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RUNNING HEAD: TEI AND ACHIEVEMENT

The Role of Trait Emotional Intelligence in Academic Performance: Theoretical Overview

and Empirical Update

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Abstract

Considerable debate still exists among scholars over the role of trait emotional intelligence (TEI) in academic performance. The dominant theoretical position is that TEI should be orthogonal or only weakly related to achievement; yet, there are strong theoretical reasons to believe that TEI plays a key role in performance. The purpose of the current paper is to provide (a) an overview of the possible theoretical mechanisms linking TEI with achievement and (b) an update on empirical research examining this relationship. To elucidate these theoretical mechanisms, the overview draws on multiple theories of emotion and regulation, including TEI theory, social-functional accounts of emotion, and expectancy-value and psychobiological model of emotion and regulation. Although these theoretical accounts variously emphasize different variables as focal constructs, when taken together, they provide a comprehensive picture of the possible mechanisms linking TEI with achievement. In this regard, the paper redresses the problem of vaguely specified theoretical links currently hampering progress in the field. The paper closes with a consideration of directions for future research.

Keywords: academic performance; achievement; emotional intelligence; emotions; trait EI

Does TEI play a part in educational achievement? This seemingly straightforward question has evoked considerable debate in the psychological literature over the past two decades. A tenet of TEI theory is that TEI is expected to be unrelated or only weakly related to achievement (Mavroveli & Sánchez-Ruiz, 2011; Petrides, 2011). However, evidence in the psychological literature has been largely inconsistent with respect to this tenet, suggesting a need for greater attention to the specific theoretical mechanisms linking TEI and achievement. Indeed, most research with TEI has done little in the way of offering theoretical explanations for expected or observed associations with achievement (Perera & DiGiacomo, 2013). This lack of theoretical clarity has hindered progress in understanding the ways in which affective personality traits contribute to educational achievement.

The present review is formulated in light of these shortcomings in the extant TEI literature. The review begins with a brief consideration of academic performance and the theoretical grounding of TEI. Next, the review turns to an overview of the possible theoretical mechanisms linking TEI and achievement, including a discussion of potential negative effects. Following this theoretical overview, recent research investigating the TEI-achievement relationship is briefly reviewed. The article closes with a consideration of directions for future research.

Academic Performance

Identifying predictors of academic performance remains an important goal for researchers with broad socio-political implications. In 2011, member countries of the Organization for Economic Cooperation and Development (OECD) spent, on average, over 6.0% of their gross domestic product (GDP) on education (OECD, 2014). Furthermore, between 2000 and 2011, the rate of growth in expenditure on education was faster than the rate of GDP growth in almost all OECD countries, and public investment in education increased 7.0%, on average, across OECD countries between 2008 and 2011 (OECD, 2014).

Related to this national spend, quasi-marketization strategies have been implemented in many modern education systems over the past decade (e.g., Australia) as a response, at least in part, to calls to improve achievement standards. To the extent that scholastic achievement in local educational contexts as well as high-stakes international (e.g., PISA) testing programs remains an important educational outcome in modern economies, identifying predictors of academic performance would seem to be an important area of research.

Although the meaning of academic performance is relatively intuitive and often assumed in studies of the predictors of achievement, there is some variability in operational definitions across studies. One of the most frequently used indices of achievement is GPA (Kuncel, Credé, and Thomas, 2005). GPA is typically computed as a weighted mean of final grades across all courses attempted. Even though GPA suffers from some statistical limitations, such as range restriction at higher levels of education (Poropat, 2009), the index has been shown to be internally reliable and temporally stable (Bacon & Bean, 2006). In addition to GPA, researchers have used more restricted operationalizations of academic performance, including examination scores (Chamorro-Premuzic & Furnham, 2003), single subject performance (Byrnes & Miller, 2007), and standardized achievement tests (Duckworth, Quinn, & Tsukayama, 2012).

Several meta-analyses and longitudinal studies over the past 15 years have distinguished predictors of academic achievement (Poropat, 2009; Richardson, Abraham, & Bond, 2012; Robbins et al., 2004). These studies converge on the conclusion that general ability and prior achievement are the strongest and most consistent positive predictors of academic performance. Other notable positive predictors of achievement are conscientiousness (Perera, McIlveen, & Oliver, 2015), academic self-efficacy (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011), and effort regulation (Komarraju & Nadler, 2013). Negative predictors of performance include procrastination (Kim & Seo,

2015), avoidance goal orientations (Huang, 2012), and test anxiety (Cassady & Johnson, 2002). Furthermore, in recent years, there has been an explosion of interest in the potential role of emotional intelligence (EI) in academic performance (Perera & DiGiacomo, 2013), especially the trait conceptualization of the construct. Notwithstanding this interest, little systematic attention has been given to the theoretical rationale for a relationship. This is the focus of the present review.

TEI Conceptualized

EI is a multidimensional meta-construct with fundamental theoretical underpinnings that can be traced to multiple sources. Distal sources of EI include Darwin's (1872/1998) initial account of the adaptive function of emotional expressions. Another distal source of EI is Thorndike's (1920) concept of social intelligence, which refers to the ability to understand and manage social partners. The more proximal roots of EI can be traced to the concept of alexithymia and Gardner's (1983) account of multiple intelligences. Drawing on these perspectives, the concept of EI was elaborated in the 1990s in an effort to systematize the study of emotion-related constructs under a single, unifying framework (Bar-On, 2000; Goleman, 1995; Salovey & Mayer, 1990).

