability is "maintaining high well-being. . ." then we can substitute "high well-being" with "positive appraisals of one's life, circumstances, etc." Resilient people are particularly adept at making these global positive appraisals (Kalisch et al. 2014), which should translate to being adept at making situational positive appraisals that produce positive emotional states in the moment (Grandjean et al. 2008). Furthermore, if resilience ability is about maintaining those global positive appraisals despite threats to well-being, then we should expect that to translate to maintaining situational positive appraisals (and the associated positive emotions) during stressors, and that is indeed what researchers find (Fredrickson et al. 2003; Tugade and Fredrickson 2004).

Second, our model posits that one of the primary tools that resilient people use is monitoring well-being and one of the signals of having well-being is positive mood. The mood-as-information theory states that when making judgments about well-being-related aspects of our lives, people use their current mood as part of the basis of those judgments (Schwarz and Clore 2007). Researchers showed, for example, that people report higher well-being on days with good weather than on days with bad weather (Schwarz and Clore 1983) and that positive moods impact people's evaluation of their meaning in life (King et al. 2006). This is not to say that global well-being is interchangeable with momentary moods (as noted in our section on well-being maintenance above), but that momentary moods and emotions serve as indices of well-being that motivate the actions required to maintain global well-being (Barrett 2017). For example, hanging out with friends may contribute to the maintenance of global well-being, but doing so does not require a full appreciation of its global well-being effects, just an appreciation that being with friends produces positive moods.

Third, in the allostatic active inference model described above, maintaining well-being is a predictive process, which means that resilience ability should be related to preparing for potential threats to well-being before they occur. Preparing for those threats requires gathering and maintaining the resources "in peacetime" needed to address them, and Fredrickson's broaden-and-build model suggests that positive emotion is the primary mechanism of resource gathering and maintenance (Fredrickson 1998, 2001). When pursuing positive emotional experiences, people build social resources (like forming new friendships; Waugh and Fredrickson 2006), physical resources (better physiological health; Kok and Fredrickson 2010) and intellectual resources (like creativity; Isen et al. 1987). Furthermore, these resources built through the experience of positive emotions can be used to address future threats to well-being (Fredrickson 1998, 2001). For example, an individual may form a new friendship because being with this person is fun and comforting and then that friend may provide social support when the individual is undergoing a divorce.

Assessment of Positive Emotions during Stress

Fortunately, there are many examples of how to assess positive emotions during stress. In a typical paradigm, participants undergo a stressor in the lab (such as an adapted version of the Trier Social Stress Test; Kirschbaum et al. 1993; Tugade and Fredrickson 2004) and report on their positive and negative emotions throughout. It has been consistently shown that resilient people are able to report higher positive emotions when recovering from stress (Fredrickson et al. 2003; Tugade and Fredrickson 2004) and that those higher positive emotions are related to their ability to make positive appraisals about the stressor (Kalisch et al. 2014; Tugade and Fredrickson 2004).

7. Conclusions

We have argued that, like EI, resilience is an ability and that ability is the maintenance of well-being despite threats to that well-being. As an ability, it is present in people before

the threat to well-being occurs and is trait-like but can also be learned throughout life. The tools of resilience ability can be described with an allostatic version of an active inference model in which people high in resilience ability monitor well-being, minimize variational free energy by maintaining stable well-being beliefs while updating situational beliefs and minimize expected free energy by either prioritizing actions that are expected to lead to well-being maintenance or by gathering the information needed to discern which actions would lead to well-being maintenance. This model also accounts for the role that positive moods and emotions play in resilience as indices of well-being and potential well-being changes and producers of behaviors that promote well-being maintenance. This model should make at least three contributions to research on resilience and EI: (1) it advances some traditions in resilience that make a strong case for resilience as an ability that is present in varying levels across people and not just an outcome; (2) it provides a starting point for the assessment of resilience ability in terms of EI tools as well as other related tools, although future research is needed to fully flesh out the computational affect dynamics that can accurately capture it; and (3) it outlines one way in which high EI can predict resilience when coupled with the ability/goal to maintain well-being despite threats to that well-being.

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Article

Training Emotional Intelligence Online: An Evaluation of WEIT 2.0

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Abstract: With the growing popularity of online courses, there is an increasing need for scientifically validated online interventions that can improve emotional competencies. We addressed this demand by evaluating an extended version of the Web-Based Emotional Intelligence Training (WEIT 2.0) program. Based on the four-branch model of emotional intelligence, WEIT 2.0 focuses on improving participants' emotion perception and emotion regulation skills. A total of 214 participants were randomly assigned to the training group ($n = 91$) or a waiting list control group ($n = 123$) to evaluate short-term (directly after WEIT 2.0) and long-term intervention effects (8 weeks later). Two-way MANOVAs and mixed ANOVAs showed significant treatment effects for self-reported emotion perception of the self, as well as emotion regulation of the self and others, after 8 weeks. No significant treatment effects were found for self-reported emotion perception in others or for performance-based emotion perception or emotion regulation. Moderator analyses revealed no significant effects of digital affinity on training success from the pretest to the posttest. The findings suggest that components of self-reported emotional intelligence can be enhanced through WEIT 2.0, but performance-based emotional intelligence cannot. Further research is needed on the online training of emotional intelligence and the mechanisms that underlie training success.

Keywords: emotional intelligence; emotion perception; emotion regulation; online training; digital affinity

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1. Introduction

“I don't want to be at the mercy of my emotions. I want to use them, to enjoy them, and to dominate them.”—Oscar Wilde

Emotions, such as anger, sadness, disgust, or happiness, play an integral role in our lives. Long before the first official scientific definition, the Irish poet Oscar Wilde described the essence of what Salovey and Mayer (1990) would decades later call ability-related emotional intelligence (EI), namely, “the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions” (p. 189).

A plethora of studies have shown that the ability to master one's emotions is associated with better physical and mental health (Martins et al. 2010), higher quality of interpersonal relationships (Schröder-Abé and Schütz 2011), better job performance (Joseph et al. 2015), and higher job satisfaction (Miao et al. 2016). Given the numerous benefits of EI, different authors have made successful attempts to increase EI through face-to-face (F2F) training (Buruck et al. 2016; Herpertz et al. 2016; Hodzic et al. 2015). Despite the growing popularity of online courses (Gegenfurtner et al. 2020), only a few studies have examined whether the positive effects of F2F training can be generalized to the online setting (Köppe et al. 2019; Persich et al. 2021).

Various EI intervention studies have been criticized, as they were not theoretically grounded, focused on short-term changes rather than long-term ones, did not use performance-based measures of EI, and failed to randomly assign participants to experimental conditions

(Schutte et al. 2013). In order to address such shortcomings, we based the extension of the Web-Based Emotional Intelligence Training (WEIT 2.0) program on the four-branch model of EI (Mayer and Salovey 1997) and randomly assigned participants to a control group (CG) or a training group (TG). In addition, we examined short-term and long-term changes in the individuals' EI with the help of both self-report and performance-based measures. Finally, we explored the participants' digital affinity as a potential skill that fostered the participants' training success.

1.1. Ability-Related EI

In past decades, two distinct lines have emerged in the EI literature: (1) ability models; and (2) mixed or trait models (Mayer et al. 2008). In the mixed models, EI is viewed as an umbrella term that encompasses different personality traits, cognitive abilities, motivational constructs, interpersonal competencies, and emotional abilities (Bar-On 2006; Goleman 1995; Petrides and Furnham 2001). Various authors have criticized mixed models for including a wide variety of different constructs (e.g., Locke 2005), for rarely being based on a clear theoretical background (Mayer et al. 2008), and for having low discriminant and predictive validity (e.g., Joseph et al. 2015).

