

Coping mediates the relationship between emotional intelligence (EI) and academic achievement

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ABSTRACT

Research examining the relationships between performance measures of emotional intelligence (EI), coping styles, and academic achievement is sparse. Two studies were designed to redress this imbalance. In each of these studies, both EI and coping styles were significantly related to academic achievement. In Study 1, 159 community college students completed the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) and problem-focused, emotion-focused, and avoidant coping scales. Collectively, the coping variables significantly mediated the relationship between EI and grade point average (GPA) for Emotion Perception, Emotion Facilitation of Thought and Emotion Management (but not for Emotional Understanding). Problem-focused coping was the only single significant mediator, mediating the relationship between emotion management and GPA (but not other branches and GPA). In Study 2, 293 middle school students completed the Situational Test of Emotion Management for Youths (STEM-Y) and scales measuring the same three coping strategies. In this study, the coping variables again significantly mediated the relationship between emotion management and GPA. Once again, problem-focused coping was a significant mediator. Collectively, these results suggest that better educational outcomes might be achieved by targeting skills relating to emotion management and problem-focused coping.

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1. Introduction

The idea that academic achievement is related to social and emotional adjustment to the school environment has recently received considerable attention from the fields of economics, social and emotional learning, and positive psychology (see e.g., Goetz, Frenzel, Pekrun, & Hall, 2005; Kyllonen, Lipnevich, Burrus, & Roberts, in press; Zeidner, Matthews, & Roberts, 2009). Educational success requires self-regulated learning practices, sustained effort, managing time demands and academic stress, as well as successfully navigating the social landscape. Two constructs hypothesized to affect academic achievement through these social and motivational pathways are emotional intelligence (EI) and coping styles. The initial focus of research in this area was on the relationship between EI and academic achievement (e.g., Barchard, 2003) and between EI and coping (e.g., Bastian, Burns, & Nettlebeck, 2005). More recent studies of EI in educational settings have begun to explore the ways in which cognitive ability, EI, coping, and related

variables interact to influence performance outcomes (e.g., Hogan et al., 2010).

The current study contributes to this relatively unexplored area by testing a model that depicts coping as a mediator of the EI-academic achievement relationship. The somewhat sparse research linking coping and EI with academic achievement has employed self-report Likert-type rating scales of EI, most often administered to first-year psychology participants (see Zeidner, Matthews, & Roberts, 2006). The focus on one method of measurement (Likert-type rating scales) may restrict the generality of findings because relations involving EI vary markedly depending on how EI is measured (Mayer, Roberts, & Barsade, 2008). For this reason, the current research uses two alternatives to Likert-type self-ratings: (a) a well-known set of EI ability scales – the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, Caruso, & Sitarenios, 2003) and (b) a situational judgment test assessing emotion management – the Situational Test of Emotion Management for Youths (STEM-Y; MacCann, Wang, Matthews, & Roberts, 2010). If the mediation model replicates across the two different measures of emotion management, this constitutes evidence that findings are not instrument-specific. Further, in the current paper we attempt to replicate findings in two very different and under-studied populations, namely, students in vocational

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education training (Study 1) and eighth-graders completing middle school (Study 2). The aim is to generalize findings across different populations as well as different instruments.

There is potentially both theoretical and applied knowledge to be gained by considering the role of EI and coping as essential mechanisms through which students at all levels adapt to challenging learning environments. The literature review that follows deals firstly with the definition of EI and some important considerations related to its measurement. The nature of coping is then described, along with conjectures from the available literature about the likely association between EI and different coping styles. The final section of this introduction proposes a mediation model that captures the relations among EI, coping, and academic achievement.

2. Emotional intelligence and its measurement

The most commonly accepted theoretical model of EI is the four-branch hierarchical model (e.g., Mayer et al., 2008). In this model, EI consists of four subcomponent branches: (a) *emotion perception* (the perception and expression of emotions); (b) *emotional facilitation of thought* (the knowledge and skills needed to use emotional states to facilitate problem-solving); (c) *emotional understanding* (an awareness of how emotions may combine, and how emotions relate to situations and time courses); and (d) *emotion management* (the strategic management of one's own and others' emotions, involving the ability to ameliorate negative emotions and maintain positive emotions). There is a proposed hierarchy among these four branches, such that abilities involved in the higher branches (understanding and management) are dependent on abilities in the lower branches (perception and facilitation). In fact, the lower two branches (perception and facilitation) are collectively known as the "Experiential EI" area, which is concerned with a person's direct experience of the world, and involves basic information processing of surrounding emotional stimuli. In contrast, the higher two branches (emotional understanding and emotion management) are collectively known as the "Strategic EI" area, which involves more complex, considered, and strategic use of the emotional information, as opposed to basic perceptual processing (Mayer et al., 2008).

The concepts within the EI framework bear some similarity to constructs from other fields. For example, Gross' (1998) research on emotion regulation has a strong conceptual link to the EI component of emotion management (Mayer et al., 2008; Zeidner et al., 2009). Further, much of the work on emotion recognition ability (e.g., Matsumoto et al., 2000; Scherer, Banse, & Wallbott, 2001) has strong conceptual links to the EI component of emotion perception. Despite these clear conceptual links, empirical and theoretical research linking these different domains is in its infancy (Roberts et al., 2006). With additional research, an empirical mapping between domains should become possible, such that findings and models can be integrated across different research domains.

Mayer, Salovey, and Caruso (2000) delineate different measurement models of EI into two broad varieties: (a) *ability EI*, which is assessed as maximum performance, shows empirical relationships to intelligence, and measured by objective tests such as the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2003); and (b) *trait EI*, which is assessed as typical performance, relates to the personality domain and relies heavily upon Likert-type rating scales. Because these different approaches are only weakly related, the relationship between EI and constructs such as coping and academic achievement depends critically upon whether EI is measured using "ability EI" or "trait EI" tests (e.g., Barchard, 2003; Matthews, Zeidner, & Roberts, 2003). Indeed, self-report rating scale measures of EI tend to correlate with other self-report

rating scales, such as personality, whilst objective measures of EI tend to correlate with cognitive performance (Bastian et al., 2005).

