Published in final edited form as:
Child Dev Perspect. 2012 June ; 6(2): 129–135. doi:10.1111/j.1750-8606.2011.00192.x.

Linking Students' Emotions and Academic Achievement: When and Why Emotions Matter

Carlos Valiente, **Jodi Swanson**, and **Nancy Eisenberg**
Arizona State University

Abstract

Few studies include associations of emotions, or of individual differences in emotionality, to academic competence, and there are virtually no empirical data on when or why relations exist (or do not exist). The few studies of emotion and achievement have largely focused on anxiety, but there has been scant theoretical and empirical attention devoted to the treatment of other emotions. It is suggested that considering the moderated and indirect effects of students' emotions on their academic functioning may provide an understanding of whether and under what circumstances emotions are related to achievement. This article briefly reviews findings linking situational and dispositional negative or positive emotions to academic achievement and suggests that researchers can learn much about relations between emotions and achievement by considering the potential moderating role of effortful control, as well as considering the mediating roles that cognitive processes, motivational mechanisms, and classroom relationships play in linking emotions and achievement.

Keywords

emotion; effortful control; academic achievement

Liew (2012) provides a succinct review of progress on understanding the relations between academic achievement and effortful control (EC; "the efficiency of executive attention—including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" Rothbart & Bates, 2006, p. 129). The thesis that students' EC (or, more broadly, dispositional regulation) matters for their academic achievement is rapidly gaining theoretical (Eisenberg, Sadovsky, & Spinrad, 2005) and empirical (Blair & Razza, 2007; Ponitz et al., 2008; Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008) support. The impetus for the growing number of studies was Blair's (2002) and Raver's (2002) argument that emotions matter to academics and that integrating cognition and emotion results in models that substantially advance our understanding of school readiness and academic achievement through early elementary school. As Liew noted, high-quality studies increasingly show positive relations between EC and achievement; as a result, researchers are fine-tuning the explanations for why EC matters.

We agree that researchers are effectively advancing an understanding of associations between EC (and related constructs relevant to the regulation of emotion and behavior) and achievement; however, to date, investigators have insufficiently considered the contributions of negative and positive emotions to achievement. We suggest that we can learn a great deal

Correspondence concerning this article should be addressed to Carlos Valiente, Arizona State University School of Social and Family Dynamics, Tempe, AZ 85287-3701; valiente@asu.edu..

about when and why emotions relate to achievement if we consider the potential moderating role of EC and the roles that cognitive processes, motivational mechanisms, and classroom relationships play in the associations of emotions with achievement.

Baumeister and Bushman (2007) conceptualized the experience of an emotion as "a subjective state, often accompanied by a bodily reaction (e.g., increased heart rate) and an evaluative response, to some event" (p. 61). Thus, emotions represent individuals' reactions to stimuli, accompanied by their judgments on the circumstances surrounding the stimuli. Investigators often use the term emotionality to refer to temperamental or dispositional emotion-related characteristics, which manifest in individual differences in peoples' experience or expression of emotion. Scholars often view emotionality as a component of temperament and personality (e.g., Rothbart & Bates, 2006).

Frijda, Kuipers, and ter Schure (1989) argued that emotions bias or produce action; Izard, Stark, Trentacosta, and Schultz (2008) posited that emotions contain motivational components and influence cognition and adaptive functioning. Recent advances in psychology and neurosciences demonstrate that emotions are crucial contributors to students' motivation, interpersonal resources, memory, and learning (Lewis & Haviland-Jones, 2000; Lewis, Haviland-Jones, & Barrett, 2008). Despite the prominent role emotions play in educational settings, work on how negative or positive emotions (with the exception of anxiety) contribute to key academic outcomes has emerged slowly, although some theoretical and empirical work is available. Here, we review findings on specific negative (particularly anxiety and anger) and positive (including relaxedness, joy, pride, and enthusiasm) emotions, as well as on dispositional differences in emotional responding, or emotionality.

DIRECT ASSOCIATIONS BETWEEN EMOTIONS AND ACADEMIC FUNCTIONING

The most common findings on emotions or emotionality and achievement are negative associations between situational or dispositional anxiety and school outcomes (such as test performance, course grades, and high school completion; Duchesne, Vitaro, Larose, & Tremblay, 2008; Seipp, 1991). The lack of substantial work on other emotions is surprising, because situational emotional responses and individual differences in negative emotionality have prominent roles in many models of social development (Davidson, Scherer, & Goldsmith, 2003; Denham, 1998; Eisenberg et al., 2001; Lengua, West, & Sandler, 1998), and emotional disorders increase risk for school dropout (Stein & Kean, 2000). Broad measures of negative emotion or individual differences in negative emotionality are negatively related to students' grade point average (GPA) and achievement scores (Gumora & Arsenio, 2002), although attempts to replicate those results using different measures have not always obtained significant associations (e.g., Supplee, Shaw, Hailstones, & Hartman, 2004). Zhou, Main, and Wang (2010) found that teachers', but not parents', reports of Chinese students' dispositional anger were prospectively inversely related to GPA. In contrast, Pekrun, Elliot, and Maier (2006) found no relations between achievement-related anger and GPA.