On the basis of work by Thorndike (1920) and Gardner (1983), Salovey and Mayer (1990) introduced the four-branch model of EI, which distinguished four different facets: (1) emotion perception; (2) using emotions to facilitate thinking; (3) understanding emotions; and (4) emotion regulation. Introducing the four-branch model as a form of social intelligence, they focused the model on clearly defined abilities (Salovey and Mayer 1990). In addition, the authors assumed that the four branches developed across people's lives and could be trained with the help of targeted interventions (Mayer and Salovey 1997). However, the four-branch model has come under criticism in recent years because several studies suggested that the second branch (using emotions) showed significant overlap with the other three branches (Joseph and Newman 2010; MacCann et al. 2014; Rossen et al. 2008). Thus, we did not address the second branch in our training program. Furthermore, the third branch, which focuses on the cognitive aspect of EI (understanding emotions), has also been criticized due to its overlap with verbal intelligence (Schütz and Koydemir 2018), and we, therefore, included limited training content on emotion knowledge. Overall, we provide participants with the basic emotional abilities of the four-branch model. Since the training content to improve emotion understanding in participants was quite limited, we did not evaluate participants' development of their emotion knowledge and focused on improvements in emotion perception and regulation in the present study.

1.2. Relevance of Emotion Perception and Emotion Regulation

It is not surprising that emotion perception and emotion regulation are the most studied dimensions of the four-branch model, as they have shown significant associations with many important outcomes in practical settings (Herpertz et al. 2016). In the four-branch model of EI, emotion perception is the most basic facet and consists of the ability to recognize emotional states in the faces, voices, and behaviors of other individuals (emotion perception in others) as well as to accurately perceive one's own emotions (emotion perception of the self) (Mayer and Salovey 1997).

Individuals with better interpersonal emotion perception were found to report higher satisfaction with their interpersonal relationships, perform better at work, demonstrate more competence in social situations, and possess a wide range of positive personality traits (Hall et al. 2009). In line with these research results, low emotion perception skills have been associated with more depressive feelings, more somatic symptoms, and higher levels of stress (Robinson et al. 2012). In the work context, studies have demonstrated that the emotion perception of the self and others is negatively associated with burnout (Nizielski et al. 2013) and that the ability to accurately perceive other's emotions is positively related to performance in jobs that include high emotional demands (Farh et al. 2012). In addition, salespeople who were more adept at reading others' nonverbal emotional cues had higher

increases in salaries and sales figures than their colleagues with poorer emotion perception skills (Byron et al. 2007).

The research results suggested that accurately perceiving the emotions of another individual is an important prerequisite for regulating the corresponding emotional state (Reeck et al. 2016). For instance, individuals with better emotion perception skills were found to be more sensitive in social interactions and to employ more adaptive strategies to regulate others' emotions in interpersonal contexts (López-Pérez and Pacella 2021). Mayer and Salovey (1997) defined emotion regulation as the ability to select and apply the appropriate emotion regulation strategies to regulate both one's own (emotion regulation of the self) and others' emotional states (emotion regulation in others) to reach specific goals, making it the most complex facet of the four-branch model.

Many patients who suffer from psychological disorders have exhibited significant deficits in regulating their own emotions (Berking and Wupperman 2012; Hertel et al. 2009). In addition, the ability to regulate emotions of the self and others has been found to significantly impact friendships, romantic relationships, and work relationships (Niven et al. 2015; Tamminen et al. 2019), as individuals with better interpersonal emotion regulation skills tend to be able to build trust in relationships (Niven et al. 2015). At the same time, dysfunctional intra- and interpersonal emotion regulations were found to be associated with an increase in conflicts (Lopes et al. 2011). As a result, the ability to regulate emotions in oneself and others has been associated with a higher quality of relationships (Lakey and Orehek 2011; Niven et al. 2012b) as well as higher subjective well-being in both interaction partners (Diamond and Aspinwall 2003; Niven et al. 2012a; Schröder-Abé and Schütz 2011). In the organizational world, people who have better overall emotion regulation skills and those who work in high-emotional labor jobs have been found to perform better at work (Joseph and Newman 2010). Finally, employees who have been good at managing emotions in themselves and others reported higher job satisfaction (Brackett et al. 2010). Given these benefits of both emotion perception and emotion regulation, our online course focused on improving these two key components of the four-branch model.

1.3. EI Interventions

Slaski and Cartwright (2003) were among the first to conduct a scientific study on an EI intervention and evaluate it with the managers. They found that only the TG, but not the CG, significantly improved their overall EI as well as their general health and psychological well-being. In 2008, Groves et al. (2008) demonstrated that the participants of an EI intervention, which was based on the four-branch model of EI (Mayer and Salovey 1997), showed improvements in all four emotional abilities. Since then, the research has gained substantial traction, with evaluation studies being conducted on many different target groups, such as students (e.g., Di Fabio and Kenny 2011; Viguer et al. 2017), teachers (e.g., Pérez-Escoda et al. 2012), employees (e.g., Buruck et al. 2016), athletes (e.g., Campo et al. 2019), and unemployed adults (e.g., Hodzic et al. 2015). Looking more closely at such EI interventions, however, it can be seen that they have varied greatly in duration as well as in the underlying theoretical models of EI they used. For instance, the duration varied from a few training days in the corporate setting (e.g., Slaski and Cartwright 2003) to two years in academic contexts (e.g., Viguer et al. 2017). Still, several studies showed that F2F training could improve participants' EI and could have a positive impact on physical and mental health, the quality of social relationships, and life satisfaction (Kotsou et al. 2011; Nelis et al. 2009, 2011).

However, intervention studies on EI have remained subject to sustained criticism because they often displayed substantial methodological weaknesses (Geßler et al. 2021). Major shortcomings included the lack of an active CG and the failure to randomize participants to experimental conditions. Therefore, alternative explanations, such as placebo or Hawthorne effects, could not be ruled out (Shipstead et al. 2012). In addition, many studies did not use a theoretical model as the basis for their EI intervention (Zeidner et al.

2008), ignored long-term changes (Schutte et al. 2013), and lacked performance-based EI measures to explore training success (Köppe et al. 2019).

Being aware of these limitations when choosing studies for their meta-analysis, Schutte et al. (2013) included studies ($k = 4$, $N = 435$) only if they based their EI intervention on a clear theoretical foundation, randomly assigned participants to experimental conditions, and measured participants' EI at pretest and posttest with either a self-report or performance-based measure of EI. The authors found that participants' EI increased as a result of the EI interventions. In 2018, Hodzic et al. conducted another meta-analysis ($k = 28$, $N = 1986$), using similar inclusion criteria but without insisting on the random assignment of participants to the experimental conditions. Consistent with Schutte et al.'s (2013) results, the authors reported that the EI interventions had a moderate effect on participants' EI when comparing pretest and posttest results. An analysis of long-term effects showed that participants were able to retain the effects from the posttest to follow-up (Hodzic et al. 2018). In a recent meta-analysis, Mattingly and Kraiger (2019) examined the trainability of EI and included $k = 14$ studies ($N = 582$) that focused on ability-related EI interventions. They found that EI interventions had a moderate, positive effect on ability-related EI.

In the four-branch model of EI, EI is conceptualized as a set of emotional abilities (Mayer and Salovey 1997) that could be improved effectively through training (Hodzic et al. 2018; Schutte et al. 2013). Moderator analyses revealed that EI interventions that were based on ability models produced larger effect sizes compared with the interventions based on mixed models or no theoretical model (Hodzic et al. 2018). In addition, longer EI interventions proved superior to shorter EI interventions in terms of training success (Hodzic et al. 2018). Interestingly, later research results suggested that when emotion regulation and emotion perception were trained in conjunction, such an approach was more effective than when emotion perception was trained alone (Geßler et al. 2021). This finding supports our approach of integrating these two branches into one training program.

Even though F2F training has demonstrated positive effects on participants' EI, and online interventions in positive psychology concepts are generally effective (Koydemir et al. 2021), there is still little research on the effectiveness of online EI interventions. Online interventions bring many benefits because they are more cost-effective; they can easily be accessed by a larger number of people, and they allow participants to learn at their own pace in a self-directed manner (Kimiloglu et al. 2017). Online interventions have been found to demonstrate success in other EI-related areas, such as positive psychology (Ouweneel et al. 2013), mindfulness (Spijkerman et al. 2016), and stress management (Hintz et al. 2015). Consequently, it is even more surprising that only a few studies have explored whether EI can be enhanced online.