The fact that the two EI measurement paradigms can give rise to differing validity coefficients has implications for any study that seeks to ascertain the role of EI within a nomological network because the strength of the relations depends on the particular method used to measure EI. The vast majority of research linking EI and coping has used rating scale measures rather than performance measures of EI. Using rating scales to measure both EI and coping may over-estimate the relationship of EI with coping, but under-estimate the relationship between EI and achievement, since self-ratings measure self-perceptions of one's emotional skills rather than the skills themselves (e.g., Zeidner et al., 2006). The current study is the first to consider whether coping mediates the relationship between EI and achievement using performance measures of EI.

3. Coping processes

Current transactional models of stress view coping as a process that intervenes between the appraisals of stressors (both personal and environmental) and the immediate and long-term effects of the stressor, including emotional states, chronic physiological and psychological conditions, and situational outcomes (Lazarus, 1999). Coping has been defined as a person's efforts to remove, reduce, or manage threatening events or situations that are appraised as challenging or stressful (Lazarus & Folkman, 1984). Cognitive appraisals of potentially stressful stimuli are critical in this coping process, as are the resulting emotions. Ideally, *adaptive* coping should lead to a permanent problem resolution with no additional residual outcomes, while maintaining a positive emotional state.

In the early formulations of stress and coping theory (Lazarus & Folkman, 1984), a distinction was made between problem-focused coping processes (directed at altering the environmental demands placed on the person) and emotion-focused coping processes (involving attempts to regulate emotions surrounding the stressful encounter). The latter term is potentially confusing because, as already acknowledged, emotions are central to coping processes. The key word is "focus" and both terms (problem-focused coping and emotion-focused coping) capture individual differences in characteristic ways of dealing with stress. They are also known as ways of coping or styles of coping and they have implications for performance outcomes (Skinner & Zimmer-Gembeck, 2007).

Theorists have frequently emphasized the positive effects of problem-focused coping on psychological outcomes, especially when the threatening situation can be ameliorated by the person's responses (Zeidner & Saklofske, 1996). In fact, this form of coping is preferred by most people and is highly effective in stress reduction, providing a sense of mastery over the problem (Zeidner & Saklofske, 1996). Emotion-focused coping, which may help in maintaining emotional balance by effectively channeling and venting negative emotions or building up positive emotions, is not generally so effective. An adaptive response to remediable situations still requires problem-focused activities in order to effectively remove or ameliorate the threat. However, coping effectiveness is both context-specific and related to the specific encounter (Folkman & Moskowitz, 2004), meaning that what works in one situation may not work in another. Emotion-focused coping may in fact be the strategy of choice when the source of stress is unclear, little can be done to eliminate the stressor, or there is a lack of knowledge about how to modify the stressor (Lazarus, 1999). A third category introduced in the literature (Parker & Endler, 1996) – avoidant coping – reflects negative responses to stressors such as denial, drug taking, and mental disengagement. This form of coping is unlikely to lead to beneficial outcomes in any situation.

Coping is a very complex construct and it is possible to list more ways of coping than we have described here. Skinner and Zimmer-Gembeck (2007) listed as many as 12 “families” of coping but the focus of the present study is on these three broad categories and the above definitions lead to a set of predictions which will later be depicted as part of a mediation model (Fig. 1). Before dealing with this model, however, we consider the relationship between coping and EI.

4. Coping and emotional intelligence

Some of the newer models and definitions of coping draw upon emotion research, linking the constructs of EI and coping quite closely (Folkman & Moskowitz, 2004; Skinner & Zimmer-Gembeck, 2007). Even prior to these developments, a strong link was posited between EI and coping. People high in EI are thought to be better equipped to deal with stressful events. Their ability to accurately perceive, understand, and manage their own and other peoples' emotions should result in better coping skills (Salovey, Bedell, Detweiler, & Mayer, 2000). Zeidner et al. (2006) suggested various ways in which EI can help individuals to deal with (or in certain instances, avoid) stress. These methods include: (a) avoidance of stressful encounters; (b) more constructive perceptions and situational appraisals; (c) adaptive management and repairing of emotions; (d) richer coping resources; and (e) use of effective and flexible coping strategies. Coping features prominently in almost all of these explanations.

Zeidner et al. (2006) summarized much of the research linking EI and coping, noting that correlations among these constructs range between .20 and .60. The strength and direction of the relations differ markedly depending on the way EI is measured (using self-report versus performance scales) as well as the way in which different coping styles have been delineated. In summarizing the available literature, we thus consider trait EI and ability-based EI separately, and consider coping in terms of three broad categories: Problem-focused, emotion-focused, or avoidant coping.

Trait EI shows a consistent positive relationship to problem-focused coping, with correlations mainly at the $r = .30$ to .40 level (Austin, Saklofske, & Mastoras, 2010; Downey, Johnston, Hansen, Birney, & Stough, 2010; Mikolajczak, Nelis, Hansenne, & Quoidbach, 2008; Mikolajczak, Petrides, & Hurry, 2009; Rogers, Qualter, Phelps, & Gardner, 2006; Saklofske, Austin, Galloway, & Davidson, 2007). Trait EI also shows a consistent negative association with emotion-focused coping, at around the $r = -.30$ level (Austin et al., 2010; Mikolajczak et al., 2008, 2009; Saklofske et al., 2007). Relationships of trait EI with avoidant coping tend to be trivially small but consistently negative (Austin et al., 2010; Mikolajczak et al., 2009; Rogers et al., 2006).