The first coherent theoretical model of EI and corresponding conceptual definition were advanced by Salovey and Mayer (1990). They defined EI as a set of interrelated cognitive-emotional abilities and proposed an initial three-branch hierarchical model of EI focusing on the appraisal and expression, regulation, and utilization of emotions (Salovey & Mayer, 1990; see also Mayer & Salovey, 1997). This initial theoretical account, and a sprinkling of concomitant empirical studies (e.g., Mayer, Di Paolo, & Salovey, 1990) were followed by Goleman's (1995) seminal book *Emotional Intelligence*, which popularized the construct. The extraordinary influence of Goleman's book was largely due to its claims that EI, conceptualized as a conglomerate of emotion-related abilities and dispositions, was as

powerful, and oftentimes more powerful, than general intelligence in the prediction of important life outcomes (e.g., work performance; Goleman, 1995). In the systematic study of EI, Goleman's work may have impeded scientific progress as it spurred the development of a number of EI interventions and models with conceptual and measurement frailties (Pérez et al., 2005).

One major frailty concerns the measurement of the nascent construct. Following the proliferation of EI models, efforts to operationalize the construct were made with haste. At least 20 instruments designed to appraise EI appeared in the psychological literature between 1995 and 2005, such as the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, & Caruso, 2002), the Trait Meta-Mood Scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), the Emotional Quotient Inventory (EQ-i) (Bar-On, 1997), the Schutte Emotional Intelligence Scale (SEIS) (Schutte et al., 1998), and the Swinburne University Emotional Intelligence Test (SUEIT) (Palmer & Stough, 2002). However, for many of these measures, the process of instrument development failed to account for the core psychometric distinction between typical and maximum performance measurement (Petrides, 2011; Perez et al., 2005). This resulted in a great deal of conceptual confusion with the development of a number of self-report instruments purporting to measure some veridical intelligence, and the interpretation of data obtained from these typical-performance measurements in terms of abilities (Petrides, 2011; Petrides & Furnham, 2001).

In an attempt to bring order to the field, Petrides and Furnham (2001) proposed a conceptual distinction between the ability and trait EI constructs on the basis of the distinction between maximum and typical performance measurement. The ability EI perspective conceptualizes EI as a constellation of cognitive-emotional abilities located in frameworks of human intelligence (Petrides, 2011). This ability-based approach concerns the actual cognitive processing of emotional information as measured through maximal

performance tests (Mayer, Salovey & Caruso, 2008). Notwithstanding the wide use of ability models of EI in the psychological literature, several limitations of these models have been noted. The most prominent among these is that the inherent subjectivity of emotional experience precludes the maximal-performance assessment of EI with respect to objective criteria (Brody, 2004; Petrides, 2010; Petrides, Pita, & Kokkinaki, 2007). In this regard, EI cannot be a "true" intelligence because it is not amenable to veridical assessment (Petrides, 2011).

The ability EI perspective should be distinguished from the TEI approach on the basis of distinct conceptual definitions and methods of assessment. The TEI perspective conceptualizes EI as a collection of affective-motivational dispositions and self-perceptions located in existing frameworks of human personality (Petrides, 2011; Petrides & Furnham, 2001). Dissimilar to the measurement of ability EI via maximal-performance, TEI is appraised via typical-performance measures (e.g., self or peer-report) akin to other personality constructs (Pérez et al., 2005; Petrides, 2011). Although both perspectives on EI draw on overlapping affective content (e.g., emotion perception, expression, and regulation), they are conceptually distinct constructs and have distinctive nomological nets (Parker, Keefer, & Wood, 2011). The empirical literature supports this distinction with (a) consistently weak associations found between maximal-performance tests and self-report measures of EI (Brackett & Mayer, 2003; Brannick et al., 2009; Warwick & Nettelbeck, 2004; Zeidner, Shani-Zinovich, Matthews, & Roberts, 2005) and (b) the two formulations of EI consistently shown to be differentially related to various life outcomes (Livingstone & Day, 2005; Van Rooy & Viswesvaran, 2004).This distinction between ability EI and TEI has served to disambiguate previous work on EI and has become commonplace in the psychological literature. The present research is centrally concerned with TEI.

Although numerous theoretical models have been proposed to describe the construct of TEI, in the present work, TEI is considered from the perspective of TEI theory (Petrides, 2011). This general theory aims to organize into a unifying framework the affective-motivational aspects of personality, thereby serving an integrative function in the conceptualization of TEI (Mikolajczak, Luminet, Leroy, & Roy, 2007). TEI theory posits a multidimensional, hierarchical representation of TEI. Specifically, a global TEI factor is posited to reside at the apex of the TEI hierarchy, with sociability, self-control, emotionality, and dispositional well-being traits at the first-order level, and finite affective-motivational traits and self-perceptions at the base of the hierarchy (Petrides, 2009, 2011; cf. Perera, 2015). These primary-level traits and self-perceptions reflect typical patterns of feelings, thoughts, and behaviors related to the perception, regulation, management, and expression of emotion-related information as well as sociability, positive emotionality, self-control, self-motivation, and optimistic dispositions.

A fundamental postulate of TEI theory is that TEI is a personality construct located in extant taxonomies of human personality (Petrides, 2011; Petrides, Pita et al., 2007). This postulate and the concomitant body of research seeking to support it are integral to the present review for two reasons. First, theorizing the association between TEI, defined as a personality trait, and achievement hinges, unsurprisingly, on the validity of the postulation that TEI is a personality construct. The absence of evidence for this position complicates the development of theoretical explanations for this link because the conceptual meaning of TEI would be unclear. Second, a dearth of evidence supporting the view that TEI is a personality construct obscures the interpretation of existing findings bearing on the TEI-achievement relationship that may otherwise inform the present theorizing.

Empirical research has largely supported the postulation that TEI is a personality construct. Factor location studies have demonstrated that a partially distinct TEI factor can be

recovered in existing hierarchies of human personality, including the Big-Five and Eysenckian-Three taxonomies (Davies, Stankov, & Roberts, 1998; Petrides & Furnham, 2001; Petrides, Pita et al., 2007). Factor location work also indicates that TEI can be situated in dimensional circumplex models of personality (De Raad, 2005). In addition, recent behavioral genetic research shows that the magnitude of the genetic contribution to phenotypic variance in TEI approximates the estimates of heritability for broad bandwidth personality traits (Vernon, Petrides, Bratko, & Schermer, 2008). Furthermore, observed phenotypic covariation between TEI and established personality factors has been shown to be attributable to overlapping genetic and environmental factors (Vernon, Villani, Schermer, & Petrides, 2008; Veselka et al., 2010). Taken together, these factor location and behavioral genetic results provide support for the conceptualization of TEI as a personality construct in line with TEI theory.