Being one of the first online EI interventions, WEIT (Köppe et al. 2019) built on the four-branch model of EI (Mayer and Salovey 1997) and was designed to increase EI in future leaders. The online course consisted of four one-hour modules on emotion perception and emotion regulation, followed by a 4-week online follow-up. In their study, Köppe et al. (2019) used performance-based measures and a waiting list CG to assess training success. Results showed that the participants' emotion perception skills improved directly after WEIT and remained stable 6 weeks afterward. Regarding emotion regulation, the TG showed improvements 6 weeks after WEIT. Interestingly, participants' levels of stress were unaffected by the intervention. Another study by Persich et al. (2021) made use of an active CG (participation in awareness training) and employed self-report and performance-based EI measures to evaluate their online emotional intelligence training (EIT) program. Based on the four-branch model of EI (Mayer and Salovey 1997), the EIT program complemented the training content with other scientific, well-established emotion theories. By participating in the EIT program, participants were able to improve their emotion perception, emotion knowledge, and emotion regulation on both self-report and performance-based EI measures. Positive effects of EIT on EI were found even 6 months after the training program had ended. Taken together, these initial studies suggest that EI can also be enhanced in an online setting.

1.4. *Self-Report vs. Performance-Based EI Measures*

When assessing ability-based EI to measure training success, it is important to distinguish between self-report and performance-based measures. The two different measures seem to capture different aspects of EI, as research studies have reported low correlations between the two types of measurement (e.g., Brackett et al. 2006). Self-report measures tend to assess typical behavior rather than cognitive performance (Côté 2014), as they demonstrate stronger correlations with personality than with actual abilities (Mayer et al. 2008). By contrast, performance-based measures have been found to be more strongly related to cognitive abilities than to personality and allow researchers to compare respondents' answers against a criterion of accuracy (Joseph and Newman 2010; Mayer et al. 2008). By using both self-report and performance-based measures of EI, we aim to capture different aspects of EI and counterbalance the advantages and disadvantages of the two measurement approaches (for an overview, see Côté 2014).

On the basis of research that has suggested that EI can be enhanced through F2F training (Hodzic et al. 2018; Schutte et al. 2013) and online interventions (Köppe et al. 2019; Persich et al. 2021), we posed the following hypotheses (see the preregistration):

H1a. *Participants in the TG increase their self-reported and performance-based emotion perception and emotion regulation skills from the pretest to the posttest, whereas the scores of participants in the CG remain unchanged;*

H1b. *Participants in the TG maintain their attained self-reported and performance-based emotion perception and emotion regulation skills from posttest to follow-up, whereas the scores of participants in the CG remain unchanged.*

1.5. *Digital Affinity*

Whether or not a training program is successful may depend, at least in part, on an individual's personality (Herpertz et al. 2016). Research on traditional F2F training has shown that an individual's personality influences their motivation to learn and to transfer such training and may, thus, enhance training effectiveness (e.g., Colquitt et al. 2000; Rowold 2007; Seeg et al. 2022). With regard to online training, it has also been proposed that an individual's characteristics could influence learning effectiveness (e.g., Arbaugh et al. 2009; Castro and Tumibay 2021). Thus, the participants in a training program may differ in how much they benefit from online training, for instance, depending on their levels of computer literacy or awareness and attitudes toward information and communication technology (Ali et al. 2018). However, until now, there has been little research on how participants' personality influences their learning success in online interventions (Gegenfurtner et al. 2020; Kim and Schniederjans 2004). Given that an individual's personality is crucial for training effectiveness in traditional F2F learning environments, we argue that it is vital to examine how personality characteristics influence the effectiveness of online training, such as our WEIT program. One personality variable that may be particularly relevant in this context is digital affinity.

Digital affinity is a personality trait that describes interindividual differences in the way people interact with digital interfaces (Franke et al. 2019). It is conceptualized as an individual's approach/avoidance orientation toward an intensive interaction with technology (Franke et al. 2019). Thus, individuals with high digital affinity prefer to actively engage with technology, whereas individuals with low digital affinity prefer to avoid intensive interaction with technology (Franke et al. 2019). Accordingly, we assume that participants' digital affinity may influence the extent to which participants approach or avoid the digital learning environment of our WEIT program. Digital affinity is an important personal resource that helps people cope successfully with technology (Franke et al. 2019). Participants who are high in digital affinity adapt more quickly and more successfully to new digital interfaces, such as online training, and show higher motivation to engage with such interfaces (Franke et al. 2019). For instance, Kim et al. (2019) showed that

adaptation processes and attitudes toward the learning format were positively associated with learning success. We, therefore, propose the following (see the preregistration):

H2. *Digital affinity moderates the success of training from pretest to posttest so that participants in the TG with the higher levels of digital affinity increase their self-reported and performance-based emotion perception and emotion regulation skills to a greater extent from pretest to posttest in comparison with the participants who have lower levels of digital affinity.*

2. Materials and Methods

2.1. Sample

Participants were recruited through mailing lists, message posts, newsletters, newspapers, and contacts in corporate organizations. After signing up for the online intervention, 447 participants were randomly assigned to either the TG ($n_{TG} = 224$) or the waiting list CG ($n_{CG} = 223$). A total of 389 participants ($n_{TG} = 200$, $n_{CG} = 189$) completed the pretest; 263 participants ($n_{TG} = 113$, $n_{CG} = 150$) finished the posttest directly after the intervention, and 219 participants ($n_{TG} = 93$, $n_{CG} = 126$) filled out the follow-up 8 weeks after WEIT 2.0. Two cases ($n_{TG} = 1$) were excluded because they completed the pretest, posttest, or follow-up in an unreasonably short amount of time. In addition, two participants from the CG were excluded due to extreme response behavior. Finally, one participant from the TG was excluded because the person was blind and, thus, unable to answer the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT; Mayer et al. 2002) items. As a result, the final sample consisted of 214 participants ($n_{TG} = 91$, $n_{CG} = 123$). Figure 1 presents the participant flow diagram for the study.

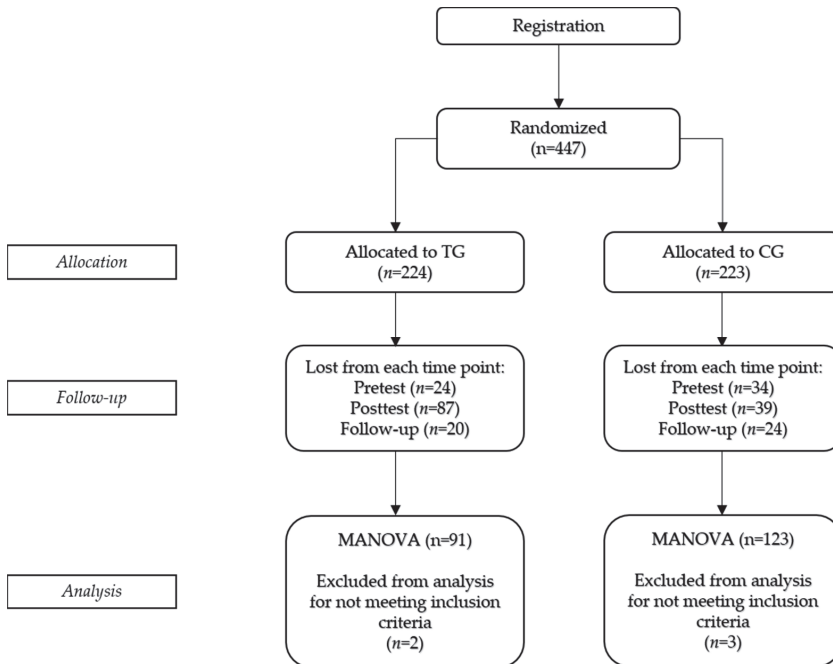


Figure 1. Participant flow diagram. TG = training group; CG = control group.