The findings are less clear where ability EI is concerned, largely because there are so few studies. Both Matthews et al. (2006) and

Peters, Kranzler, and Rossen (2009) found that MSCEIT scores showed a negative relationship with emotion-focused coping ($r = -.19$ and $-.46$, respectively) and no relationship with problem-focused coping. Matthews et al. also found a small negative relationship with avoidance-focused coping ($r = -.16$). However, Goldenberg, Matheson, and Mantler (2006) found a positive relationship between problem-focused coping and the emotion management branch of the MSCEIT (with no significant relationship for the other branches). Bastian et al. (2005) found no relationship between any of the MSCEIT branches and total scores on the COPE. Based on these results, we might expect that only the emotion management branch will relate to problem-focused coping, but that all branches might show moderate negative relationships to emotion-focused coping, and possibly small negative relationships to avoidant coping. Both EI and coping were expected to influence academic success, for reasons which we now outline.

5. Emotional intelligence and coping as predictors of academic success

Research attests that both ability and trait measures of EI relate to academic success (Ashkanasy & Dasborough, 2003; Barchard, 2003; Downey, Mountstephen, Lloyd, Hansen, & Stough, 2008; MacCann & Roberts, 2008; Parker, Summerfeldt, Hogan, & Majeski, 2004; Petrides, Fredrickson, & Furnham, 2004, cf. however, Amelang & Steinmayr, 2006; Rossen & Kranzler, 2009). Research further suggests that the different component branches within ability EI show different levels of relationship to achievement. Perception of emotions and the use of emotions to facilitate thought show little relationship to academic success, whereas understanding and managing emotions are clearly linked with academic achievement, with the strongest relationship for emotional understanding (e.g., Barchard, 2003; MacCann & Roberts, 2008; O'Conner & Little, 2003; Rode et al., 2008).

There are several possible pathways by which emotional intelligence may influence academic achievement (see e.g., Goetz et al., 2005). First, students who can regulate their negative emotions may be less impaired by negative emotions in assessment and learning situations. Depending on the degree of emotional control they possess, such students may even be able to generate positive emotions that facilitate performance (Pekrun et al., 2004). Second, academic success requires not just passing tests, but increasingly requires collaboration in the form of group projects and presentations (Ahles & Bosworth, 2004). EI, particularly emotion management, has been linked with better social relationships, such that high EI individuals may be better able to maintain the social relationships required for effective group work (Lopes, Salovey, & Straus, 2003). Third, the ability to make connections and maintain social relationships may be important not only for gaining high grades on group assessments, but more generally for maintaining social support and well-being in the educational environment (Linnenbrink-Garcia, Rogat, & Koskey, 2011; Parker, Summerfeldt et al., 2004; Wang, MacCann, Zhuang, Liu, & Roberts, 2009). At the procedural level, all three of these pathways suggest that higher EI should predict grades through the ability to cope with stressors such as assessment, the dynamics of group collaboration, or the social and emotional demands of academic life.

Within the broad context of learning, problem-focused coping should assist students in adjusting to the many challenges posed by the school environment, whereas avoidant coping is expected to restrict learning and to hinder school adjustment. As pointed out above, emotion-focused coping may help or hinder depending on such factors as controllability, so no predictions were made about its relationship with achievement. These hypothetical links formed the basis of a conceptual model which is described below.

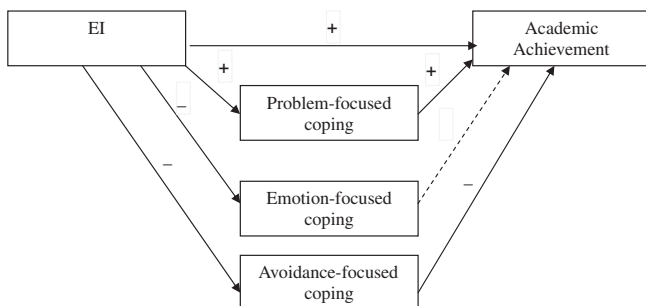


Fig. 1. Hypothesised path values expected when testing a mediation model where coping variables mediate the effect of EI on academic achievement. Signs on the paths indicate the expected directions of the relationships, and dotted pathways indicate no specific hypotheses about the relationship.

6. A Conceptual model linking emotional intelligence, coping, and academic achievement

In the sections above, we have argued that EI leads to more effective coping which in turn leads to better outcomes. Zeidner et al. (2006) stated that it has yet to be established that the coping styles characteristic of high EI individuals actually confer any real benefits in terms of wellbeing, behavioral adaptation, or health. We addressed this issue in these two studies by testing for possible mediating roles of three types of coping on the relationship between EI and academic success. The hypotheses of both studies are captured in the path model shown in Fig. 1. The signs on the pathways indicate the expected direction of the relations. The dotted pathways indicate that there is no clear hypothesis about the direction or strength of the relationship. Because the benefits of emotion-focused coping are much more situational, depending on whether situations are controllable or uncontrollable – and conceivably in school settings controllability is a feature that changes all the time – we made no predictions about how emotion-focused coping would relate to GPA. Based on prior research, we expect some of these relationships to differ by EI branch. More specifically, we expect that: (a) the relationships between EI and academic achievement will be stronger for understanding and management branches than for perception and facilitation branches, and (b) the relationship between EI and problem-focused coping may be stronger for emotion management than the other three branches.

7. Study 1

The first study was based on the four-branch hierarchical model of EI proposed by Mayer and Salovey (1997). The four branches correspond to Emotion Perception, Emotion Facilitation, Emotional Understanding, and Emotion Management. Separately considering all four branches of EI enabled us to identify whether particular aspects of EI are more important than others in predicting academic achievement. We propose the following hypotheses. First, all branches of EI will relate to academic performance, although Emotional Understanding should evince the highest correlation, with Emotion Management also showing a moderate correlation with GPA. Second, coping styles, particularly problem-focused coping, are expected to predict academic achievement, mediating the relationship between EI subscales and academic performance.

7.1. Method

7.1.1. Participants

A sample of 159 (77 male) US Community College students with a median age of 20 years ($M = 23.43$, $SD = 8.11$, Range = 17–56) participated in Study 1. The sample was drawn from five different community colleges located in Oklahoma, Georgia, Michigan, Nebraska, and Colorado. In terms of ethnicity, 102 students self-identified as being White, 19 as African American, 20 as Hispanic, 8 as Asian; the remaining 10 reported as belonging to other ethnic groups.