Although TEI theory offers a coherent conceptual definition of TEI, it is limited by the lack of transparent explanatory accounts of the associations of TEI with various life outcomes (e.g., life satisfaction). The TEI construct spans several psychological systems, including emotions, cognitions, and motives, and variables, such as expectancies (e.g., optimism), self-perceptions (e.g., emotional self-efficacy) and biologically-based traits (e.g., positive emotionality, self-motivation) (Parker et al., 2011). However, this theoretical complexity of TEI as a multifaceted meta-construct has not been adequately reflected in extant theorizing about, and empirical investigations of, its effects on various substantive criteria, including achievement. Instead, vaguely specified theoretical links and practices of establishing predictive utility preceding the elaboration of theoretical explanations have dominated the field. For example, though a tenet of TEI theory is that TEI should be only weakly related or orthogonal to achievement, the theoretical basis for this postulate is unclear (Perera & DiGiacomo, 2013). Indeed, the extent of theoretical elaboration appears to be that

TEI is a personality construct, located outside the bounds of human cognitive ability, and is therefore expected to show weak or null associations with achievement (Mavroveli & Sánchez-Ruiz, 2011; Petrides, 2011; Petrides, Frederickson, & Furnham, 2004). This is not a sufficient theoretical explanation as it fails to consider the theoretical complexity of the construct. The failure to sufficiently elaborate theoretical links of TEI with various life outcomes in line with the complexity of the construct may not only obfuscate the true nature of the construct but also complicate empirical research efforts.

Absent of transparent explanatory accounts for TEI-achievement links, the present work draws on the richer literatures pertaining to emotions and regulation, with which the construct is concerned, to elucidate plausible theoretical links between the constructs. For example, the scientific definition of TEI from the perspective of TEI theory encompasses generalized favorable expectancies for the future. This can be tied to a rich history of expectancy-value theories of regulation (Carver & Scheier, 1998). TEI also involves affective-motivational dispositions, such as positive emotionality, assertiveness, self-motivation, and self-control, which may be grounded in biologically-based appetitive and attentional systems of motivation (Connor-Smith & Flachsbart, 2007; Derryberry, Reed, & Pilkenton-Taylor, 2003). Although these goal-based and biological models of regulation have been conceptually distinguished in the psychological literature, they provide complementary views of human functioning that may be relevant to understanding the ways in which TEI is associated with achievement (Carver & Connor-Smith, 2010). In addition, TEI encompasses dispositional emotion perception and expressivity that can be linked to the social-functional account of emotions, which attempts to explain how the perception and expression of emotions regulates social interactions in ways that optimize human adaptation to social and physical environments (Keltner & Kring, 1998). Aligning TEI with these richer

accounts of emotion and regulation allows for the development of a more complete picture of the ways in which TEI is implicated in achievement.

Conceptualizing the Relation between TEI and Achievement

The notion that TEI has a positive effect on educational achievement is intuitively appealing. Beyond intuition, there are several plausible theoretical explanations for a meaningful association between TEI and educational achievement. These explanations can be organized into the following three broad categories: cognitive processes; motivational processes; and interpersonal processes. The basic structure of these processes is shown in Figure 1, and each of these processes is considered below.

INSERT FIGURE 1 ABOUT HERE

Cognitive Processes

A positive association between TEI and achievement may be attributed to both emotion regulation dispositions and emotional self-efficacy. For high TEI individuals, tendencies towards the regulation of emotion may minimize susceptibility to the potentially deleterious effects of negative emotions on cognitive functioning in learning and evaluation settings (Perera & DiGiacomo, 2013). On the contrary, for those low on TEI who tend not to regulate emotions, the experience of negative affect may interfere with academic tasks by directing cognitive resources away from academic materials to the object of emotion (Valiente, Swanson, & Eisenberg, 2012). Furthermore, perceived emotional self-efficacy may play an important role in students' emotional self-management in academic activities (Qualter, Gardner, Pope, Hutchinson, & Whiteley, 2012). These theoretical mechanisms may be especially applicable to TEI-achievement relations under stressful conditions (e.g., educational transitions, examinations, oral presentations).

TEI may also facilitate achievement by mobilizing the cognitive resources required for optimal learning and performance. TEI encompasses dispositional tendencies to

experience positive emotions in general (Petrides, 2011). In this regard, TEI reflects a generalized version of positive emotionality that has a broad range of applicability, spanning very narrow contexts (e.g., completing a discrete learning task) to broader contexts (e.g., attending school). Thus, those high on TEI should tend to experience positive emotions across diverse life situations or challenges. One such situation or challenge may be solving a novel academic problem in a classroom environment. The experience of positive emotions during the task, namely those relating to the task itself (e.g., the enjoyment of learning or interest), may broaden the repertoire of methods available for task engagement and enhance task absorption, thereby improving performance (Fredrickson, 1998, 2001; Pekrun, Goetz, Titz, & Perry, 2002a, 2002b; Valiente et al., 2012).