The mean age of the participants in the TG was $M = 35.36$ ($SD = 14.61$) years, with 70 participants identifying themselves as female ($n_{female} = 21$). More than half of the participants in the TG ($n = 83$) stated that they had obtained at least a general higher education qualification as their highest degree. Regarding occupational status, the majority of the TG were students ($n = 41$) and employees ($n = 31$). The participants in the CG had an average age of $M = 34.15$ ($SD = 13.73$) and consisted of 89 female participants ($n_{female} = 33$, $n_{diverse} = 1$). Similar to the TG, the CG consisted of a large number of academically qualified individuals ($n = 100$) who had at least a general higher education qualification. Fifty-eight students and 48 employees were part of the CG, representing the two biggest groups in terms of occupation.

2.2. Procedure

The study was preregistered on OSF (<https://osf.io/g43pz/> [accessed on 8 June 2023]).¹ Participants were able to register until 4 November 2021 for the WEIT 2.0 program. Upon registration, participants were informed about two training cycles (October to December 2021, the TG; and January to February 2022, the CG) and asked in which week they would prefer to start if they were assigned to either cycle. Participants were then randomly assigned to one of the two training cycles (either the TG or the CG). Afterward, participants were provided with participant information regarding the online course and the three online surveys.

The training program was developed for the Virtuelle Hochschule Bayern (vhb), and the evaluation study was conducted within this setting. Unfortunately, no other online courses were available at the time of the study, which could have provided an active CG. We, therefore, decided to use a waitlist CG, though we are aware of the limitations of such a research design.

Data were collected online via SoSci Survey (<https://www.sosicisurvey.de/> [accessed on 8 June 2023]). Four days prior to the start of WEIT 2.0, the TG and CG were sent the link to the first online survey (pretest). After giving their consent, participants created a personalized code to match their data across the three measurement points. Next, we collected demographic data (i.e., gender, age, country of residence, educational status, employment status, and type of residence). Afterward, participants completed the subscales from the Self-Rated Emotional Intelligence Questionnaire (SREIS; Brackett et al. 2006; German version by Vöhringer et al. 2020), the Wong and Law Emotional Intelligence Scale (WLEIS; Wong and Law 2002), and the MSCEIT (Mayer et al. 2002; German version by Steinmayr et al. 2011). At the end of the pretest, participants filled out the ATI (Franke et al. 2019) and were asked to use their email addresses to register on the course platform (<https://open.vhb.org/> [accessed on 8 June 2023]).

Each training program started on a Monday. Participants in the TG received instructions on how to navigate the course and obtained an exemplary course schedule that recommended when to complete each chapter. Participants were given 3 weeks to complete the online course at their own pace and received automated reminders each week on Monday and Thursday. After the 3 weeks, participants were sent the link to the second online survey (posttest) and completed the SREIS (Vöhringer et al. 2020), the WLEIS (Wong and Law 2002), and the MSCEIT (Steinmayr et al. 2011). For further exploratory analyses, the TG also responded to items on the quality of the online course (e.g., structure, comprehensiveness) and whether they had completed each exercise.

Eight weeks later, we sent the link to the third online survey (follow-up). In this survey, participants again completed the SREIS (Vöhringer et al. 2020), the WLEIS (Wong and Law 2002), and the MSCEIT (Steinmayr et al. 2011). As an incentive to complete the follow-up, participants were given the options to obtain a training certificate, to be entered into a lottery for one of seven vouchers (1×100 Euro, 1×50 Euro, and 5×10 Euro), and to receive feedback on their EI, as measured with the MSCEIT (Steinmayr et al. 2011). At the end of each online survey, participants were asked to self-evaluate the quality of the data they had provided (“How thoroughly did you answer the survey?”) and whether they

wanted to provide any comments. In addition, we used attention checks in each online survey to examine how conscientiously participants answered each of the three surveys. The CG answered the three online surveys parallel to the TG and started WEIT 2.0 after they completed the follow-up.

2.3. *Web-Based Emotional Intelligence Training (WEIT 2.0)*

The WEIT 2.0 program is a non-curricular, open online course that was offered through OPEN vhb (<https://open.vhb.org/> [accessed on 8 June 2023]), a platform for open online courses developed by Bavarian universities that anyone can access free of charge after setting up a user account. The WEIT 2.0 program is an extension of the WEIT (Köppe et al. 2019) program. Both are based on the four-branch model of EI (Mayer and Salovey 1997) because interventions based on ability models of EI have shown greater effect sizes than interventions based on mixed models (Hodzic et al. 2018). Furthermore, past research has shown that EI interventions that are longer in duration have larger effects than shorter EI interventions. Therefore, WEIT 2.0 expanded the content in comparison with the initial version of WEIT (Köppe et al. 2019). In addition, WEIT 2.0 targeted the general population instead of future leaders. After teaching the fundamentals of EI, the online course focused on emotion perception and emotion regulation. The online course consisted of 13 modules, of which the first one was the introductory module and the last one was the concluding module. The remaining eleven modules covered the science of emotions in general (module 1), models and measurement of EI (modules 1 and 2), emotion knowledge (module 3), emotion perception of the self (modules 4 and 5), and others (modules 8 and 9), and emotion regulation of the self (modules 6 and 7) and others (modules 10 and 11). Table A1 (see Appendix A) displays the content of WEIT 2.0 in more detail.

The WEIT 2.0 program was developed on the basis of empirically sound theories and concepts in the field of EI. For example, we contrasted the theory of constructed emotions (Barrett 2017) with Paul Ekman's (2005) theory of basic emotions to illustrate that the interpretation of contextual factors plays an important role in emotion perception beyond facial expression. Further, participants learned about stress appraisal theory (Lazarus and Folkman 1984) to understand that not only bodily sensations but also thoughts and appraisal processes are related to the onset of emotions. The modules on emotion regulation in oneself focused on different ways to downregulate negative emotions as well as to maintain and reinforce positive emotions. The process model of emotion regulation (Gross 1998) served as the theoretical basis of these modules. Finally, participants were introduced to important conflict and communication theories, such as the concept of nonviolent communication (Rosenberg 2015), to strengthen their interpersonal emotion regulation skills.

We used a multimethod approach (e.g., learning videos, drag-and-drop exercises, quizzes, and audio files) and consistent feedback to teach EI. In the online course, participants were able to navigate freely through all modules and chapters. However, participants were advised to work on the training contents in the given order. They were able to contact the training team via email or an online forum when they encountered technical difficulties or when they had questions about the training contents. As we aimed to achieve long-term changes in participants, we designed the training program in accordance with the recommendations by Blume et al. (2010) and Seeg et al. (2022) to enhance training transfer. This is why we integrated elements, such as realistic training content, goal-setting exercises, and homework assignments, into the online course. Exploratory analyses revealed that it took participants an average of 60 to 90 min to complete each module, resulting in a total workload of approximately 18 h.

2.4. Measures

Self-reported EI was measured with the German version of the SREIS (Vöhringer et al. 2020). More specifically, we used the subscales Perceiving Emotion (SREIS-P), Managing Emotion (SREIS-M₁), and Social Management (SREIS-M₂), each of which contained four items. Participants rated how accurately each item described them on a 5-point Likert scale ranging from 1 (very inaccurate) to 5 (very accurate). Because the Perceiving Emotion subscale from the SREIS assessed only emotion perception in others (e.g., “By looking at people’s facial expressions, I recognize the emotions they are experiencing”), we additionally employed the Self-Emotions Appraisal (SEA) subscale from the WLEIS (Wong and Law 2002) to measure self-reported EI in the self. The WLEIS-SEA subscale contains four items that were rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). For the TG, Cronbach’s alpha ranged from .59 to .72 for the SREIS-P, from .75 to .82 for the SREIS-M₁, from .71 to .76 for the SREIS-M₂, and from .84 to .87 for the WLEIS-SEA. For the CG, Cronbach’s alpha varied from .64 to .68 for the SREIS-P, from .75 to .79 for the SREIS-M₁, from .80 to .85 for the SREIS-M₂, and from .86 to .89 for the WLEIS-SEA.