7.1.2. Measures

7.1.2.1. Mayer, Salovey, and Caruso Emotional Intelligence Test Version 2.0 (MSCEIT). The online form of this ability-based test was used. The MSCEIT test battery consists of two marker tests for each of the four branch scores: (a) Emotion Perception (Faces and Pictures), (b) Emotion Facilitation (Facilitation and Sensations), (c) Emotional Understanding (Changes and Blends), and (d) Emotion Management (Emotion Management and Emotional

Relationships). A detailed description of each of these tasks is given in Mayer et al. (2003; see also Mayer et al., 2008).

7.1.2.2. Coping with School Situations (CWSS). In this 24-item scale, test-takers rated how often they had engaged in several behaviors indicative of problem-focused, emotion-focused, and avoidant coping across two situations that preface the items (classes and assignments versus preparing for and taking tests; MacCann, Lipnevich, Burrus, & Roberts, 2009). Example items included: (a) “I break my assignments into more manageable pieces and tackle them one by one” (*problem-focused coping*, eight items), (b) “I blame my professors for putting me into this situation” (*emotion-focused coping*, 10 items), and (c) “I postpone studying as much as I can” (*avoidant coping*, six items). Respondents were asked to rate how often they perform each behavior on a five-point Likert scale ranging from (1) “Almost Never” to (5) “Almost Always”. The different coping styles were equally balanced across the two situations, with scores aggregated across coping styles rather than contexts.

7.1.2.3. Grade point average (GPA). The measure of academic achievement was the students’ self-reported cumulative grade point average (GPA) over their college experience to date.

7.1.3. Procedure

Testing took place at computer laboratories, one student per workstation. All sessions were proctored by college staff who were provided with a supervisor’s manual and training before testing sessions commenced. Students were compensated for their participation in this study, receiving \$US120 cash after they had completed the entire test battery. All tests and protocols were approved under the Educational Testing Service human ethics review committee and fairness review process.

7.2. Results

7.2.1. Descriptive statistics and correlations between variables

Table 1 provides means and standard deviations for each of the measures. In addition, the table reports correlations between each of the measures and their relationship to the outcome variable, grade point average. Discussion of relations between variables of importance to the main hypotheses follows.

In accordance with our first hypothesis, all branches of EI predicted GPA. However, our expectation that Emotional Understanding would show the strongest relationship was not met. In fact, Emotion Management showed the strongest relationship with GPA. As hypothesized, GPA showed a smaller relationship with Emotion Perception than with the other three branches. The difference in magnitude was significant for Facilitation and Emotion Management compared to Emotion Perception ($p < .05$, 1-tailed, using pair-wise comparisons based on Cohen & Cohen’s (1983) procedure). The difference in magnitude was not significant for Emotional Understanding compared to Emotion Perception.

Emotion-focused coping showed a significant negative correlation with all four EI branches, smaller for Emotion Perception than the other branches. Avoidant focused coping showed a significant negative correlation with Emotion Facilitation, Emotional Understanding, and Emotion Management, but was not significantly related to Emotion Perception. Only the Emotion Management subscale was significantly related to problem-focused coping.

All three measures of coping were significantly correlated with GPA. Problem-focused coping correlated positively with GPA, whereas emotion-focused and avoidant coping correlated negatively. The relationship between coping styles and GPA was strongest for problem-focused coping.

Table 1
Descriptive statistics, reliability and correlations among EI, Coping, and Grade Point Average ($N = 159$).

Variable	Descriptive statistics			Correlations							
	Mean	SD	α	1	2	3	4	5	6	7	
1. MSCEIT Perception	.49	.13	.91								
2. MSCEIT Facilitation	.39	.13	.87	.68**							
3. MSCEIT Understanding	.41	.13	.89	.54**	.78**						
4. MSCEIT Management	.32	.12	.91	.48**	.64**	.72**					
5. Problem-focused coping	27.43	4.67	.72	.12	.15	.08	.22**				
6. Emotion-focused coping	16.47	4.53	.68	-.22**	-.36**	-.36**	-.32**	-.12			
7. Avoidant coping	21.74	5.57	.85	-.07	-.26**	-.25**	-.26**	-.24**	.58**		
8. GPA	3.22	0.51	–	.22**	.39**	.37**	.44**	.35**	-.24**	-.19*	

* $p < .05$.

** $p < .01$.

7.2.2. Coping as a mediator of the relationship between EI and GPA

For each of the four EI branches, we tested whether the relationship between EI and GPA was mediated by the three coping variables, using the model shown in Fig. 1. We used Preacher and Hayes' (2008) SPSS macro to calculate the following estimates: (a) standardized paths from EI to GPA (before and after controlling for the three coping variables), (b) standardized paths from EI to the three coping variables, (c) standardized paths from the three coping variables to GPA, (d) total indirect effects (the combined effect of the three pathways from EI to GPA through problem-focused, emotion-focused, and avoidant coping), and (e) the three specific indirect effects (the separate indirect effects of EI on GPA through problem-focused, emotion-focused, and avoidant coping). We used 5000 bootstrap samples to calculate 95% bias-corrected confidence intervals for the indirect effects. We also report the product of coefficients test (equivalent to the Sobel test), used to assess the significance of the indirect effects. Path coefficients are shown in Fig. 2, and the indirect effects (with bias-corrected confidence intervals) are shown in Table 2. Results are described below for each of the four EI branches.

7.2.2.1. Emotion Perception. Although the relationship between Emotion Perception and GPA remained significant after controlling for coping, bias-corrected confidence intervals as well as the Sobel test indicated that the three coping variables collectively showed significant mediation of the Perception–GPA relationship. However, no single one of the three coping variables was a significant mediator in its own right.

7.2.2.2. Emotion Facilitation. The relationship between Facilitation and GPA was still significant after controlling for coping, decreasing from .39 to .32. However, both confidence intervals and the Sobel test indicated that the three coping variables collectively showed significant mediation of the Facilitation–GPA relationship. As for Emotion Perception, none of the three coping variables was individually a significant individual mediator of the EI–GPA relationship.