Motivational Processes

Core motivational processes posited in goal-based models of human regulation may also underlie the link between TEI and achievement. According to TEI theory (Petrides, 2011; Petrides & Furnham, 2001), TEI encompasses an optimistic disposition reflecting generalized favorable expectancies for the future. This trait expectancy construct can be tied to goal-based models of human motivation and regulation, namely expectancy-value theories. In expectancy-value models of behavioral regulation, favorable expectancies for the future are posited to lead to engagement and increased effort to reach desired outcomes (Carver et al., 2010; Nes & Segerstrom, 2006; Scheier, Carver, & Bridges, 1994). On the contrary, generalized negative expectancies, reflected in low TEI, are believed to result in decreased effort and disengagement from the pursuit of valued goals (Carver et al., 2010; Scheier et al., 1994). This is because expectancy-value theories assume that behavior reflects the pursuit of desired goals, and individuals remain engaged in efforts to pursue and attain valued goals provided that their expectancies for success are sufficiently positive (Carver & Scheier, 1998). As TEI reflects a generalized optimistic disposition with broad applicability, it may be

expected to influence engagement and sustained efforts across several life domains, perhaps including academic contexts where optimal achievement is the desired goal. Thus, for those high on TEI, an optimistic disposition may promote achievement by increasing engagement in efforts to meet the academic demands of the physical environment.

The role of TEI in achievement may also be explained with reference to biological models of human regulation. These models view human behavior as reflecting fundamental approach and avoidance tendencies and the regulation of these tendencies in response to environmental cues of reward or threat (Davidson, 1998; Gray, 1994). TEI comprises dispositional tendencies towards the experience of positive emotions (i.e., trait positive emotionality), self-control, and self-motivation (Petrides, 2011). These traits may be grounded in biologically-based approach and attentional systems of regulation that provide a framework for the activation of approach behaviors and engagement of effort and attention in response to stimuli in the academic environment (Connor-Smith & Flachsbart, 2007; Derryberry & Reed, 2008; Derryberry et al., 2003). For example, the approach tendencies underlying dispositional positive emotionality may encourage academic engagement by facilitating movement towards desired academic goals. Furthermore, the attentional system that underpins the high levels of self-motivation defining TEI may regulate the effort and attention necessary for optimal academic functioning, leading the individual to persist in efforts to achieve academic goals and focus on valued academic tasks (Derryberry & Reed, 2008).

For individuals high on TEI, dispositional self-control, which could also be grounded in a biologically-based attentional system (Connor-Smith & Flachsbart, 2007; Derryberry & Reed, 2008), may also support the regulation of effort and attention necessary for optimal achievement. The TEI construct encompasses a cluster of relatively stable affective traits reflecting an individual's propensity for low impulsivity (Petrides, 2009, 2011). Those who

are high in TEI tend to delay momentary gratification in the service of pursuing long-term goals whereas low TEI individuals tend toward impulsivity, yielding to the temptation of immediate gratification (Perera & DiGiacomo, 2013; Petrides, 2009). Self-control dispositions may offset the potentially deleterious effects of proximal, externally-elicited motives on behavior by facilitating movement towards goal-related cues and the avoidance of temptation-related stimuli (Perera & DiGiacomo, 2013). For instance, the invitation to socialize with friends may trigger the reorientation of attention toward the long-term goal of completing an assignment (Fishbach & Shah, 2006; Fujita, 2011). Furthermore, individuals high on TEI, who possess strong self-control dispositions, may preserve proximity to goal-related stimuli and maintain distance from tempting stimuli in the pursuit of higher-goals (Perera & DiGiacomo, 2013). For example, in preparing for an examination, a student with high TEI may choose to remove the threat of momentary pleasure, such as viewing a preferred television program, by studying at the university library. Assuming individuals set academic goals, which is typical of those high on TEI, self-control tendencies may regulate behavior and attention towards these goal-related stimuli while disengaging from high-intensity temptations.

These motivational processes purported to link TEI with achievement may also implicate coping efforts in a sequence of causally-related events when confronting adversity (Perera & DiGiacomo, 2015). In academic settings, it may be that the pathway from TEI to achievement reflects a multistage process of increased engagement and effort to attain valued academic goals triggered by positive expectancies and the activation of appetitive and attentional systems presumed to underlie TEI. When confronting adversity, this goal driven regulation of attention and effort may be psychologically manifested as engagement coping strategies as the individual attempts to manage academic stressors towards maximizing achievement (Perera & DiGiacomo, 2015).

Recent evidence supports the theoretical view that TEI influences the ways in which individuals cope with stressful events (Downey, Johnston, Hansen, Birney, & Stough, 2010; Petrides, Pérez-González, & Furnham, 2007). TEI has been linked to the use of both primary (e.g., active coping) and secondary (e.g., positive reinterpretation) control engagement strategies (e.g., Mikolajczak, Nelis, Hansenne, & Quoidbach, 2008; Petrides, Pita et al., 2007). For those high on TEI, an optimistic disposition may foster the use of primary control strategies because favorable expectancies lead to greater engagement and increased efforts to overcome adversity (Carver et al., 2010). The biologically based appetitive and attentional systems believed to underlie TEI may also serve as regulative frameworks for the selection of engagement coping strategies that preserve the mobilization of effort and attention towards academic goal attainment under stressful conditions (Connor-Smith & Flachsbart, 2007; Derryberry et al., 2003). This multistage process may play out along the entire timeline of a stressful educational event (e.g., preparing for an examination), activating and regulating effort and attention in the service of attaining valued achievement goals.

Interpersonal Processes

In addition to these cognitive and motivational processes, TEI may regulate interpersonal relationships and coordinate social interactions in ways that enhance the individual's navigation of collaborative educational settings towards maximizing achievement (Perera & DiGiacomo, 2013). Achievement in educational environments increasingly requires performance in not only high-stakes testing contexts but also collaborative environments (Ahles & Bosworth, 2004; Wang, MacCann, Zhuang, Liu, & Roberts, 2009). One such collaborative context is group projects or presentations in primary, secondary, and tertiary education settings. Other cooperative contexts include medical and teacher education settings in which achievement depends on performance in not only traditional academic subjects (e.g., biomedical science, curriculum and pedagogy) but also

community-based practical courses requiring interactions with patients and students, respectively. Individuals high on TEI are expected to function effectively in these collaborative academic settings because they possess the affective dispositions best suited to positive social functioning (Perera & DiGiacomo, 2013). This is consistent with an evolutionary postulate of TEI theory which holds that TEI evolved as a result of unidirectional natural selection for affective-motivational personality traits that foster optimal social adaptation (Rushton et al., 2009; Veselka, Schermer, Petrides, & Vernon, 2009).