The German online version of the MSCEIT (Steinmayr et al. 2011) was used to measure performance-based EI. Emotion perception (MSCEIT-P) was assessed with the faces and images subtasks. In the faces subtask, participants are asked to use a 5-point scale to rate the degree to which each of the five emotions is expressed in a photograph. The images subtask is similar to the faces subtask, with the exception that landscapes and abstract patterns are displayed. Emotion regulation (MSCEIT-M) was measured with the emotion management and social management subtasks. Different situations are presented, and the effectiveness of strategies for attaining or maintaining a specific emotional state needs to be evaluated on a 5-point scale. While the emotion management subtask focuses on regulating emotions in the self, the social management subtask covers the regulation of emotions in others. Consensus scoring was used to calculate participants’ MSCEIT scores. For the TG, Cronbach’s alpha ranged from .86 to .91 across measurement points for the MSCEIT-P and from .46 to .61 for the MSCEIT-M. For the CG, Cronbach’s alpha varied from .87 to .89 for the MSCEIT-P and from .46 to .54 for the MSCEIT-M. Whereas the internal consistency of the MSCEIT-P was good, the internal consistency of the MSCEIT-M was not. This is in line with other studies examining the reliability of the MSCEIT and its respective subscales (Mayer et al. 2002).

Finally, we assessed participants’ digital affinity with the Affinity for Technology Interaction (ATI; Franke et al. 2019) scale. The ATI scale encompasses nine items (e.g., “I like to occupy myself in greater detail with technical systems.”), which participants rated on a 6-point scale ranging from 1 (completely disagree) to 6 (completely agree). Higher ratings on the scale corresponded to higher digital affinity. Reliability analyses showed that Cronbach’s alpha was .93 in the TG and .92 in the CG.

2.5. Data Analysis

We analyzed the data with the software IBM SPSS Statistics Version 29. We ran two separate two-way MANOVAs for self-reported and performance-based EI with the within-subjects factor Time (Pretest, Posttest, Follow-up) and the between-subjects factor Group (Training Group, Control Group) to test for short-term (H1a) and long-term (H1b) intervention effects of the WEIT 2.0 program. In the case of a significant interaction, we followed up with mixed ANOVAs and examined simple main effects of group and time to investigate which patterns were responsible for the significant interaction.

Before running the analyses, we checked whether all assumptions were met. We found neither univariate outliers nor multivariate outliers, as assessed with the Mahalanobis distance ($p > .001$). The assumption of multivariate normality was violated, as assessed with the Henze–Zirkler test statistic ($HZ = 1.0064, p < .001$). However, the parametric test statistic from a MANOVA is robust against the violation of the normality assumption and is superior to nonparametric test statistics with respect to power and the Type I error rate (Finch 2005). This is why we opted to use the parametric test statistic. Low to medium

correlations ($r < .90$) between the dependent variables suggested that multicollinearity was not a major concern for the analysis. Finally, scatterplots challenged the assumption of linearity between self-reported and performance-based EI measures. As a result, we ran two separate MANOVAs, one for self-reported EI and one for performance-based EI.

We used a linear regression approach to test the moderating role of digital affinity on training success from the pretest to the posttest (H2). We employed MEMORE (Montoya 2019) to account for the fact that we used repeated-measures variables as predictors in our statistical model. In our analysis, we used bias-corrected bootstrapping with 5000 iterations to estimate 95 percent confidence intervals. MEMORE has the advantage that it can be used to probe significant interactions in a two-instance repeated-measures design by using either the pick-a-point approach or the Johnson–Neyman procedure.

3. Results

3.1. Descriptive Statistics

The training group had a mean digital affinity score of $M = 3.39$ ($SD = 1.14$) and a CG of $M = 3.40$ ($SD = 1.06$). Table 1 presents means and standard deviations for all outcome variables, separated by group and time point.

Table 1. Means and standard deviations per measure, separated by group.

Outcome	Pretest				Posttest				Follow-Up			
	TG		CG		TG		CG		TG		CG	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
SREIS-P	3.62	0.62	3.67	0.55	3.59	0.53	3.60	0.50	3.69	0.56	3.63	0.56
SREIS-M ₁	3.18	0.81	3.23	0.75	3.53	0.68	3.23	0.71	3.55	0.73	3.30	0.71
SREIS-M ₂	3.37	0.67	3.40	0.72	3.81	0.65	3.47	0.73	3.77	0.62	3.45	0.72
WLEIS-SEA	5.2	1.03	5.14	1.11	5.44	0.91	5.21	1.08	5.50	0.95	5.20	1.02
MSCEIT-P	103.26	15.08	106.17	12.49	103.48	12.25	105.93	13.26	103.71	13.90	104.84	13.44
MSCEIT-M	106.34	11.36	105.63	12.73	107.59	12.85	106.67	12.39	108.26	10.88	104.50	13.72

Note. TG = control group; CG = control group; SREIS-P = perceiving emotions in others; SREIS-M₁ = managing emotions in the self; SREIS-M₂ = managing emotions in others; WLEIS-SEA = appraising emotions in the self; MSCEIT-P = performance-based emotion perception; MSCEIT-M = performance-based emotion regulation.

The correlations of the self-reported EI measures with each other ranged from $r = .26$ to $r = .54$ (all $ps < .001$) at the pretest, from $r = .25$ to $r = .50$ (all $ps < .001$) at the posttest, and from $r = .32$ to $r = .53$ (all $ps < .001$) at the follow-up. The correlations of the performance-based EI measures with each other were $.18$ ($p = .010$) at the pretest, $.10$ ($p = .142$) at the posttest, and $.19$ ($p = .006$) at the follow-up. The correlations between the self-reported EI measures and the performance-based EI measures ranged from $r = -.02$ ($p = .769$) to $r = .16$ ($p = .020$) at the pretest, from $r = -.04$ ($p = .546$) to $r = .12$ ($p = .081$) at the posttest, and from $r = -.07$ ($p = .330$) to $r = .20$ ($p = .004$) at the follow-up. Table A2 (see Appendix A) contains the complete correlations for all measures at each measurement point.

3.2. Self-Reported EI

Results from our first two-way MANOVA showed a statistically significant interaction between time and group (Wilk’s lambda $\Lambda = .77$, $F [8, 205] = 7.57$, $p < .001$). As the interaction was statistically significant, we next determined whether there were any statistically significant univariate interaction effects for each dependent variable. To do so, we first tested the assumption of sphericity for the repeated-measures variables using Mauchly’s test. Mauchly’s test was significant for the subscales Perceiving Emotion (SREIS-P; $p < .001$), Managing Emotion (SREIS-M₁; $p = .002$), Social Management (SREIS-M₂; $p = .047$), and Self-Emotions Appraisal (WLEIS-SEA; $p < .001$), meaning that the assumption of sphericity was violated for all self-reported EI scales. Therefore, we used the Greenhouse–Geiser adjustment to correct violations of sphericity. There was no statistically significant interaction between time and group for the SREIS-P (Greenhouse–Geisser $F [1.79, 379.13] = 1.82$,

$p = .167$, $\eta^2 = .009$), contradicting Hypotheses 1a and 1b to some extent. However, there was a statistically significant interaction between time and group for the SREIS-M₁ (Greenhouse–Geisser $F [1.89, 401.10] = 15.64$, $p < .001$, $\eta^2 = .069$), the SREIS-M₂ (Greenhouse–Geisser $F [1.95, 412.25] = 19.31$, $p < .001$, $\eta^2 = .083$), and the WLEIS-SEA (Greenhouse–Geisser $F [1.86, 393.97] = 12.22$, $p < .001$, $\eta^2 = .055$).