7.2.2.3. Emotional Understanding. Coping variables did not significantly mediate the relationship between Emotional Understanding and GPA. Both the Sobel test and the confidence intervals showed that the indirect effects were not significant.

7.2.2.4. Emotion Management. Total indirect effects were significant for Emotion Management, indicating that three coping variables collectively showed significant mediation of the between Management/GPA relationship. In addition, problem-focused coping was also a significant mediator in its own right.

7.3. Discussion

Results from Study 1 show that coping is most strongly linked with the emotion management branch of EI (all three coping mechanisms showed significant relationships to emotion management) and least strongly linked with emotion perception (which was only related to emotion-focused coping). The consistent negative link between EI and emotion-focused coping may seem counter-intuitive, since superior emotion processing and knowledge might be assumed to lead to better emotion-related strategies for coping. However, the Coping with School Situations (CWSS) instrument conceptualizes and measures emotion-focused coping primarily in terms of self-blame, rumination, venting, and catastrophizing, rather than positive re-appraisal or seeking social support. Given this emphasis on the more detrimental aspects of emotion-focused coping, the negative relationship between EI and emotion-focused coping appears conceptually plausible.

Emotional intelligence was related to academic achievement. This relationship was weaker for emotion perception than for the higher branches. The greater role for the higher branches (Strategic EI) than the lower branches (Experiential EI) in accounting for valued outcomes has been noted in previous research, although results have been inconsistent for the facilitation branch (e.g., Mayer et al., 2008). However, a recent meta-analysis has demonstrated that emotional management shares a very weak correlation with cognitive ability whereas the relationship between emotional understanding and cognitive ability is quite substantial (Roberts, Schulze, & MacCann, 2008). Given this robust finding, the relationship between emotion understanding and GPA may be explained by cognitive ability, but the relationship between emotion management and GPA would appear to be due to other factors. Results from the mediation analysis in this study suggest that at least part of the reason emotion management relates to GPA is due to the use of problem-focused coping. Individuals with higher emotion management use more problem-focused coping, which in turn is associated with higher grades. In Study 2, we focus on emotion management particularly, examining whether the effect is generalizable to different populations using a different instrument for the assessment of emotion management.

8. Study 2

Study 1 demonstrated that emotion management predicted GPA, but this relationship was partly mediated by problem-focused coping. Study 2 was designed to test whether these findings would apply to a middle school sample using a different measure of emotion management. Previously, scholars have cautioned against mono-method biases in EI research: When all research is conducted using the MSCEIT test battery, it is possible that findings are test-specific rather than construct-related (MacCann & Roberts,

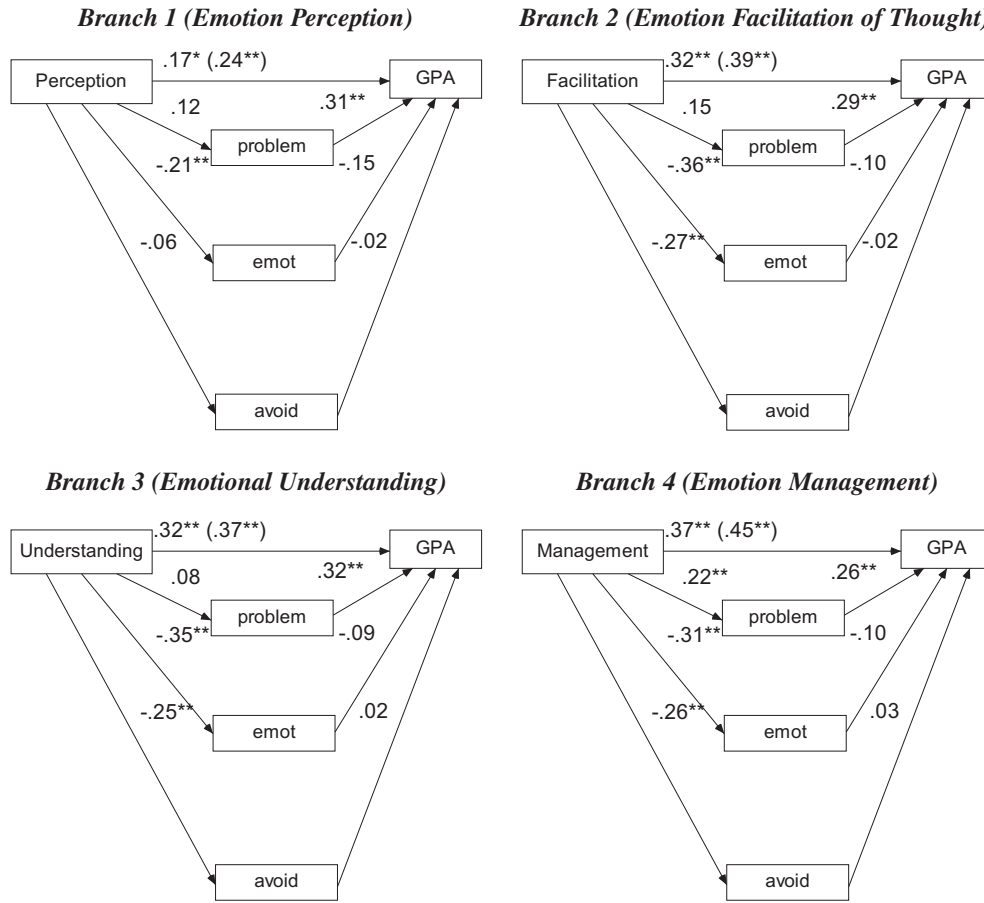


Fig. 2. Multiple mediation models testing whether coping variables mediate the relationship between EI and GPA (path models were run separately for each EI branch with and without coping mediators, with the value without mediators shown in parentheses).

Table 2

Mediation of the effect of emotional intelligence on grade point average through problem-focused, emotion-focused, and avoidant coping (standardized estimates shown).