The two affective dispositions that may be chiefly implicated in this interpersonal process linking TEI and achievement are emotion expression and emotion perception. From a social-functional perspective on emotions, emotional expressions are believed to coordinate social interactions in ways that enhance individuals' ability to meet social goals and resolve social problems through their informative, evocative, and incentive functions (Keltner, 2003; Keltner & Haidt, 1999, 2001; Keltner & Kring, 1998). Emotional displays serve an informative function by enabling the rapid transmission of valenced information about a sender's emotional state (Ekman, 1993), social intentions (Fridlund, 1994), and orientation towards relationships (Knutson, 1996; Keltner & Kring, 1998). Emotional expressions also have an evocative function to the degree that they elicit complementary emotional responses in others (Keltner & Kring, 1998). Finally, emotional expressions may function as incentives for, or reinforces of, others' social behaviors during ongoing social interactions (Keltner & Haidt, 1999; Keltner & Kring, 1998; Klinnert, Campos, Sorce, Emde, & Svejda, 1983). In these ways, emotion expressivity serves an important social-communicative function.

It follows that generalized difficulties in expressing emotions, typical of those low in TEI, may interfere with social communication, which is integral to effective academic collaboration. From a social-functional standpoint, there are at least two reasons for expecting that difficulties in communicating emotions will impede social interactions. First, the

dissociation of affective experiences from human expression may impair the communication of internal states that is crucial to adaptive social functioning (Harker & Keltner, 2001; Shariff & Tracy, 2011; Srivastava, Tamir, McGonigal, John, & Gross, 2009). Second, it may be that those with low TEI struggle to negotiate relative position in group settings because generalized difficulties expressing self-conscious emotions (e.g., pride, shame, and embarrassment displays) disrupt the communication of status, thereby hampering collaborative performance (Shariff & Tracy, 2009, 2011).

Although it is clear from the social-functional account of emotions that social communication is dependent on emotion expressivity (Shiota, Campos, & Keltner, 2004; Keltner & Haidt, 1999, 2001), because emotions are relational processes that coordinate the actions of individuals and their social partners (Keltner & Kring, 1998; Lazarus, 1991), it is unlikely that expressivity is the only emotional response tendency implicated in social communication. Indeed, to the extent that the instructive, evocative, and incentive functions of emotions hinge on the flow of emotion communication (Keltner & Kring, 1998), the perception of emotions may play an equally important role in coordinating social interactions (Izard, 2001; Izard et al., 2001). In the context of ongoing social interactions, it may be that a relationship of dependency emerges between emotion perception and expressivity characterized by a reciprocal process of encoding, expressing, perceiving, and decoding emotion-related information. From this perspective, the normal flow of emotion-based communication, which is crucial to maintaining social interactions (Srivastava et al., 2009), may depend, in part, on perceiving expressions of emotion cues (Izard, 2001). It may be that the propensity for perceiving emotion-related information among individuals high on TEI enables them to keep up with and maintain the flow of emotion-based communication in the service of maximizing social outcomes during social interactions. The sustained flow of affective communication may, in turn, provide socially-relevant information about partners'

emotional states and social intentions that sufficiently prepares the individual to respond adaptively to social events (Izard, 2001; Izard et al., 2001; Keltner & Kring, 1998).

Disturbances in emotional responses may interrupt the flow of affective communication (Keltner & Kring, 1998; Srivastava et al., 2009). One such disturbance may be perceptual impairments generated by emotion perception dysfunction that is typical of low TEI. If low TEI individuals experience difficulties in discriminating and processing emotion expressive behavior (Petrides, 2009, 2011), they may struggle to keep up with the flow of emotion-based communication and, consequently, become less responsive to key emotion cues (Izard, 2001). This reduced responsiveness may lead to an irrevocable breakdown in emotion communication, generating situationally-inappropriate and socially-discordant behavioral responses that threaten social interactions and lead to poor performance in collaborative settings (Izard, 2001; Izard et al., 2001).

Taken together, in collaborative educational settings, dispositional emotion expressivity and perception among those high on TEI may regulate interpersonal relationships in ways that enhance students' ability to work together by sustaining the flow of emotion-based information between social partners. Disruptions to the normal exchange of emotion-related information, triggered by deficits in expressivity or perception typical of low trait, may result in situationally-inappropriate and socially-discordant responses that threaten the academic collaboration. These theorized effects involving interpersonal processes may be expected to weaken as a function of increasing academic level as academic collaboration becomes less frequent at higher levels of education (Perera & DiGiacomo, 2013).

Can TEI Ever Hinder Academic Achievement?

The theoretical arguments advanced in the preceding section suggest that TEI should be positively linked with achievement. Compared with people who are low in TEI, individuals with high TEI should be less impaired by negative emotions in academic settings

because they tend to regulate their emotions. They also tend to experience positive emotions that may broaden the repertoire of methods for engaging in task work and enhance attention to academic activities. Among these individuals, optimistic, positive emotionality, self-control, and self-motivation dispositions may regulate effort and attention towards the achievement of academic goals, and stable tendencies towards the expression and perception of emotion may confer an important advantage in adapting to the dynamics of academic collaboration. Altogether, these qualities of TEI appear to be uniformly adaptive in academic contexts.