There is scant evidence of the associations between children's positive emotions or dispositional positive emotionality and academic achievement. This lack of scholarly attention could be because there are fewer positive than negative emotions (there is approximately one positive emotion for every three to four negative emotions; Ellsworth & Smith, 1988) and because various positive emotions are more difficult to observe and differentiate. For example, Ekman (1992a, 1992b) noted that, unlike negative emotions, positive emotions have no unique facial signatures; rather, positive emotions, such as joy or

pride in achievement, share the Duchenne smile (raised lip corners with muscle contraction near the eyes). Positive emotions are also less likely to produce distinguishable autonomic responses (Levenson, Ekman, & Friesen, 1990), which eliminates a potentially useful measurement mechanism. Finally, perhaps the primary reason few studies of positive emotions exist is researchers' focus on negative outcomes and solving problems. Because negative emotions are perceived as the more troublesome for children's functioning and development, they receive more investigative attention.

The few studies linking positive emotions to achievement show that joy, hope, and pride positively correlate with students' academic self-efficacy, academic interest and effort, and overall achievement (Pekrun et al., 2004). The premise that pride in one's ethnic or cultural heritage should be associated with increased academic achievement has received considerable empirical attention (Byrd & Chavous, 2009; Murry, Berkel, Brody, Miller, & Chen, 2009; Rodriguez, Umana-Taylor, Smith, & Johnson, 2009). In addition, students' pride in their achievement in particular academic subjects can predict performance in those subjects (Frenzel, Pekrun, & Goetz, 2007). Positive emotions are hypothesized to facilitate approach-related activities, and these activities are likely to provide academic benefits, particularly as the student moves toward a desired goal (Davidson, Jackson, & Kalin, 2000; Rothbart & Bates, 2006). Fredrickson (1998, 2001) suggested that positive emotions enhance academic competence because they encourage exploring, integrating diverse materials, and broadening potential methods of solving problems.

Although researchers typically expect positive emotions to foster academic success, high-arousal positive emotions (such as exuberance, excitedness, and elatedness) may detract from achievement. Investigators studying adults' emotions have differentiated between high-arousal positive emotions, low-intensity positive emotions (like relaxedness and contentedness), and those in between (such as pleasantness; Larsen & Diener, 1992). The different positive emotions load on different factors in statistical analyses, and high and low factors are only moderately correlated in adults (Yik, Russell, & Barrett, 1999). Scholars focused on children's emotions have discussed the potentially dysregulating nature of high- and low-intensity positive emotion (Sallquist et al., 2009) and the associations of highly activated emotions with low EC (Kochanska, Murray, & Harlan, 2000) and problem behaviors (Dennis, Hong, & Solomon, 2010; Stifter, Putnam, & Jahromi, 2008). These findings suggest the benefit of considering quadratic relations between high-intensity positive emotions and academic competence. We predict that low to medium levels of these emotions are positively related to the achievement, but that the positive relation declines and perhaps even reverses at high levels of highly activated positive emotions.

THE MODERATING ROLE OF EC ON ACADEMIC ACHIEVEMENT

The direct associations between specific measures of negative emotion (or dispositional indices of negative emotionality), or low- and medium-activated positive emotions, and achievement are relatively modest and infrequently examined. A nuanced understanding of the relations of emotions to achievement likely requires considering more complex models. Specifically, studies that consider EC as a moderator of the associations between negative emotions or negative emotionality and the role of mediating variables (such as cognitive processes, motivational mechanisms, or classroom relationships) likely to contribute to academic outcomes may explain the associations between emotions and achievement.

The relations between emotions or emotionality and academic outcomes may be weak and inconsistent because individual differences in EC moderate these relations. Eisenberg and Fabes (1992) argued that the effects of emotionality and EC on behavior may interact, such that even when prone to negative emotionality, children may exhibit uncontrolled, disruptive

behavior only if they are also low in EC—an empirically supported hypothesis (Belsky, Friedman, & Hsieh, 2001; Eisenberg et al., 2000). Later, Fabes, Martin, and Hanish (1999) applied this idea specifically to academic outcomes, arguing that even when experiencing moderate levels of negative emotionality, well-regulated students should be motivated to perform, engaged in learning activities, and able to form good relationships with peers and teachers. These ideas are consistent with the concept of "emotion utilization"—the notion that students, at least if they are sufficiently regulated, can modulate and then harness emotion-generated energy to initiate and accomplish tasks (Izard, 2002).