Variable	Point estimate	Product of coefficients (z)	Bootstrapping (95% CI, bias corrected)	
			Lower limit	Upper limit
<i>MSCEIT Perception</i>				
Problem-focused	.037	1.434	-.010	.100
Emotion-focused	.030	1.381	-.002	.095
Avoidant	.001	0.197	-.009	.029
Total	.068	2.025*	.008	.156
<i>MSCEIT Facilitation</i>				
Problem-focused	.044	1.705	-.000	.108
Emotion-focused	.067	1.149	-.023	.112
Avoidant	-.005	-.208	-.050	.036
Total	.076	2.040*	.010	.161
<i>MSCEIT Understanding</i>				
Problem-focused	.024	0.939	-.029	.084
Emotion-focused	.031	0.993	-.025	.107
Avoidant	-.006	-.277	-.045	.035
Total	.049	1.326	-.018	.129
<i>MSCEIT Management</i>				
Problem-focused	.056	2.257*	.017	.127
Emotion-focused	.030	1.104	-.016	.103
Avoidant	-.007	-.335	-.050	.029
Total	.081	2.364*	.022	.161

* p < .05.

2008; Roberts et al., 2008). For this reason, we attempt to replicate the results of Study 1 not only in a different population, but using a different measure of emotion management: The Situational Test of Emotion Management for Youths (STEM-Y; MacCann et al., 2010). Thus, this study examines the relationship between EI and achievement for the emotion management branch only, but will include all three coping variables as mediators, in order to replicate Study 1 findings for emotion management.

The STEM-Y is a situational judgment test (like the two emotion management scales from the MSCEIT), which presents the test-taker with a written description of a situation with several possible responses. In contrast to the MSCEIT, the STEM-Y uses slightly different instructions (i.e., the test-taker is asked “what would you do in this situation?” rather than “how effective is each response?”). The STEM-Y was constructed using a critical incident methodology, rendering it more ecologically valid than the MSCEIT Emotion Management subtests (MacCann & Roberts, 2008). In any case, the adult version of the MSCEIT is inappropriate for this age range, as the tests were developed and normed based on adult samples, and involve adult concepts (e.g., items refer to scenarios involving driving cars and workplace scenarios). Thus, Study 2 tests whether the finding that problem-focused coping mediates the relationship between emotion management and GPA generalizes to the construct of emotion management and middle school students rather than being unique to the MSCEIT testing paradigm or community college students.

8.1. Method

8.1.1. Participants

Participants (383 eighth-grade students, 49% female) were recruited from five sites across the USA: Atlanta (Georgia), Chicago (Illinois), Denver (Colorado), Fort Lee (New Jersey), and Los Angeles (California). The sample is part of a longitudinal study tracking these students from middle school to high school on a number of noncognitive variables (see e.g., Lipnevich, MacCann, Krumm, & Roberts, in press; Liu, Rijmen, MacCann, & Roberts, 2009; MacCann et al., 2010; note that data for GPA and the STEM-Y reported in the current study are also used in Lipnevich et al. and MacCann et al.). Cases were removed for students who did not complete the coping assessment (nine cases), or who failed to accurately report their GPA (81 cases, see description of GPA for more detail), resulting in a listwise N of 293. This final sample of 293 (50% female) consisted of 219 participants who identified their ethnicity as “White” or “Other”, 38 who identified as Black, and 36 who identified as Hispanic. In terms of age, six students were 12 years old, 219 students were 13 years old, 66 students were 14 years old, and 2 students were 15 years old. Participants were remunerated for their time, with each parent–child pair receiving \$US150 after the completion of the entire test battery.

8.1.2. Measures

8.1.2.1. The Situational Test of Emotion Management for Youths (STEM-Y). The STEM-Y (MacCann et al., 2010) is a situational judgment test (SJT) of emotion management designed for young adolescents. The STEM-Y is a downward extension of the Situational Test of Emotion Management (STEM; MacCann & Roberts, 2008). The STEM-Y consists of 11 items, and is scored according to the judgment of 17 experts (seven clinical/counseling psychologists, six emotions/EI researchers, and four educators). Experts rated each of the four options for each scenario on a six-point scale, from “Very Ineffective” to “Very Effective”, with the mean expert rating used as the scoring weight (e.g., if the mean expert rating was 4.5 out of 6 for option C, a participant selecting option C would score 4.5).

An example STEM-Y item is: *You and James sometimes help each other with homework. After you help James on a difficult project, the teacher is very critical of this work. James blames you for his bad grade. You respond that James should be grateful, because you were doing him a favor. What would you do in this situation? (a) Tell him from now on he has to do his own homework, (b) Apologize to him, (c) Tell him “I am happy to help, but you are responsible for what you turn in”, (d) Don’t talk to him.*

8.1.2.2. Coping with School Situations – Youth Form. This was a downward extension of the coping measure used in Study 1, with items and contexts more appropriate for a middle school student population. In particular, the contexts included within school stressors, homework, and after-school activities (MacCann et al., 2009). Example items included: (a) “I make the extra effort to get all of my homework done” (*problem-focused coping*, nine items), (b) “I ask myself: ‘How could I have let this happen to me?’” (*emotion-focused coping*, 12 items), and (c) “I go out and buy myself something” (*avoidant coping*, 11 items). In addition, rather than make ratings on a five-point scale, the participants were required to make judgments on a four-point scale: (1) Never or Rarely, (2) Sometimes, (3) Often, (4) Usually or Always. This form was slightly longer (32 items) than the college-student form (24 items).

8.1.2.3. GPA. For each student, both the students and a parent/caregiver reported the student’s grades from the previous semester in language arts, mathematics, science, and social studies. The grades ranging from A+ to F were given a numerical rating (A+ = 12 to f = 0) for analysis. Some reports of grades were not interpretable (e.g., “very good”, “reading”, “don’t know”), resulting in 59 cases that were excluded from the analysis. An overall self-report grade variable was created by taking the first principal component of valid student reports of Language, Mathematics, Science, and Social Studies grades. An overall parent-report grade was created in a similar manner. Parent-reports were used as a validation check and where the difference in factor scores was greater than $z = 1$, the case was removed from the dataset. This procedure resulted in the removal of a further 22 cases. The correlation between the factor scores after these cases were removed was .91, suggesting that we were working with a reliable outcome variable, which we labeled GPAz.