The contribution of TEI to achievement may not, however, be altogether positive. In addition to encompassing affective-motivational self-regulative traits (e.g., optimism, positive emotionality, self-control, self-motivation), TEI encompasses sociability dispositions, such as a prosocial orientation and tendencies toward social activity, which may hamper achievement by leading the individual to socialize and pursue other social activities instead of attend to academic work (Chamorro-Premuzic & Furnham, 2003; De Raad & Schouwenburg, 1996). Furthermore, stable tendencies towards the management of others' emotions, reflected in TEI, may increase exposure to social stressors (e.g., managing others' problems), which could interfere with academic activities. This effect may assume prominence during key academic transitions (e.g., high school and college transitions) involving a lower level of academic structure and greater social opportunities. Consistent with TEI theory, the present account departs from the popular "EQ is good for you" perspective on EI (Petrides, 2011). There is, however, a need to reconsider the prevailing theoretical position concerning the TEI-achievement link to include the possibility of divergent effects of TEI.

Empirical Relations between TEI and Achievement

The last substantial narrative review of the relationship between TEI and achievement was published in 2011 (Mavroveli & Sánchez-Ruiz, 2011). The review provides an overview

of studies on the TEI-achievement link, covering the period from the inception of TEI theory into the mainstream scientific literature in the early 2000s to about 2011. The present update of empirical relations is therefore centrally concerned with studies published after this time, but including the empirical results reported by Mavroveli and Sánchez-Ruiz (2011).

Table 1 presents a summary of published research in the given time frame. In general, at the highest level of conceptual aggregation (i.e., global TEI), studies show a relatively consistent pattern of results indicating modest-to-moderate positively validity for TEI in the prediction of achievement (see Table 1). Even the non-significant associations of TEI with Year 3 students' SAT reading and writing achievement scores reported by Mavroveli and Sánchez-Ruiz (2011) were of a near-moderate magnitude. These findings regarding global TEI are consistent with the results of two meta-analytic studies of the relationship between TEI and achievement. First, Richardson et al. (2012) reported a measurement-error-corrected correlation of .17 for the association between EI and university students' achievement based on data from 14 studies. However, both ability and trait operationalizations of the construct were included in the computation of the summary effect, potentially obscuring the true effect of TEI. In a second meta-analysis, based on the synthesis of data from 47 independent samples and over 8700 participants, Perera and DiGiacomo (2013) obtained a near-moderate positive validity coefficient for the association of global TEI, operationalized using only self-report measures, with achievement ($r = .20$, 95% CI = .16–.24). The meta-analysis also revealed that age and academic level moderated the summary effect, such that (a) the effect increased as a function of decreasing age and (b) the effect was stronger in primary samples than tertiary samples, respectively. These findings of moderation are tentatively consistent with the earlier claim that the interpersonal processes linking TEI with achievement may assume prominence at lower levels of education when learning is typically more

collaborative. Taken together, these results suggest that TEI may confer a small, yet important, advantage in academic learning and testing contexts.

INSERT TABLE 1 ABOUT HERE

The summary of studies presented in Table 1 also suggests that the lower-order dimensions of TEI may be differentially implicated in achievement. For example, Rodeiro et al. (2012) found that the self-control and self-motivation dimensions of TEI were moderately predictive of achievement. These findings broadly accord with the earlier theorizing about the motivational processes triggered by self-control and self-motivation dispositions underlying the link between TEI and achievement. On the contrary, these researchers reported that the sociability dimension of TEI was virtually unrelated to achievement (Rodeiro et al., 2012). Furthermore, Saklofske et al. (2012) obtained a small negative coefficient for the association of sociability (operationalized via the interpersonal subscale of the EQ-i) with achievement. These results are somewhat consistent with the theorizing above regarding the potentially divergent effects of TEI on achievement.

Finally, the summary of studies in Table 1 shows that the association between TEI and achievement may be chiefly due to an indirect pathway. Perera and DiGiacomo (2015) examined the pathways through which TEI is linked with achievement in a sample of nearly 500 freshmen during the college transition. These researchers found that higher TEI was indirectly associated with better achievement via engagement coping strategies and academic engagement linked serially in a three-path mediated pathway. This finding is broadly consistent with the theorizing above concerning a pathway of increasing engagement, effort, and attention linking TEI with achievement. Interestingly, Perera and Giacomo found no evidence for a direct link between TEI and achievement, after accounting for the indirect pathway.

Conclusions and Future Directions

Despite considerable interest in the role of TEI in academic achievement, the specific theoretical mechanisms linking the constructs have received only little systematic attention (Perera & DiGiacomo, 2013, 2015; Petrides et al., 2004; Qualter et al., 2012). This dearth of theoretical clarity has led to a body of largely under-theorized empirical research efforts and impeded progress in understanding the nature of the association. The goal of the present paper was to provide (a) an overview of plausible theoretical mechanisms linking TEI with achievement and (b) an empirical update on research examining this association. On the basis of this work, three directions for future research are suggested.

Conceptual Alignment

The present review drew on well-established theories of emotion and regulation, such as social-functional and broaden-and-build accounts of emotion, expectancy-value theories of regulation and psychobiological models of motivation, to explicate plausible cognitive, motivational, and interpersonal processes underlying the trait EI-achievement link. This conceptual alignment of TEI with richer accounts of emotion and regulation was necessary given the absence of transparent explanatory accounts proffered by TEI theory for the TEI-achievement link. Indeed, though efforts have been made to tie TEI to the extant personality and self-concept literatures (Petrides & Furnham, 2001; Petrides, Pita et al., 2007), it is surprising that a construct, reflecting the human propensities to perceive, express, and regulate emotions, persevere, control impulses, and hold generalized favorable outcome expectancies, has been examined absent of the emotion and regulation literatures (Averill, 2004; Izard, 2001). Although these accounts of emotion and regulation have not historically been tied to TEI and emphasize different focal constructs, taken together, they provide a more complete picture of the ways in which TEI may be linked with achievement. Future research would do well to further align TEI with these richer accounts of emotion and regulation, on which the affective-motivational construct should be based, to better illuminate the ways in

which the construct is linked with achievement and other substantive criteria (e.g., health). This alignment is central to not only understanding the effects of such a high bandwidth construct but also connecting the nascent construct to the mainstream psychological literature.