In our follow-up mixed ANOVA for the SREIS-M₁, we found no significant main effect of group ($F [1, 212] = 3.25$, $p = .073$, $\eta^2 = .015$), but we did find a significant main effect of time (Wilk's lambda $\Lambda = .85$, $F [2, 211] = 18.36$, $p < .001$, $\eta^2 = .148$). Specifically, in the CG, there were no significant differences in the SREIS-M₁ scores across time (Wilk's lambda $\Lambda = .97$, $F [2, 121] = 1.92$, $p = .151$, $\eta^2 = .031$), but in the TG, there were significant differences in the SREIS-M₁ scores across time (Wilk's lambda $\Lambda = .72$, $F [2, 89] = 17.67$, $p < .001$, $\eta^2 = .284$). Participants in the TG had significantly higher SREIS-M₁ values at the posttest compared with the pretest ($-.34$, $p < .001$), and their values remained unchanged from the posttest to the follow-up ($-.02$, $p = 1.0$). In sum, H1a and H1b were fully supported for the SREIS-M₁.

Concerning the SREIS-M₂, we found a significant main effect of group ($F [1, 212] = 5.64$, $p = .018$, $\eta^2 = .026$) and a significant main effect of time (Wilk's lambda $\Lambda = .77$, $F [2, 211] = 31.14$, $p < .001$, $\eta^2 = .228$). Specifically, in the CG, there were no significant differences in the SREIS-M₂ scores across time (Wilk's lambda $\Lambda = .97$, $F [2, 121] = 1.61$, $p = .203$, $\eta^2 = .026$). However, in the TG, there were significant differences in the SREIS-M₂ scores across time (Wilk's lambda $\Lambda = .59$, $F [2, 89] = 31.16$, $p < .001$, $\eta^2 = .412$). Participants in the TG had significantly higher SREIS-M₁ values at the posttest compared with the pretest ($-.44$, $p < .001$), and their values remained unchanged from the posttest to the follow-up ($.04$, $p = 1.0$). Altogether, H1a and H1b were fully supported for the SREIS-M₂.

Results of our follow-up mixed ANOVAs for the WLEIS-SEA revealed no significant main effect of group ($F [1, 212] = 1.08$, $p = .301$, $\eta^2 = .005$), but there was a significant main effect of time (Wilk's lambda $\Lambda = .86$, $F [2, 211] = 17.08$, $p < .001$, $\eta^2 = .139$). Specifically, in the CG, there were no significant differences in the WLEIS-SEA scores across time (Wilk's lambda $\Lambda = .99$, $F [2, 121] = 0.78$, $p = .462$, $\eta^2 = .013$), but in the TG, there were significant differences in the WLEIS-SEA scores across time (Wilk's lambda $\Lambda = .68$, $F [2, 89] = 20.98$, $p < .001$, $\eta^2 = .320$). Participants in the TG had significantly higher WLEIS-SEA values at the posttest compared with the pretest ($-.42$, $p < .001$), and their values remained unchanged from the posttest to the follow-up ($-.06$, $p = 811$). Thus, H1a and H1b were fully supported for the WLEIS-SEA.

3.3. Performance-Based EI

With regard to the performance-based EI, our second two-way MANOVA did not show a statistically significant Time \times Group interaction effect (Wilk's lambda $\Lambda = .97$, $F [4, 209] = 1.39$, $p = .238$). Therefore, Hypotheses 1a and 1b were not supported for the MSCEIT-P or for the MSCEIT-M.

Figure 2 shows the trajectories of each dependent variable from the pretest to the posttest to the follow-up.

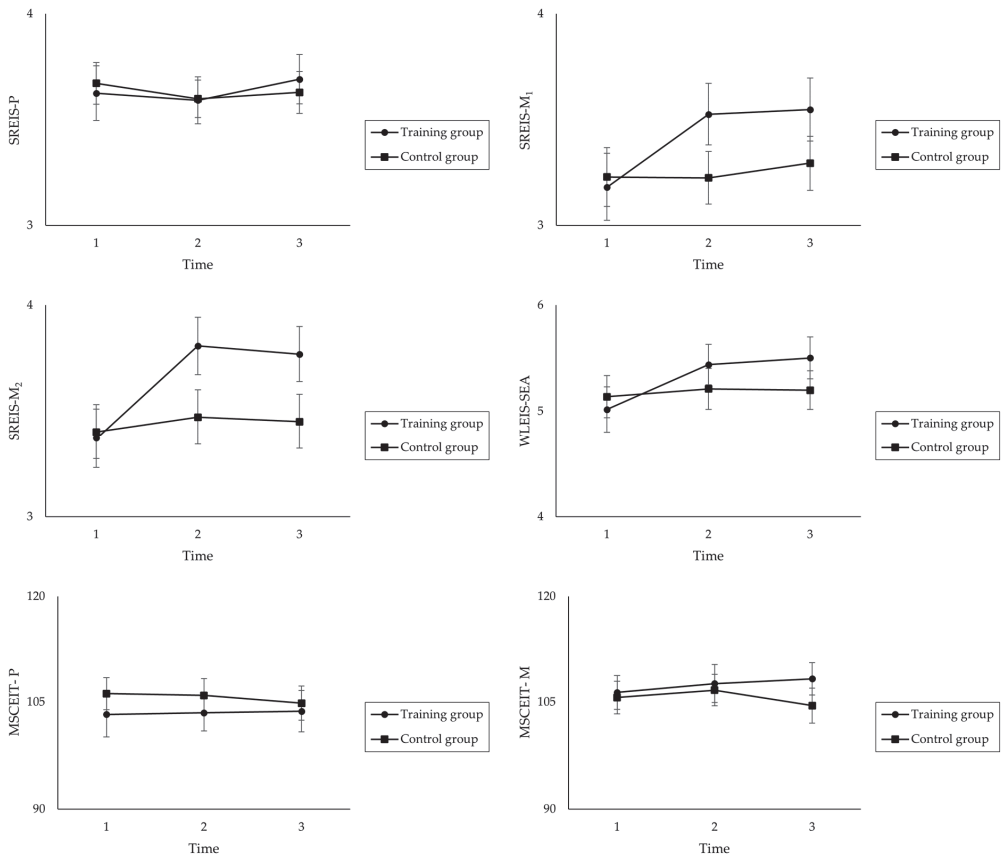


Figure 2. Graphs of interactions for all dependent variables across the pretest, posttest, and follow-up. Time 1 = pretest; Time 2 = posttest (directly after WEIT 2.0); Time 3 = follow-up (8 weeks later). SREIS-P = perceiving emotions in others; SREIS-M₁ = managing emotions in the self; SREIS-M₂ = managing emotions in others; WLEIS-SEA = appraising emotions in the self; MSCEIT-P = performance-based emotion perception; MSCEIT-M = performance-based emotion regulation.

3.4. Digital Affinity

Results of the multiple linear regression analyses with the MEMORE tool revealed that digital affinity did not moderate training success from pretest to posttest for the SREIS-P ($t [89] = 0.16, p = .876$), SREIS-M₁ ($t [89] = 0.84, p = .405$), SREIS-M₂ ($t [89] = 0.07, p = .941$), WLEIS-SEA ($t [89] = -0.67, p = .502$), MSCEIT-P ($t [89] = -0.22, p = .823$), or MSCEIT-M ($t [89] = -0.12, p = .908$). Therefore, Hypothesis 2 was not supported.

4. Discussion

Emotions play an essential role in people’s lives and permeate private as well as work lives. They allow people to enjoy their lives to the fullest and are important prerequisites for effective psychological functioning in society (Elfenbein et al. 2007; Hall et al. 2009). When emotion regulation is impaired, humans suffer, and emotional problems are part of many psychological disorders (Sheppes et al. 2015). Against this background, it is all the more important to be able to observe one’s own emotions and the emotions of others, to differentiate between them, and to use emotions to regulate one’s thinking and behavior—in short, to have EI (Salovey and Mayer 1990). Yet, not everyone possesses ability-related EI (Mayer et al. 2002), thus rendering it important to offer appropriate training. While F2F training

has demonstrated success in improving individuals' EI (Buruck et al. 2016; Herpertz et al. 2016; Hodzic et al. 2015), less is known about the effectiveness of online EI training (Köppe et al. 2019; Persich et al. 2021). In general, online training offers many advantages, such as flexibility in terms of when and where to participate, higher accessibility, or reduced costs, to name only a few (Kimiloglu et al. 2017). Accordingly, in order to train EI, it would be useful and advantageous to design such a training program as an online course. We carefully designed the WEIT 2.0 program built on a sound theoretical foundation (e.g., Barrett 2017; Gross 1998; Lazarus and Folkman 1984) and made use of recommendations for best practice (Blume et al. 2010; Seeg et al. 2022). In the following sections, we report on whether and to what extent WEIT 2.0 was effective and whether individual differences (i.e., in terms of digital affinity) had an impact on training effectiveness.