8.1.3. Procedure

Parents completed parent-report grades for their child in six subjects for the previous semester; along with a number of additional assessments (not relevant to this study). Students were taken to a separate testing room from their parents to complete a self-paced, proctored computerized test battery that included self-report grades, and the tests listed above, plus other tests peripheral to the aims of the current study (e.g., measures of mathematics attitudes, life satisfaction, and engagement). The test battery took about 90 min to complete, and students were encouraged to take a rest break after 45 min.

8.2. Results

8.2.1. Correlations among variables

Descriptive statistics and correlations for all variables are shown in Table 3. The correlations provided an opportunity to test outcomes against expectations. As in Study 1, emotion management was positively related to academic performance and problem-focused coping, but negatively related to emotion-focused coping. However, the strongest relationship between emotion management and coping was for problem-focused coping. This contrasts with Study 1, where emotion management related more

Table 3Descriptive statistics, reliabilities, and correlations among emotional intelligence, coping, and school performance ($N = 293$).

Variable	Descriptive statistics			Correlations			
	Mean	SD	α	1	2	3	4
1. Management (STEM-Y)	42.49	4.56	.69				
2. Problem-focused coping	25.53	5.99	.88	.37**			
3. Emotion-focused coping	21.62	6.40	.83	-.20**	.06		
4. Avoidant coping	21.35	7.54	.90	-.10	.20**	.40**	
5. GPAz	–	–	–	.28**	.36**	-.13**	-.14**

** $p < .01$.

strongly to both avoidant coping and emotion-focused coping than to problem-focused coping. In a replication of Study 1, problem-focused coping related positively to academic performance whereas emotion-focused and avoidance coping related negatively to GPA.

8.2.2. Coping as a mediator of the relationship between EI and GPA

As in Study 1, we used Preacher and Hayes' (2008) SPSS macro to calculate standardized path coefficients as well as estimates of the specific indirect effects and total indirect effects (with statistical significance assessed using both the Sobel test and bias-corrected confidence intervals). Fig. 3 shows the standardized path coefficients, and Table 4 shows the results of the Sobel test and the bias-corrected confidence intervals. The current study replicated the results obtained with the MSCEIT Management test in Study 1. The coping variables collectively mediated the relationship between emotion management and GPA. In addition, specific indirect effects were significant for problem-focused coping, but not for emotion-focused or avoidant coping.

8.3. Discussion

Study 2 replicated the finding from Study 1. That is, emotion management related to GPA, even though the STEM-Y rather than MSCEIT was used as a measure of emotion management. Other researchers have reported correlations between EI and academic performance of a similar magnitude and direction using different measures of EI (e.g., Ashkanasy & Dasborough, 2003; Barchard, 2003; Downey et al., 2008; Parker, Creque et al., 2004). It seems that the EI-achievement link generalizes across multiple instruments, and thus is construct-related rather than method-related. Students with higher levels of emotional intelligence tend to gain higher levels of academic achievement.

Study 2 also replicated the finding that problem-focused coping related positively to students' GPA whereas emotion-focused and

avoidant coping related negatively to students' GPA. There is a clear link between the coping strategy used to deal with stressful school situations and the final grade obtained. It seems that directly addressing the problems involved in exam-related stress, homework-related stress, and extracurricular activity-related stress is associated with higher achievement than giving vent to anxious or angry emotional responses to the problem or avoiding the problem altogether.

Mediation effects also replicated findings from Study 1: Problem-focused coping was a significant mediator of the EI-GPA relationship whereas emotion-focused and avoidant coping were not significant mediators. In contrast to Study 1, the current study showed full rather than partial mediation – coping styles completely accounted for the relationship between emotion management and students' grades. In essence, both studies suggested that the reason emotion management is valuable for academic achievement may be because effective emotion management tends to involve a greater use of problem-focused coping.

9. General Discussion

The results of the two studies suggest that emotion management may be more important for academic achievement than the lower branches of EI. In addition, it appears that coping mediates the relationship between emotion management and academic achievement. Together, these results have important implications for educational policy and, in particular, the veracity of social and emotional learning interventions.

9.1. A branch-level perspective of EI and achievement

Results from Study 1 suggest that the higher branches of EI may be more robust predictors of academic achievement than lower branches. In particular, emotion perception was not a strong predictor of GPA. Although emotional facilitation, emotional understanding, and emotion management predicted GPA at similar levels, previous studies shed light on these findings. The first observation from the available literature is that the emotional facilitation construct is possibly redundant with other emotional intelligence constructs; it has not been possible to recover as a separate factor in a number of large-scale studies (see Palmer, Gignac, Manocha, & Stough, 2005; Roberts et al., 2006). The second observation from extant research is the known relationship between emotional understanding and cognitive ability (e.g., Roberts et al., 2008), which suggests that emotional understanding may not incrementally predict GPA over and above cognitive ability.

These ideas are consistent with additional research which suggests that the emotion management component of EI is the branch most strongly linked to valued life outcomes. For example, a recent meta-analysis found that emotion management shows the strongest links with workplace performance (Joseph & Newman, 2010). In addition, Bastian et al. (2005) found that emotion management was the only one of the four branches to predict life

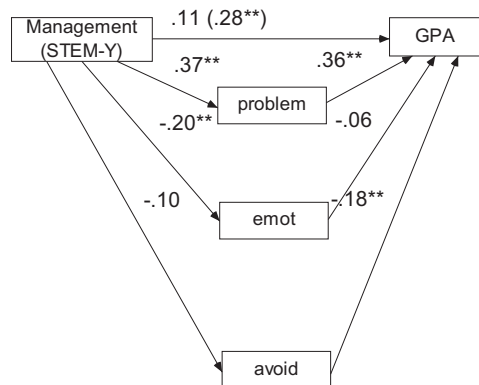


Fig. 3. Path models testing whether coping variables mediate the relationship between emotion management and GPA (direct relationship of emotion management and GPA shown in parentheses).