Bandwidth vs. Fidelity

The evidence gathered in the present review also suggests that theory bearing on TEI may be advanced by examining the construct at lower-levels of conceptual aggregation (i.e., first-order factor or facet levels). There is increasing recognition that working with TEI at the highest level of conceptual aggregation (i.e., global TEI operationalized as composite total EI scores) may obscure meaningful links with plausible outcomes (Downey et al., 2010; Perera, 2015; Perera & DiGiacomo, 2013; Zeidner et al., 2012). This is because, as a high bandwidth construct, spanning many psychological systems, TEI encompasses several affective-motivational traits, ranging from emotion expressivity and positive emotionality to self-motivation and low impulsivity, which may be differentially implicated in various substantive criteria. For example, it is unlikely that positive emotionality (i.e., trait happiness) will be implicated in achievement to the extent that self-motivation is implicated. Further, it may even be that sociability dispositions contained in the TEI content domain are negatively related to achievement (Saklofske et al., 2012). What is clear is that the role of TEI in achievement cannot be understood adequately if its multidimensionality is ignored (Parker et al., 2011; Perera, 2015).

Although the examination of TEI at lower levels of conceptual aggregation may be theoretically informative and enhance fidelity, the scientific utility of TEI as a parsimonious representation of affective traits may be diminished by empirical disaggregation. This issue broadly resembles the bandwidth-fidelity trade-off observed in the mainstream personality literature in which the higher efficiency of broad bandwidth constructs is set against the

higher fidelity of more narrowly-conceived traits (Saucier & Goldberg, 2003; Saucier & Ostendorf, 1999). One of the chief advantages of the global TEI factor is that it serves an integrative function, unifying conceptually related affective personality traits (Petrides, 2011). For example, individual differences in the propensity to perceive, express, and regulate emotions in social interactions, which is straightforwardly reflected in the global TEI construct, would otherwise require some cumbersome combination of traits from existing personality frameworks to be adequately captured (Mickolajcazk et al., 2007). Further, to the extent that global TEI is a higher-order, efficient representation of affective traits that are partly scattered across extant personality and emotion taxonomies (Petrides, Pita et al., 2007), these TEI subcomponents may not show sufficient discriminant validity against established personality traits to be scientifically useful (Matthews, Zeidner, & Roberts, 2012). Future research would do well to examine the discriminant validity of the TEI subcomponents against theoretically-related constructs to determine the scientific utility of disaggregating the construct.

Intervening Mechanisms

Finally, TEI theory and research may be profitably advanced by isolating the specific processes or mechanisms through which TEI influences achievement. This direction for future research resembles Zeidner et al's (2012) recent call for greater attention to uncovering processes concerning the emotional intelligence-health relationship. While the empirical demonstration of total effects is important to the initial development of the nomological net of TEI, it is unlikely that the continued focus on the TEI-achievement total effect in the empirical literature will be theoretically informative. Indeed, the exclusive focus on total effects may even impede theory development, especially where suppression effects are expected (Rucker, Preacher, Tormala, & Petty, 2011). Future investigators are encouraged to empirically test some of the cognitive, motivational, and interpersonal mechanisms linking

TEI and achievement proposed in this review using robust multiwave designs with empirical tests of mediation (Perera & DiGiacomo, 2015). This focus on uncovering processes will serve to isolate the specific pathways through which TEI is associated with achievement (Petrides et al., 2004).

Concluding Comments

This paper commenced by noting that the TEI-achievement relationship has received little theoretical consideration in the scientific literature notwithstanding a good deal of empirical work. Only recently have researchers given systematic attention to the specific theoretical mechanisms linking the constructs (Qualter et al., 2012; Perera & DiGiacomo, 2013, 2015). The present review aimed to not only overview the possible theoretical links between TEI and achievement but also provide an empirical update. In totality, the theoretical arguments advanced and evidence gathered in the review suggest that TEI may confer benefits in academic learning and evaluation settings. This effect may be attributed to cognitive, motivational, and interpersonal processes. There may, however, be circumstances where the sociability dispositions of TEI hinder achievement, and future investigators would do well to further examine this issue. The review also highlights the need to (a) integrate TEI with richer accounts of emotion and regulation, (b) examine the construct at lower levels of conceptual aggregation, and (c) uncover underlying pathways to better understand the role of TEI in achievement. Given the arguments proposed and evidence gathered in this review, the challenge of clarifying the TEI-achievement relationship would seem to be well worthwhile.

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Table 1.

Summary of Studies on the Relationship between TEI and Academic Achievement.

Study	TEI measure	Achievement measure	Sample	Effect
Mavroveli & Sánchez-Ruiz (2011)	TEIQue-CF	Key Stage 1 scores in math, reading, and writing	$N = 565$ (50.6% female) primary school children; $M_{age} = 9.12$ (SD = 1.27; range 7 – 12); UK	• TEI was positively related to year 3 students' math achievement ($r = .25$, $p < .01$). • TEI was not significantly related to year 3 students' SAT reading ($r = .17$, $p > .05$) or writing ($r = .18$, $p > .05$) achievement. • For students in years 4–6, all correlations of TEI with SAT scores were not statistically significant. [a]
Rodeiro, Emery, & Bell (2012)	TEIQue	GCSE results	$N = 874$ (50.5% female) British secondary school students; $M_{age} = 16.35$ (SD = 0.30); UK	• TEI significantly predicted mean GCSE attainment ($\beta = .22$, $SE = .05$), controlling for prior achievement and gender. • The Well-Being ($\beta = .10$, $SE = .03$), Self-Control ($\beta = .22$, $SE = .04$), Emotionality ($\beta = .11$, $SE = .04$) and Self-Motivation ($\beta = .21$, $SE = .03$) lower-level components also significantly predicted achievement in separate regression equations, controlling for prior achievement and gender. • The Sociability ($\beta = .02$, $SE = .04$) and Adaptability ($\beta = .05$, $SE = .03$) components of TEI did not significantly predict achievement.
Qualter, Gardner, Pope, Hutchinson, & Whiteley (2012)	EQ-i: YV	GCSE scores in English, math, and science used as indicators of latent achievement	$N = 411$ (52.1% female) students attending a secondary school in Lancashire ; TEI data collected in year 7; Achievement data collected in	• Initial (year 7) TEI significantly predicted later (year 11) GCSE performance for boys only ($\beta = .09$, $p < .05$), controlling for cognitive ability and ability EI.

			year 11; UK	

Table 1 (continued).