WEIT 2.0 is an open online course that focuses on improving individuals' emotional competencies by building on the four-branch model of EI (Mayer and Salovey 1997). Participants were randomly assigned to either the TG or the waiting list CG and filled out measures on self-reported and performance-based EI at three measurement points (prior to WEIT 2.0 [pretest], directly after WEIT 2.0 [posttest], and 8 weeks later [follow-up]). We found that some facets of self-reported EI could be improved by WEIT 2.0, whereas performance-based EI remained unaffected by WEIT 2.0.

4.1. *Theoretical Contributions*

In a rapidly changing and digitalized world, learning virtually has become more important than ever, as it allows individuals to learn anytime and from anywhere (Kimiloglu et al. 2017). Another important advantage of online interventions is their cost-effectiveness because a very large number of participants can be trained, and the learning content can be personalized for each individual (Esteban-Millat et al. 2014). In the previous studies, online courses led to learning outcomes that were as good as, if not better, than F2F training (Sitzmann et al. 2006; Smith et al. 2015; Soffer and Nachmias 2018). With the onset of the COVID-19 pandemic, the need for online training has become greater than ever before. However, there is a lack of research on how participants will benefit the most from online training and how to best design a successful online intervention (Gegenfurtner et al. 2020). This is especially true in the field of EI, where only a few studies have probed whether EI can be improved through online training programs (e.g., Köppe et al. 2019; Persich et al. 2021).

Our research showed that the WEIT 2.0 program was an effective way to improve (in part) self-reported EI. Particularly, we found that through WEIT 2.0, individuals improved their self-rated abilities in managing emotions in the self and in others, as well as in appraising emotions in the self. By contrast, the ability to perceive emotions in others was not improved through WEIT 2.0. In line with previous research (Hodzic et al. 2018), training effects were still present even 8 weeks after training, meaning that WEIT 2.0 had long-term effects. This result shows that efforts to use a theoretically well-founded training concept with a multimethod approach in an online setting pay off at the individual level. We, thus, conclude that WEIT 2.0 is a successful adaptation and extension of WEIT (Köppe et al. 2019). In comparison with WEIT, which is targeted at leaders, WEIT 2.0 targets the general population, and, therefore, a larger group of people can access WEIT 2.0 and benefit from it.

Unexpectedly, and in contrast with previous research, which has shown that performance-based EI can be improved via training (Hodzic et al. 2018; Persich et al. 2021), in our study, performance-based EI was not improved through WEIT 2.0. One reason for this finding could be that WEIT 2.0 might not be ideally designed to improve ability-related EI as assessed by the MSCEIT. In addition, participants' performance-based EI was already high before they participated in the training program, and it was, thereby, not easy to improve their EI further through training. Moreover, taking a look at the mean values of the performance-based EI scores at the pretest shows that the scores were already relatively high (with means ranging from 103.26 to 106.34) compared with the mean of ability-related

EI in the general population, which usually has a value of 100 and an *SD* of 15 (Mayer et al. 2002). Exploratory analyses revealed that participants with higher performance-based EI at the pretest had a smaller increase in their performance-based EI than participants with lower performance-based EI at the pretest. This finding is in line with previous research that showed that individuals who demonstrated poorer EI skills were less likely to take part in EI training opportunities and were less receptive to negative feedback (Sheldon et al. 2014). By contrast, people with a well-developed skillset were more open to receiving further education (Sheldon et al. 2014). Thus, the lack of improvement may have also been due to a ceiling effect.

Unexpectedly, participants' digital affinity did not influence training success. While it has been proposed that individual characteristics may influence training success in traditional F2F settings (e.g., Colquitt et al. 2000) but not in online settings (e.g., Arbaugh et al. 2009; Castro and Tumibay 2021), we could not find such an effect for WEIT 2.0, at least not for the individuals' digital affinity. Self-selection could be a reason for this finding. As we advertised WEIT 2.0 as an online training program, it is possible that the individuals who agreed to participate may have been particularly open to such an online setting or, in terms of digital affinity, the people who volunteered may have had a high approach orientation with respect to digital environments. Yet, taking a look at the means of digital affinity in our sample, the TG participants scored lower in digital affinity than those in the standard sample in Franke et al. (2019). Another explanation could be that the online training program was well-designed, the program was not too complex, and the user interface was designed to be user-friendly so that all individuals, independent of their level of digital affinity, could profit from WEIT 2.0.

4.2. Limitations and Future Research

Our study has several limitations, which offer directions for future research. First, WEIT 2.0 was built on the four-branch model of EI and is focused on improving emotion perception and emotion regulation (Mayer and Salovey 1997). While we had a clear rationale for focusing on these two branches (e.g., as they are considered the two key EI-intervention components that are associated with the desired outcomes (Herpertz et al. 2016)), we do not know whether it is possible to train people to improve their skills in the other two branches, using emotions and understanding emotions. However, as the branches involving using emotions and understanding emotions have been criticized (e.g., with respect to the validity of these two branches (Joseph and Newman 2010; MacCann et al. 2014; Rossen et al. 2008)), we refrained from including them in WEIT 2.0. Future research could investigate whether and how using emotions and understanding emotions can be trained in an online setting.

Second, although we did not find support for our hypothesis that digital affinity would enhance training success, previous research has clearly indicated that individuals' personal characteristics notably influenced training success (e.g., Arbaugh et al. 2009; Castro and Tumibay 2021). Therefore, we recommend that future research investigate other potentially relevant personal characteristics that may influence the training success of WEIT 2.0. For example, two individual characteristics that have been associated with training success are training motivation (Seeg et al. 2022) and conscientiousness (Kim and Schniederjans 2004). Future research could, therefore, address whether these individual characteristics can also influence the effectiveness of WEIT 2.0.

Third, due to the open accessibility of WEIT 2.0 and voluntary participation, the selectivity of participants may be an issue. Our sample consisted primarily of highly educated, young participants who already had high values on EI. Even though it is not surprising that well-educated people are especially likely to be open to participating in further training (Sheldon et al. 2014), we can draw conclusions about the effectiveness of WEIT 2.0 only for a population with similar characteristics (highly educated, young, emotionally intelligent). However, we do not know whether individuals who differ from our sample in these characteristics will also profit from WEIT 2.0 in a similar way. For

instance, even though we tried to make our training program as understandable as possible, it remains open whether WEIT 2.0 is also comprehensible and useful to less educated people and will lead to similar training success. Furthermore, as younger people, in general, tend to interact more intensively with technology (Franke et al. 2019), it remains an open question whether older people will also profit from our online training program. Finally, we found that WEIT 2.0 improved self-reported EI in individuals with high initial values on EI. Regarding a population with lower EI, we would expect that WEIT 2.0 could be even more effective, as there would be more room for improvement. We, therefore, recommend evaluating WEIT 2.0 in a sample with less-educated, older, and less emotionally intelligent individuals. In order to achieve greater variability across participants, it would also be possible to offer the WEIT 2.0 course to a wider audience or to a group in an institution (e.g., in schools, higher education settings, or work settings).

Fourth, WEIT 2.0 was developed and tested in Germany, thus limiting the usability and range of its application. As we were able to demonstrate the effectiveness of the intervention in terms of self-rated EI, it would be conceivable to translate WEIT 2.0 into other languages and test its effectiveness. As cultural differences influence emotion perception and emotion regulation (Matsumoto and Wilson 2022), adaptations of WEIT 2.0 may also be necessary.

Fifth, whereas the emotion perception subscale from the MSCEIT showed good reliabilities in our study, the emotion regulation subscale did not. Although the reliabilities for this subscale are in agreement with the previous literature (Maul 2012), there is a need for a measure that can reliably assess emotion regulation. In future research, other ability-related EI measures could be used to investigate whether performance-based EI can be improved with WEIT 2.0.