Few investigators have examined whether EC moderates the relations between negative emotions or dispositional negative emotionality and achievement, but studies have found more support in younger samples, such as preschoolers and kindergartners. For example, Gumora and Arsenio (2002) found that EC did not moderate the association between dispositional negative emotionality and achievement in a sample of middle school students, where as Belsky et al. (2001) found positive relations between negative emotion expressed during the Strange Situation test and school readiness at high, but not low, levels of EC. In a short-term prospective study involving kindergartners, Valiente, Lemery-Chalfant, and Swanson (2010) found evidence that the relations between dispositional anger or sadness and achievement depended on the level of EC. Specifically, at low levels of dispositional anger and sadness, students high in EC performed best, but all children performed poorly at high levels of emotions. Thus, it appears that EC provided clear advantages for young school children low in negative emotionality, but at high levels, all children had difficulty with the achievement measures regardless of their regulatory skills. Valiente, Swanson, and Lemery-Chalfant (in press) found some preliminary evidence that EC moderates the association between dispositional anger and other early indicators of academic competence, such as the formation of a close student–teacher relationship or classroom participation. They found a negative relation between anger and the student–teacher relationship and participation only for students low in EC. However, as children develop greater regulatory skills, high EC may provide an advantage even for children high in negative emotionality.

In summary, preliminary evidence demonstrates that for younger children, EC serves to moderate the effects of anger in specific contexts, as well as other indices of negative emotionality. Failing to consider such effects might lead to the inaccurate conclusion that there are no effects. We are unaware of empirical tests on whether EC moderates the relations between positive emotion or dispositional positive emotionality and academic competence, but we posit that EC might moderate relations for highly activated positive emotions. Extant findings illustrate the usefulness of examining the interaction of negative emotions (or negative emotionality) and EC when predicting social competence and problem behaviors. It is plausible that considering interactions involving emotion and EC may delineate when negative emotions are, or are not, associated with academic achievement. For example, some emotions may be more debilitating than others if unregulated. In addition, there is a growing understanding of how to promote the development of EC, and this knowledge could help students avoid the academic challenges associated with being prone to expressing negative emotions and highly activated positive emotions.

ARE THE RELATIONS BETWEEN EMOTION/EMOTIONALITY AND ACADEMIC ACHIEVEMENT INDIRECT?

Based on the inconsistent pattern of findings and the theoretical ideas that Blair (2002) and Raver (2002) expressed, a research agenda that also considers potential indirect and direct effects of emotion on achievement will generate knowledge of interest to researchers, clinicians, and school personnel (Eisenberg et al., 2005). Recently, Zhou et al. (2010) argued that the effect of emotionality on achievement might be indirect, through cognitive processes

(such as problem solving, memory, strategic thinking), motivational mechanisms (including engagement, school liking, and staying on task), and interpersonal resources (such as relationships with teacher and peers). Some empirical findings support this idea.

Mediation via Cognitive Processes

Both Blair (2002) and Pekrun, Elliot, and Maier (2009) posited that negative emotions like anger reduce achievement partly because they negatively affect higher order cognitive processes (such as problem solving, memory, and strategic thinking) and focus attention on a narrow set of behavioral options (Fredrickson, 2001). There is substantial evidence that cognitive processes are strongly related to achievement; thus, evidence that negative emotions are linked to these processes is consistent with the notion of mediation. Both anxiety and anger may disrupt students' ability to recall relevant material (Linnenbrink, 2007; Linnenbrink, Ryan, & Pintrich, 1999; Rice, Levine, & Pizarro, 2007). As Blair (2002) noted, young children characterized by negative emotionality are likely to have a hard time applying higher order cognitive processes simply because their emotional responses do not call for reflective planning and problem solving, so these skills are underused and underdeveloped. When a student's experience of negative emotion leads to focusing on the object of the emotion (as when a child ruminates on the morning's event that resulted in his or her anger), cognitive resources are diverted away from educational materials to events or circumstances that distract from learning. In this way, negative emotions interfere with scholastic activities by reducing resources needed to integrate and recall important details.