Study	TEI measure	Achievement measure	Sample	Effect
Saklofske, Austin, Mastoras, Beaton, &Osborne (2012)	EQ-i: S	Mean end-of-year grades	$N = 238$ (77.7% female) undergraduate students attending the University of Edinburgh; $M_{age} = 20.03$ (SD = 4.69); achievement data available for 163 students; UK	• The Interpersonal ($r = -.10$, $p > .05$), Intrapersonal ($r = .06$, $p > .05$), Stress management ($r = .05$, $p > .05$), and General Mood ($r = .09$, $p > .05$) subscales of the EQ-i-SF, administered at the beginning of the academic year, were not statistically significantly associated with year-end achievement. • The Adaptability subscale of the EQ-i-SF was significantly and positively associated with achievement ($r = .17$, $p < .05$)
Fernandez, Salamonson, & Griffiths (2012)	TEIQue-SF	GPA at six months after course start	$N = 81$ (80.2% female) students enrolled in an accelerated nursing program; $M_{age} = 29.0$ (SD = 6.5); Australia	• TEI was a statistically significant predictor of academic achievement ($\beta = .25$, $p < .05$) in a regression model with extrinsic goal orientation.
Agnoli, Pozzoli, Russoe, & Surcinelli (2012)	TEIQue-CF	Year-end grades in Language and Math	$N = 352$ (53.4%) school children in third to fifth grade; $M_{age} = 9.35$ (SD = 0.80); Italy	• TEI positively predicted end of year language ($\beta = .18$, $p < .01$) and math ($\beta = .14$, $p < .05$) achievement, controlling for age, gender, emotion recognition ability, and cognitive ability • TEI moderated the relationship between cognitive ability and language achievement, such that higher TEI was associated with better achievement across low (-1 SD) and average IQ scores.
Sanchez-Ruiz, Mavroveli,	TEIQue-SF	GPA	$N = 323$ (35.0% female)	• TEI predicted later GPA ($\beta = .24$, $p < .001$), controlling for the effects of fluid intelligence

| & Poullis (2013) | | | university students attending two English-speaking universities in Cyprus; M_{age} = 23.00 (SD = 1.65); Cyprus | and the Big-Five personality dimensions. |

Table 1 (continued).

Study	TEI measure	Achievement measure	Sample	Effect
Brouzos, Misailidi, & Hadjimattheou (2014)	EQ-i: YV	Year-end grades in math and Greek over a two-year periods (mean for each subject computed)	N = 205 (49.8% females) primary school-age children; M_{age} = 10.01 (*SD* = 1.42; range = 8–12 years); Cyprus	• Global trait EI was significantly associated with math (r = .34, p < .01) and Greek (r = .37, p < .01) achievement in 11–13 year olds but not 8–10 year olds.
Costa & Faria (2015)	ESCQ	GPA; Year-end grades for three consecutive years (10th, 11th and 12th grades) in Portuguese and math	N = 380 (54.2% female) Portuguese secondary school students; M_{age} = 15.4 (SD = 0.71); Portugal	• TEI in 10th grade predicted 10th grade GPA (β = .14, p <.05) and 10th grade mathematics grades (β = .12, p < .05), holding constant ability EI; however, no effects were observed for later GPA and mathematics grades • TEI did not predict year-end Portuguese grades
Perera & DiGiacomo (2015)	TEIQue-SF	End of first semester GPA	N = 470 (61.7 % female) freshmen attending an Australian university; M_{age} = 17.80 (SD = .72);	• The total effect of TEI on achievement (i.e., zero-order relationship) was small and non-significant (r = .05, p > .05) • TEI was indirectly associated with achievement via academic adjustment and engagement coping linked serially in a three-path mediated effect (γββ = .14, 95% BC CI [.06-.22]) • Evidence of inconsistent

Siegling, Vesley, Saklofske, Frederickson, & Petrides (2015)	TEIQue-ASF	National Curriculum Levels in English, math, and science	Australia N = 357-491 (range = 11-13) adolescents and pre-adolescents attending four secondary schools in South-East England; UK	mediation in the data • TEI was a significant positive predictor of Grade 7 English (β = .12, p < .01) and science (β = .08, p < .05) achievement but not mathematics scores (β = .04, p > .05), controlling for gender and cognitive abilities. • TEI was a significant positive predictor of Grade 8 English (β = .25, p < .001), science (β = .15, p < .01), and mathematics (β = .10, p < .05) achievement, controlling for gender and cognitive abilities.

Note. [a] The absolute sizes of these coefficients were not reported in the original study. EQ-i: S = Emotional Quotient Inventory: Short; EQ-i: YV = Emotional Quotient Inventory-Youth Version; TEIQue: Trait Emotional Intelligence Questionnaire; TEIQue-CF = Trait Emotional Intelligence Questionnaire-Child Form; TEIQue-SF = Trait Emotional Intelligence Questionnaire-Short Form; TEIQue-ASF = Trait Emotional Intelligence Questionnaire-Adolescent Short Form; ESCQ = Emotional Skills and Competence Questionnaire. GCSE = General Certificate of Secondary Education. BC = bias-corrected; CI = confidence interval.