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"Just Stop Thinking About It": Effects of Emotional Disengagement on Children's Memory for Educational Material

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Children regulate negative emotions in a variety of ways. Emotion education programs typically discourage emotional disengagement and encourage emotional engagement or "working through" negative emotions. The authors examined the effects of emotional disengagement and engagement on children's memory for educational material. Children averaging 7 or 10 years of age ($N = 200$) watched either a sad or an emotionally neutral film and were then instructed to emotionally disengage, instructed to engage in problem solving concerning their emotion, or received no emotion regulation instructions. All children then watched and were asked to recall the details of an emotionally neutral educational film. Children instructed to disengage remembered the educational film better than children instructed to work through their feelings or children who received no emotion regulation instructions. Although past research has indicated that specific forms of emotional disengagement can impair memory for emotionally relevant events, the current findings suggest that disengagement is a useful short-term strategy for regulating mild negative emotion in educational settings.

Keywords: emotion regulation, children, memory, education

The Stoics sought to eradicate the experience of powerful emotion from their lives. Such experiences, in their view, did nothing but interfere with the insight brought about through rational contemplation. Other philosophers, ranging from the Hedonists to Hume, have regarded emotional states as valuable guides, or even as ends in themselves (Sorabji, 2000). In comparison, psychologists studying emotion have taken a relatively moderate position on the value of emotional experiences—there are certainly situations in which emotions can be disruptive (e.g., when anger prompts assault), as well as situations in which emotions can be beneficial (e.g., when anger promotes commitment to attaining goals). But whether one regards emotions as unwanted disruptions or as valuable sources of information, the necessity of regulating emotional experiences to fulfill one's goals has been recognized for quite some time. Indeed, one of the fundamental questions in the study of emotional development is how children come to develop this regulatory ability and what the consequences of this ability may be (Saarni, 1999). Moreover, the study of emotional regulation has become increasingly central to the study of emotions (Campos, Frankel, & Camras, 2004; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Gross, 1998b; Salovey & Mayer, 1990; Thompson, 1994).

One of the reasons emotional regulation has garnered so much interest of late is the promise that the skills involved in such regulation can be taught and, as a consequence, may help to reduce maladaptive or antisocial behavior (Goleman, 1995; Pizarro & Salovey, 2002). Recent high-profile incidences of violence in schools, for instance, have led to a greater focus on these skills as a way of teaching children to deal with conflict. As evidence of the growing recognition of the importance of emotion management, the past 2 decades have seen an increase in the number of school-based prevention programs that include an emotional education component, such as the Self-Science Curriculum (Stone & Dillehunt, 1978), the Resolving Conflict Creatively Program (Aber, Brown, Chaudry, Jones, & Samples, 1996), the New Haven Social Development Curriculum (Weissberg, Jackson, & Shriver, 1993), and the Providing Alternative Thinking Strategies curriculum (Greenberg & Kusche, 1998). Initial evidence has demonstrated that these programs can be effective in decreasing problem behaviors, at least in the short term (e.g., Henrich, Brown, & Aber, 1999). This finding is not surprising given that children's ability to effectively regulate their emotions has been associated with a number of measures of good social functioning and mental health (e.g., Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996; Eisenberg et al., 1995).

Emotion regulation holds out hope not only for improving social functioning but for improving intellectual functioning as well. Consider a typical situation in which a child might engage in

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emotional regulation: A conflict on the playground has left her feeling sad, but now she has to go back in the classroom and, for example, memorize the state capitals. Emotions direct attention to information that seems immediately relevant to maintaining well-being or attaining goals (e.g., Frijda, 1987; Lazarus, 1991; Lerner & Keltner, 2000; Levine & Pizarro, 2004; Stein & Levine, 1987). Because attention is a limited resource, emotions can also divert attention from other information, like state capitals, that may be relevant to the individual in the long run. So a child who can regulate her sadness or anger when entering a classroom should have a distinct intellectual advantage over one whose emotions continue to commandeer attention.

The simple claim that emotion regulation improves cognitive performance is not as straightforward as one might imagine, however. When faced with an emotional situation, people may regulate emotion in very different ways. They may attend to emotion, identify its causes, and allow it to inform their actions, or they may attempt to rid themselves of emotion (as the Stoics often recommended). These divergent approaches to regulating emotion are likely to have different effects on cognitive processes such as memory because each directs regulation efforts toward different sorts of information to execute the strategy (Gross, 1998a, 2002; Richards, Butler, & Gross, 2003; Richards & Gross, 1999, 2000). Our goal in the present research was to investigate the effects of emotional engagement and disengagement on children's memory for educational material.