Conversely, work with adults suggests that under certain circumstances some negative emotions might facilitate cognitive performance. Investigators have argued that moods congruent with the negative valence inherent in conflict tasks (Botvinick, 2007) facilitate conflict registration (Rusting, 1998). If conflict registration is important for tuning goal-directed behavior on tasks (such as the flanker test) that involve conflicting pulls on attention (Kerns et al., 2004), negative emotions that prioritize conflict processing could strengthen behavioral adaptations to cognitive conflict. van Steenbergen, Band, and Hommel (2010) found that adults induced to experience a low-pleasure mood (such as sadness or anxiety) adapted more strongly to cognitive conflict on a flanker task than those induced to experience happiness or calmness. Notably, negative emotions increased cognitive control only after conflict situations, but did not improve control in general. In fact, adult participants with low pleasure levels made slightly more errors than their high-pleasure counterparts. Further investigations should test whether these findings would replicate among children on similar, age-appropriate behavioral assessments.

In contrast to negative emotions, students' low- and medium-activated positive emotions may enhance their cognitive processing and, in turn, their achievement. Indeed, in describing the broaden and build theory, Fredrickson (1998, 2001) argued that positive emotions promote successful academic functioning because they broaden one's cognitive awareness and consciousness of potential solutions to problems. For example, interest in a particular subject is likely to help students maintain attention on assignments and, in turn, perform well. As Liew (2012) pointed out, for both neurological and social reasons, attentional control is a key factor in promoting learning and achievement. Joy spurs the desire to play and be creative, which are especially important mechanisms that promote young children's learning (Frijda, 1986; Vygotsky, 1978). According to Fredrickson (1998), joy builds students' thought-action repertoire through playful interactions, and over time, these interactions advance students' intellectual resources.

There is emerging evidence that the object of attention and the motivational intensity of the emotions influence the relations between emotions and cognitive processes, which extends and enhances the broaden and build theory in important ways. For example, high approach-

motivated positive affect (like desire) narrows adults' cognition, whereas low approach-motivated positive affect (like contentment) broadens it (Gable & Harmon-Jones, 2008, 2010b, 2010c). Moreover, Gable and Harmon-Jones (2010b, 2010c) have argued that high approach-motivated positive affect causes a general narrowing of cognitive resources that facilitates memory for centrally presented information and hinders memory for peripherally presented stimuli. In contrast, they found that low approach-motivated positive affect broadens cognitive resources, improving memory of peripherally, but not centrally presented information. Similarly, negative emotion high in motivational intensity (like disgust) narrows attentional focus, whereas negative emotion low in motivational intensity (like sadness) broadens it (Gable & Harmon-Jones, 2010a, 2010c). Next, investigators must test whether these findings hold with children. It is unknown how these processes operate as students undergo various cognitive tasks at school, especially given the narrow range of cognitive tasks included in studies with adults. Moreover, the tasks typically used with adults have examined *what* individuals attend to (such as global stimuli or more specific components of the larger visual stimulus), not *if* they attend. In addition, the tasks typically do not involve the participant learning new information. Thus, their findings may be relevant only to individual differences in specific types of learning tasks.

Mediation via Motivational Processes

Motivational processes are clearly associated with students' achievement (Ladd, Birch, & Buhs, 1999; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006), and motivation might partially mediate the relations between emotion and achievement. Students prone to anger or anxiety may perform poorly because these emotions decrease their motivation for learning and engaging in classroom activities (Linnenbrink, 2007), which are important predictors of academic success (Wigfield et al., 2006). Negative correlations between students' proneness to anger or shyness and their classroom participation and school liking also support the consideration of motivational mechanisms as potential mediators (Valiente et al., in press). Consistent with these findings, Heavey, Adelman, Nelson, and Smith (1989) reported that dispositional anger was negatively associated with motivation for on-task performance. In addition, although they did not test mediation, Gilman and Anderman (2006) reported that dispositional anxiety tended to reduce students' motivation to master a subject, which was positively related to GPA. Sadness and anxiety are part of the withdrawal system and may interfere with learning by causing children to avoid challenging school activities that might involve negative experiences or outcomes (Davidson et al., 2000).

Fredrickson (1998, 2001) argued that positive affect is likely to enhance academic behavior and engagement, and substantial evidence shows that participation in learning activities is positively related to academic success (Ladd et al., 1999). Positive emotions, especially interest and curiosity, likely promote achievement because interested students who take pride in their work are especially motivated to seek out supplemental learning resources. Similarly, Pekrun, Frenzel, Goetz, and Perry (2007) argued that a joy of learning is positively related to extrinsic and intrinsic motivation. These findings are consistent with the literature on mastery motivation (including intrinsic motivation, self-adequacy, and locus on control), which is often associated with pride, enjoyment, and hope, and is a prime candidate to mediate associations between emotion and achievement (Pekrun et al., 2006, 2009).