Sixth, a disadvantage of self-report measures of EI is that they (1) can be affected by social desirability (Furnham 1986; Nederhof 1985) and (2) may reflect demand characteristics (Orne 1962). Future research could, therefore, control social desirability. Furthermore, we do not know whether self-reported increases in EI were associated with training transfer to participants' daily lives (for example, if there was an impact on participants' well-being or social relationships). Future research could examine whether WEIT 2.0 has such effects by including further measures of participants' well-being or peer ratings indicating social relationship quality.

Finally, due to organizational issues, we were not able to implement an active CG. We, therefore, recommend that future research uses an active CG in order to make sure that improvements in the TG are not due to a placebo effect.

4.3. Practical Implications

The results of our study have several notable practical implications. First, the evaluation of WEIT 2.0 shows that online interventions are effective, at least in terms of improving self-reported EI. We speculate that training success can be traced back (at least in part) to a carefully designed training program. When designing WEIT 2.0, we grounded the training content on empirically sound theories (e.g., Barrett 2017; Gross 1998; Lazarus and Folkman 1984) and followed the recommendations for best practice (Blume et al. 2010; Seeg et al. 2022). As this approach appears to be feasible and efficient, we would like to encourage practitioners to develop future training content on a sound theoretical basis (e.g., the four-branch model of EI (Mayer and Salovey 1997)) and to follow the recommendations for best practice (e.g., by including elements, such as realistic training content, goal-setting exercises, and homework assignments) in future ability-related EI training programs. Moreover, in line with the previous research (Geßler et al. 2021), our study shows that emotion perception and emotion regulation can be effectively trained at the same time. Therefore, we recommend that practitioners also include both branches in one training program.

Furthermore, as longer EI interventions have been shown to have larger effect sizes than shorter EI interventions (Hodzic et al. 2018), we also recommend that practitioners develop future EI interventions with sufficient content mapping of all areas of EI that are of

interest. For instance, WEIT 2.0 includes 13 modules that cover diverse aspects of EI based on two branches of the four-branch model of EI (Mayer and Salovey 1997).

For future EI training evaluations, we also recommend that researchers investigate not only the short-term effects (Schutte et al. 2013) but also the long-term effects of the intervention. By doing so, long-term training effectiveness can be evaluated, and researchers can determine whether training pays off in the long run. With regard to WEIT 2.0, long-term training effects were found for self-rated EI, as the effects were still present 8 weeks after training.

Finally, as EI is relevant to all areas of life, everyone can profit from a training program that is aimed at improving EI. This is why WEIT 2.0 was developed as an open online course that is accessible to anyone interested in this topic. We would, therefore, like to encourage practitioners to make future training available to the general population as well. As EI is associated with better health (Martins et al. 2010), higher interpersonal relationship qualities (Schröder-Abé and Schütz 2011), improved job performance (Joseph et al. 2015), and greater job satisfaction (Miao et al. 2016), open online courses could be beneficial for all members of various societies.

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Appendix A

Table A1. Content of WEIT 2.0.

Module	Content
1 Introduction to emotions and emotional intelligence	<ul style="list-style-type: none"> • Definition, components, and functions of emotions • Distinction between emotions, moods, and feelings • Russell’s circumplex model of emotion • Models of emotional intelligence (i.e., ability models, trait models, and mixed models)

Table A1. *Cont.*

Module		Content
2	Measurement of emotional intelligence	<ul style="list-style-type: none"> • Importance of emotional intelligence in private life and work life • Trainability of emotional intelligence • Measurement approaches for the assessment of emotional intelligence • Distinction between emotional intelligence, empathy, social competence and resilience
3	Emotion knowledge	<ul style="list-style-type: none"> • Important emotion theories (e.g., theory of basic emotions, theory of constructed emotions) • Enhancement of participants' emotion vocabulary • Internal and external triggers of emotions • Temporal sequence and consequences of emotions
4	Emotion perception of the self (Part 1)	<ul style="list-style-type: none"> • Introduction to emotion perception, emotion awareness and self-awareness • Claude Steiner's emotional literacy • Bodily sensations and emotions (e.g., James-Lange theory, Schachter-Singer theory) • Connection of facial expressions and gestures with emotions
5	Emotion perception of the self (Part 2)	<ul style="list-style-type: none"> • Relation between cognitive processes and emotions • Appraisal theories (e.g., Richard Lazarus, Magda Arnold) • Reasoning errors and cognitive distortions
6	Emotion regulation of the self (Part 1)	<ul style="list-style-type: none"> • Surface acting and deep acting • Introduction to the process model of emotion regulation by James Gross • Familiarization with different emotion regulation strategies (e.g., cognitive reappraisal, social support, suppression of emotions, relaxation methods, distraction, concentration)
7	Emotion regulation of the self (Part 2)	<ul style="list-style-type: none"> • Application of different emotion regulation strategies to mitigate or intensify both pleasant and unpleasant emotions • Reflecting on the effectiveness and appropriateness of learned emotion regulations strategies • Development of an emotion plan for troubling emotions to better analyze one's emotions
8	Emotion perception of others (Part 1)	<ul style="list-style-type: none"> • Social and communicative functions of emotional expression • Interpretation of different types of emotional and communicative signals (e.g., facial expression, body posture, voice) • Emotion perception of others from facial expressions through images and videos
9	Emotion perception others (Part 2)	<ul style="list-style-type: none"> • Cultural influences on the perception of emotions in others (e.g., display rules) • Strategies for masking, intensifying and attenuating the expression of emotions • Differences in the expression of emotions among different cultures
10	Emotion regulation in others (Part 1)	<ul style="list-style-type: none"> • Communication and emotion regulation • Theoretical fundamentals of traditional sender-receiver models • Familiarization with different strategies of interpersonal emotion regulation (i.e., active listening)
11	Emotion regulation in others (Part 2)	<ul style="list-style-type: none"> • Conflict management skills • Introduction to nonviolent communication by Rosenberg • Expressing appreciation and feedback towards others
12	Transfer into everyday life	<ul style="list-style-type: none"> • Goal setting to enhance learning transfer with the help of SMART goals and implementation intentions

Table A2. Correlations of measures at pretest, posttest, and follow-up.

Variable	1	2	3	4	5	6
1 SREIS-P	1/1/1					
2 SREIS-M ₁	.26 ***/.25 ***/ .32 ***	1/1/1				
3 SREIS-M ₂	.54 ***/.5 ***/ .53 ***	.38 ***/.46 ***/ .51 ***	1/1/1			
4 WLEIS-SEA	.37 ***/.37 ***/ .4 ***	.33 ***/.44 ***/ .41 ***	.34 ***/.37 ***/ .40 ***	1/1/1		
5 MSCEIT-P	-.02/.01/0	.12/-.01/.05	.02/-.04/-.07	.09/.09/.13	1/1/1	
6 MSCEIT-M	.1/-.01/.13	.15*/.12/-.02	.16*/.08/.1	.14*/.06/.2 **	.18 **/.10/.19 **	1/1/1
7 Digital Affinity	0/-.05/.01	.26 ***/.25 ***/ .25 ***	.06/.06/.06	.08/.1/.07	-.01/.03/.08	-.01/-.01/-.13

Note. Correlations are presented separately according to time of measurement. Correlations at the pretest appear first; correlations at the posttest appear second, and correlations at the follow-up appear last. SREIS-P = perceiving emotions in others; SREIS-M₁ = managing emotions in the self; SREIS-M₂ = managing emotions in others; WLEIS-SEA = appraising emotions in the self; MSCEIT-P = performance-based emotion perception; MSCEIT-M = performance-based emotion regulation. * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Note

¹ Critical assumptions (i.e., measurement invariance) that were needed to test Hypotheses 1a and 1b using multigroup structural equation modeling were not met. Therefore, we deviated from our preregistration and employed two separate two-way MANOVAs to test for short- and long-term changes in self-reported and performance-based EI measures.

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