Table 4

Mediation of the effect of emotional intelligence on grade point average through problem-focused, emotion-focused, and avoidant coping (standardized estimates shown).

	Point estimate	Product of coefficients (z)	Bootstrapping (95% CI, bias corrected)	
			Lower limit	Upper limit
Problem-focused	.135	4.586**	.079	.208
Emotion-focused	.011	0.947	-.008	.044
Avoidant	.017	1.450	-.002	.050
Total	.163	4.953**	.106	.241

** $p < .01$.

satisfaction. In fact, the proposed pathways from high EI to academic achievement conceptually relate to the management of emotion rather than the subsidiary branches. Recall, we proposed that the high EI individual might have fewer negative emotions that distract them from learning and assessment, better social relationships that lead to higher grades on group assignments, as well as greater social support. Management of emotion is a key component to ameliorating negative emotions and enhancing positive ones (in fact, this is part of the definition of emotion management as a component of EI; Mayer et al., 2008), as well as the ability involved in forming and maintaining social relationships (Lopes et al., 2003). As such, emotion management seems to be the active ingredient linking EI to coping and to valued educational outcomes, such as grades.

9.2. The role of problem-focused coping in emotion management

The mediation of the relationship between emotion management and GPA was found in both of the current studies. We speculate that the mechanism underlying the management/achievement link is problem-focused coping. That is, the reason that higher emotion management is associated with greater achievement is that people with high management skills tend to use problem-focused coping more frequently. Rather than engage in strategies such as distancing, distraction, venting, self-blame, or rumination (i.e., avoidant and emotion-focused coping), students high on emotion management address the problem underlying the academic stressors. It seems plausible that the cumulative effect of using problem-focused coping across a range of stressful school situations would result in higher achievement. For example, if the stressor is an impending assignment, focusing on the assignment rather than avoiding the situation or focusing the feelings evoked should result in getting the assignment turned in, and getting a reasonable grade (all else being equal).

Thus far, studies examining relationships among EI, coping, and academic achievement have been mainly restricted to populations of 4-year (i.e., university) students, and in particular participants drawn from first-year psychology subject pools. The two populations currently studied – community college and middle school students – are much under investigated, certainly in extant studies of emotional intelligence. Because the present results were replicated across two different populations, and with two different instruments, it might be a generalizable educational principle. Indeed, the findings with the community college sample are also suggestive of how these constructs might operate in the workforce.

9.3. Implications for educational policy and potential interventions

An important underpinning of the present paper relates to the proposition that both EI and coping can be manipulated in a more direct fashion than intelligence or personality, which has been the target of much previous research examining the correlates of academic performance. Even if one were to make the claim that the

present set of measures of EI and coping are simply sub-constructs of general intelligence and personality respectively, there is accumulating evidence that changes in narrow domains are easier than changes in broad domains. For example, Venezuela's Project Intelligence, which attempted to increase the overall intelligence of the country's school children, was more successful in teaching specific skills than in boosting broad measures of IQ (Herrnstein, Nickerson, de Sanchez, & Swets, 1986).

In this respect, the mediation analysis of Studies 1 and 2 are especially informative. Results are consistent with the idea that coping is a behavioral manifestation of high levels of emotion management, and it is this behavior that actually relates to achievement at school. Given that it is much clearer to target a behavior than a construct, interventions may be most successful if they concentrate on these clear instances of behavior. With coping, there are several interventions available that are often designed to teach individuals how to manage the cognitive and behavioral aspects that are perceived as controllable by an individual (Compas, Connor-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001). These interventions typically include techniques that help the individual deal with and handle stress, such as positive re-appraisal, problem-solving, and stress avoidance (see e.g., Ayers, Sandler, West, & Roosa, 1996; Compas, 1998; Lengua & Long, 2002; Rudolph, Dennig, & Weisz, 1995). Existing coping resources, such as optimism, self-esteem, and social support, can improve an individual's ability to manage stress and anxiety, as well as their ability to use appropriate coping strategies (Taylor & Stanton, 2007). Together, these studies suggest that coping may be modifiable and doing so may lead to enhanced academic achievement.

9.4. Limitations and future directions

The reader should keep in mind that coping styles were assessed as individual differences variables in this study, and that all data was collected at the same time point. Future research would profit from examining the mediating role of context-specific coping strategies in the EI-academic performance relationship as the situation unfolds over time. In addition, the current study used self-reported grades, which show an imperfect correlation with actual grades (meta-analytic $r = .90$ with college GPA; Kuncel, Crede, & Thomas, 2005). Furthermore, the current studies do not address the role that cognitive ability might play in the prediction of GPA from coping and EI (although as we have reiterated at several points meta-analytic evidence suggests emotion management is only weakly related to ability constructs). The current research only examined one of the four branches of EI (emotion management) in the sample of eighth-graders. Although the other three branches (perception, facilitation, and management) were not significant mediators in the community college sample, these relationships were not tested in the eighth-graders.

In research to date the relations of EI and coping to academic outcomes tend to use a narrow criterion space: Students' grades. However, qualities like EI and coping skills may be more important

for other diverse outcomes such as staying on in school, exhibiting exemplary citizenship behaviors, remaining engaged, and other valued academic outcomes rather than grades per se. Future research on EI and coping may also benefit from a more fine-grained conceptualization of coping, differentiating between emotion-focused coping strategies such as seeking social support, self-blame, wishful thinking, rumination, and positive re-appraisal. The current conceptualization of emotion-focused coping concentrated primarily on the more negative aspects, and results may vary for different narrow conceptualizations of coping.

In essence, the present series of studies suggests that the relationship between emotion management and success at school may be at least partly due to the coping processes that students use. As such, policy and interventions aimed at teaching and encouraging problem-focused coping might be beneficial for students' academic success. Carefully designed experimental studies examining this proposition are needed, as are additional studies that expand the outcome space beyond grades to include measures of student retention, citizenship, and engagement.

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