Mediation via Interpersonal Resources

Experiencing and expressing emotions are also likely to influence students' achievement because of how emotions affect relationships. Emotional expressions that undermine relationships at school, such as angrily shouting at a teacher or peer, can be problematic because the quality of peer and student-teacher relationships is consistently linked to

positive educational outcomes (Hamre & Pianta, 2001; Jerome, Hamre, & Pianta, 2009; Ladd, Herald, & Kochel, 2006; Welsh, Parke, Widaman, & O'Neil, 2001). Students prone to anger can encounter more challenges developing and maintaining relationships in the classroom (Dougherty, 2006; Pianta, Cox, & Snow, 2007; Rothbart & Bates, 2006). Consistent with this idea, negative emotionality predicts low levels of social competence (Dougherty, 2006) and conflictual student-teacher relationships (Valiente et al., in press). Similarly, parents and teachers rate students prone to sadness as high in internalizing and externalizing problem behaviors both concurrently and longitudinally (Eisenberg et al., 2009). Anxious children are likely to have difficulty relating to peers, to be rejected, and to exhibit aggressiveness (Bruch, 2001; Rubin, LeMare, & Lollis, 1990; Zoccolillo, 1992). If a consistently sad or anxious student continually withdraws from aversive stimuli (such as negative experiences while participating in learning groups), he or she is likely to miss out on the benefits of working with peers (Davidson et al., 2000).

Conversely, students prone to positive emotions may experience high levels of achievement partly because such emotions are associated with high-quality peer and teacher relationships. Joyful students are more likely to engage in free-time social play at school and to form friendships that can provide social and academic support. Indeed, preschoolers exhibiting more positive emotions are less likely to engage in solitary and reticent play (Spinrad et al., 2004).

CONCLUSIONS AND FUTURE DIRECTIONS

Emotions matter to a range of developmental outcomes. However, research has neglected when and why emotion is associated with academic success, even though "emotions contain useful information that can guide cognition and action" (Izard, 2002, p. 815). A valuable next step is to test whether EC moderates the relations between emotions (or emotionality) —particularly for anger or anxiety—and indices of academic competence. The presence of moderation may be one reason current findings are weak and inconsistent.

Another critical next step is to design studies that test potential mediators. The emotions that students experience and express in the classroom are predicted to be associated with learning and academic progress for cognitive, motivational, and interpersonal reasons. However, the accumulated body of evidence is relatively small, and researchers are only beginning to explore the specific mechanisms that maintain the associations. Longitudinal data are most desirable for testing mediation, and it will be important to carefully specify when assessments occur. In many longitudinal studies, assessments are 1 or 2 years apart, but because negative or highly activated emotions may interfere with many classroom processes, it may be more appropriate to assess emotion, the mediator, and outcome during the same academic year. Studies should also use longitudinal data to examine bidirectional relations. For example, pride and enthusiasm are associated with performing well on a test, and performance, in turn, might be associated with these emotions (or, alternatively, performing poorly may be associated with anger or sadness), which may further the desire to engage in learning activities that foster academic success.

Last, not all emotions are likely to relate to achievement the same ways or for the same reasons. Therefore, clarifying the relations between emotions and achievement will require the assessment of specific types of positive and negative emotions, instead of using broad composites. Moreover, emotions may actually influence what students retain on a specific learning task. A movement away from solely considering main effects toward multivariate models should clarify when and which emotions are (or are not) associated with achievement.

REFERENCES

Baumeister, RF.; Bushman, BJ. Angry emotions and aggressive behaviors. In: Steffgen, G.; Gollwitzer, M., editors. Emotions and aggressive behavior. Hogrefe & Huber; Ashland, OH: 2007. p. 61-75.

Belsky J, Friedman SL, Hsieh KH. Testing a core emotion-regulation prediction: Does early attentional persistence moderate the effect of infant negative emotionality on later development? Child Development. 2001; 72:123–133. [PubMed: 11280474]

Blair C. School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. American Psychologist. 2002; 57:111–127. [PubMed: 11899554]

Blair C, Razza RP. Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. Child Development. 2007; 78:647–663. [PubMed: 17381795]

Botvinick MM. Conflict monitoring and decision making: Reconciling two perspectives on anterior cingulate function. Cognitive, Affective & Behavioral Neuroscience. 2007; 7:356–366.

Bruch, MA. Shyness and social interaction. In: Crozier, WR.; Alden, L., editors. International handbook of social anxiety: Concepts, research and interventions relating to the self and shyness. Wiley; New York: 2001. p. 195-215.

Byrd CM, Chavous TM. Racial identity and academic achievement in the neighborhood context: A multilevel analysis. Journal of Youth and Adolescence. 2009; 38:544–559. [PubMed: 19636727]

Davidson RJ, Jackson DC, Kalin NH. Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. Psychological Bulletin. 2000; 126:890–909. [PubMed: 11107881]

Davidson, RJ.; Scherer, KR.; Goldsmith, H., editors. Handbook of affective sciences. Oxford University Press; London: 2003.

Denham, SA. Emotional development in young children. Guilford; New York: 1998.

Dennis TA, Hong M, Solomon B. Do the associations between exuberance and emotion regulation depend on effortful control? International Journal of Behavioral Development. 2010; 34:462–472.

Dougherty LR. Children's emotionality and social status: A meta-analytic review. Social Development. 2006; 15:394–417.

Duchesne SP, Vitaro F, Larose S, Tremblay RE. Trajectories of anxiety during elementary-school years and the prediction of high school noncompletion. Journal of Youth and Adolescence. 2008; 37:1134–1146.

Eisenberg N, Cumberland AJ, Spinrad TL, Fabes RA, Shepard SA, Reiser M, et al. The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. Child Development. 2001; 72:1112–1134. [PubMed: 11480937]

Eisenberg, N.; Fabes, RA. Emotion, regulation, and the development of social competence. In: Clark, MS., editor. Emotion and social behavior. Review of personality and social psychology. Vol. 14. Sage; Thousand Oaks, CA: 1992. p. 119-150.

Eisenberg N, Guthrie IK, Fabes RA, Shepard S, Losoya S, Murphy BC, et al. Prediction of elementary school children's externalizing problem behaviors from attention and behavioral regulation and negative emotionality. Child Development. 2000; 71:1367–1382. [PubMed: 11108101]

Eisenberg N, Sadovsky A, Spinrad T. Associations among emotion-related regulation, language skills, emotion knowledge, and academic outcomes. New Directions in Child and Adolescent Development. 2005; 109:109–118.

Eisenberg N, Valiente C, Spinrad TL, Cumberland A, Liew J, Reiser M, et al. Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occurring behavior problems. Developmental Psychology. 2009; 45:988–1008. [PubMed: 19586175]

Ekman P. An argument for basic emotions. Cognition and Emotion. 1992a; 6:169–200.

Ekman P. Facial expressions of emotion: New findings, new questions. Psychological Science. 1992b; 3:34–38.

Ellsworth PC, Smith CA. Shades of joy: Patterns of appraisal differentiating pleasant emotions. Cognition and Emotion. 1988; 2:301–331.

Fabes, RA.; Martin, CL.; Hanish, L. Peers and the transition to school; Paper presented at the Successful Transition to School Conference; Birmingham, AL. 1999;

Fredrickson BL. What good are positive emotions? Review of General Psychology. 1998; 2:300–319. [PubMed: 21850154]

Fredrickson BL. The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. American Psychologist. 2001; 56:218–226. [PubMed: 11315248]

Frenzel AC, Pekrun R, Goetz T. Girls and mathematics—A “hopeless” issue? A control-value approach to gender differences in emotions towards mathematics. European Journal of Psychology of Education. 2007; 22:497–514.

Frijda, NH. The emotions. Cambridge University Press; New York: 1986.

Frijda NH, Kuipers P, ter Schure E. Relations among emotion, appraisal, and emotional action readiness. Journal of Personality and Social Psychology. 1989; 57:212–228.

Gable PA, Harmon-Jones E. Approach-motivated positive affect reduces breadth of attention. Psychological Science. 2008; 19:476–482. [PubMed: 18466409]

Gable PA, Harmon-Jones E. The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. Psychological Science. 2010a; 21:211–215. [PubMed: 20424047]

Gable PA, Harmon-Jones E. The effect of low versus high approach-motivated positive affect on memory for peripherally versus centrally presented information. Emotion. 2010b; 10:599–603. [PubMed: 20677877]

Gable PA, Harmon-Jones E. The motivational dimensional model of affect: Implications for breadth of attention, memory, and cognitive categorisation. Cognition and Emotion. 2010c; 24:322–337.

Gilman R, Anderman EM. The relationship between relative levels of motivation and intrapersonal, interpersonal, and academic functioning among older adolescents. Journal of School Psychology. 2006; 44:375–391.

Gumora G, Arsenio WF. Emotionality, emotion regulation, and school performance in middle school children. Journal of School Psychology. 2002; 40:395–413.

Hamre BK, Pianta RC. Early teacher-child relationships and the trajectory of children’s school outcomes through eighth grade. Child Development. 2001; 72:625–638. [PubMed: 11333089]

Heavey CL, Adelman HS, Nelson P, Smith DC. Learning problems, anger, perceived control, and misbehavior. Journal of Learning Disabilities. 1989; 22:46–50. [PubMed: 2703788]

Izard C. Translating emotion theory and research into preventive interventions. Psychological Bulletin. 2002; 128:796–824. [PubMed: 12206195]

Izard C, Stark K, Trentacosta C, Schultz D. Beyond emotion regulation: Emotion utilization and adaptive functioning. Child Development Perspectives. 2008; 2:156–163. [PubMed: 19956781]

Jerome EM, Hamre BK, Pianta RC. Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. Social Development. 2009; 18:915–945.

Kerns JG, Cohen JD, MacDonald AW III, Cho RY, Stenger VA, Carter CS. Anterior cingulate conflict monitoring and adjustments in control. Science. 2004; 303:1023–1026. [PubMed: 14963333]

Kochanska G, Murray K, Harlan ET. Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. Developmental Psychology. 2000; 36:220–232. [PubMed: 10749079]

Ladd GW, Birch SH, Buhs ES. Children’s social and scholastic lives in kindergarten: Related spheres of influence? Child Development. 1999; 70:1373–1400. [PubMed: 10621962]

Ladd GW, Herald SL, Kochel KP. School readiness: Are there social prerequisites? Early Education and Development. 2006; 17:115–150.

Larsen, RJ.; Diener, E. Promises and problems with the circumplex model of emotion. In: Clark, MS., editor. Review of personality and social psychology: Emotion. Sage; Newbury Park, CA: 1992. p. 25-59.

Lengua LJ, West SG, Sandler IN. Temperament as a predictor of symptomatology in children: Addressing contamination of measures. Child Development. 1998; 69:164–181. [PubMed: 9499565]

Levenson RW, Ekman P, Friesen WV. Voluntary facial action generates emotion-specific autonomic nervous system activity. Psychophysiology. 1990; 27:363–384. [PubMed: 2236440]

Lewis, M.; Haviland-Jones, JM., editors. Handbook of emotions. 2nd ed.. Guilford; New York: 2000.

Lewis, M.; Haviland-Jones, JM.; Barrett, LF., editors. Handbook of emotions. 3rd ed.. Guilford; New York:

Liew J. Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. Child Development Perspectives. 2012; 6:105–111.

Linnenbrink, EA. The role of affect in student learning: A multi-dimensional approach to considering the interaction of affect, motivation, and engagement. In: Schutz, PA.; Pekrun, R., editors. Educational psychology series. Elsevier Academic; San Diego, CA: 2007. p. 107-124.

Linnenbrink EA, Ryan AM, Pintrich PR. The role of goals and affect in working memory functioning. Learning and Individual Differences. 1999; 11:213–230.

Murry VM, Berkel C, Brody GH, Miller SJ, Chen Y-F. Linking parental socialization to interpersonal protective processes, academic self-presentation, and expectations among rural African American youth. Cultural Diversity and Ethnic Minority Psychology. 2009; 15:1–10. [PubMed: 19209975]

Pekrun R, Elliot AJ, Maier MA. Achievement goals and discrete achievement emotions: A theoretical model and prospective test. Journal of Educational Psychology. 2006; 98:583–597.

Pekrun R, Elliot AJ, Maier MA. Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. Journal of Educational Psychology. 2009; 101:115–135.

Pekrun, R.; Frenzel, AC.; Goetz, T.; Perry, RP. The controlvalue theory of achievement emotions: An integrative approach to emotions in education. In: Schutz, PA.; Pekrun, R., editors. Emotion in education. Elsevier Academic; San Diego, CA: 2007. p. 13-36.

Pekrun R, Goetz T, Perry RP, Kramer K, Hochstadt M, Molfenter S. Beyond test anxiety: Development and validation of the Test Emotions Questionnaire (TEQ). Anxiety, Stress, & Coping: An International Journal. 2004; 17:287–316.

Pianta, RC.; Cox, M.; Snow, K. School readiness and the transition to kindergarten in the era of accountability. Brookes; Baltimore: 2007.

Ponitz CC, McClelland MM, Jewkes AM, Connor CM, Farris CL, Morrison FJ. Touch your toes! Developing a direct measure of behavioral regulation in early childhood. Early Childhood Research Quarterly. 2008; 23:141–158.

Raver CC. Emotions matter: Making the case for the role of young children's emotional development for early school readiness. Social Policy Report, Society for Research in Child Development. 2002; 16:3–18.

Rice JA, Levine LJ, Pizarro DA. "Just stop thinking about it": Effects of emotional disengagement on children's memory for educational material. Emotion. 2007; 7:812–823. [PubMed: 18039051]

Rodriguez J, Umana-Taylor A, Smith EP, Johnson DJ. Cultural processes in parenting and youth outcomes: Examining a model of racial-ethnic socialization and identity in diverse populations. Cultural Diversity and Ethnic Minority Psychology. 2009; 15:106–111. [PubMed: 19364197]

Rothbart, MK.; Bates, JE. Temperament. In: Damon, W.; Eisenberg, N., editors. Handbook of child psychology. Vol. 3. Social, emotional, personality development. 6th ed.. Wiley; Hoboken, NJ: 2006. p. 99-166.Series Ed.

Rubin, KH.; LeMare, LJ.; Lollis, S. Social withdrawal in childhood: Developmental pathways to peer rejection. In: Asher, SR.; Coie, JD., editors. Peer rejection in childhood. Cambridge studies in social and emotional development. Cambridge University Press; New York: 1990. p. 217-249.

Rusting CL. Personality, mood, and cognitive processing of emotional information: Three conceptual frameworks. Psychological Bulletin. 1998; 124:165–196. [PubMed: 9747185]

Sallquist JV, Eisenberg N, Spinrad TL, Reiser M, Hofer C, Zhou Q, et al. Positive and negative emotionality: Trajectories across six years and relations with social competence. Emotion. 2009; 9:15–28. [PubMed: 19186913]

Seipp B. Anxiety and academic performance: A meta-analysis of findings. Anxiety Research. 1991; 4:27–41.

Spinrad TL, Eisenberg N, Harris E, Hanish L, Fabes RA, Kupanoff K, et al. The relation of children's everyday nonsocial peer play behavior to their emotionality, regulation, and social functioning. Developmental Psychology. 2004; 40:67–80. [PubMed: 14700465]

Stein MB, Kean YM. Disability and quality of life in social phobia: Epidemiologic findings. American Journal of Psychiatry. 2000; 157:1606–1613. [PubMed: 11007714]

Stifter CA, Putnam S, Jahromi L. Exuberant and inhibited toddlers: Stability of temperament and risk for problem behavior. Development and Psychopathology. 2008; 20:401–421. [PubMed: 18423086]

Supplee LH, Shaw DS, Hailstones K, Hartman K. Family and child influences on early academic and emotion regulatory behaviors. Journal of School Psychology. 2004; 42:221–242.

Valiente C, Lemery-Chalfant K, Swanson J. Prediction of kindergartners' academic achievement from their effortful control and emotionality: Evidence for direct and moderated relations. Journal of Educational Psychology. 2010; 102:550–560.

Valiente C, Lemery-Chalfant K, Swanson J, Reiser M. Prediction of children's academic competence from their effortful control, relationships, and classroom participation. Journal of Educational Psychology. 2008; 100:67–77. [PubMed: 21212831]

Valiente C, Swanson J, Lemery-Chalfant KS. Kindergartners' temperament, classroom engagement, and student-teacher relationship: Moderation by effortful control. Social Development. in press.

van Steenbergen H, Band GPH, Hommel B. In the mood for adaptation: How affect regulates conflict-driven control. Psychological Science. 2010; 21:1629–1634. [PubMed: 20943936]

Vygotsky, LS. Mind in society. Harvard University Press; Cambridge, MA: 1978.

Welsh M, Parke RD, Widaman K, O'Neil R. Linkages between children's social and academic competence: A longitudinal analysis. Journal of School Psychology. 2001; 39:463–482.

Wigfield, A.; Eccles, JS.; Schiefele, U.; Roeser, R.; Davis-Kean, P. Development of achievement motivation. In: Damon, W.; Eisenberg, N., editors. Handbook of child psychology. Vol. 3. Social, emotional, personality development. 6th ed.. Wiley; New York: 2006. p. 933-1002.Series Ed.

Yik MSM, Russell JA, Barrett LF. Structure of self-reported current affect: Integration and beyond. Journal of Personality and Social Psychology. 1999; 77:600–619.

Zhou Q, Main A, Wang Y. The relations of temperamental effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. Journal of Educational Psychology. 2010; 102:180–196.

Zoccolillo M. Co-occurrence of conduct disorder and its adult outcomes with depressive and anxiety disorders: A review. Journal of the American Academy of Child & Adolescent Psychiatry. 1992; 31:547–556. [PubMed: 1592790]