The first broad type of strategy, emotional engagement, consists of attempting to "work through" an emotional experience by identifying emotions and their causes and devising ways to respond to the emotional experience. The view that it is adaptive to be aware of, express, and discuss one's emotions has a long history in psychology (e.g., Freud, 1917/1957). Many clinicians assume that expressing negative emotion facilitates coping as well as overall mental health and that ignoring aversive emotions is harmful (Shedler, Mayman, & Manis, 1993). Expressing emotion may help individuals integrate upsetting events into a meaningful causal sequence, promote a sense of mastery over events and emotional reactions to them, and lead to a feeling of resolution that allows individuals to turn their attention to other tasks (Klein & Boals, 2001; Lepore & Greenberg, 2002). Although it can lead to a brief increase in negative emotion, expressing thoughts and feelings about meaningful topics has been shown to have beneficial long-term effects on a variety of psychological and physical health outcomes (Frattaroli, 2006; Pennebaker, 1997; Pennebaker & Seagel, 1999).

It is not surprising, then, that emotional engagement is encouraged in many school-based emotion education curricula. In the Incredible Years program, for example, students are taught to detect emotions in themselves and in others, label emotions accurately, and talk about them (Webster-Stratton et al., 2001). Likewise, one of the primary objectives of the Promoting Alternative Thinking Strategies (PATHS) curriculum is to encourage the active discussion of feelings (Greenberg & Kusche, 1998). A recently developed emotion curriculum for children in the Head Start program uses puppets, emotion storybooks, and interactive games to increase children's ability to label and understand emotions (Izard, Trentacosta, King, & Mostow, 2004). These programs attempt to foster emotional competence by teaching children to identify emotions and their causes and to generate alternative solutions for managing emotional experiences (e.g., Elias & Tobias, 1996; Greenberg, Kusche, Cook, & Quamma, 1995).

A second broad type of regulatory strategy, emotional disengagement, involves attempting to eliminate subjective feelings and outward signs of emotion (Eisenberg, Cumberland, & Spinard, 1998). Emotional disengagement is often characterized in the psychological literature as ineffective and maladaptive (e.g., Shedler et al., 1993). Indeed, it is now well documented that suppressing facial, vocal, and bodily expression of emotion is ineffective as a means of diminishing negative feelings and sympathetic arousal (e.g., Campbell-Sills, Barlow, Brown, & Hoffman, 2006; Gross & Levenson, 1997). Expressive suppression also impairs memory for emotion-eliciting information. For example, in a series of experiments, Richards and Gross (1999, 2000) induced negative emotion by showing participants a set of disturbing images (e.g., pictures of severe injuries). Participants who were instructed to suppress all facial and bodily expression of emotion while viewing the images exhibited poorer memory for the images compared with participants who received no emotion regulation instructions. The negative effects of expressive suppression on memory have now been shown across a variety of experiments (e.g., Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Egloff, Schmukle, Burns, & Schwerdtfeger, 2006; Richards & Gross, 2006; for a review, see John & Gross, 2004) as well as in diary studies of emotion regulation in everyday life (Richards & Gross, 1999, 2000). Suppressing emotional expression has also been shown to deplete the regulatory resources needed for performing subsequent cognitive tasks (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Schmeichel, Vohs, & Baumeister, 2003). Richards and Gross (2000, 2006) have argued that the heightened awareness of the physiological, behavioral, and affective aspects of emotional experience necessary for expressive suppression draws cognitive resources away from processing other information, making it a costly strategy for regulating emotion.

Attempts to inhibit emotional thoughts and feelings also can be ineffective and have unfortunate consequences for memory. Suppressing emotional thoughts can lead to a rebound effect such that the frequency of those thoughts actually increases (e.g., Edwards & Bryan, 1997; Roemer & Borkovec, 1994; Wegner, Erber, & Zanakos, 1993; Wegner & Gold, 1995). Individuals who habitually attempt to inhibit or avoid emotional feelings, "repressive copers," are more physiologically reactive to emotional stimuli than nonrepressors (Weinberger, Schwartz, & Davidson, 1979) but have fewer memories of negative emotions and experiences (Davis & Schwartz, 1987; Holtgraves & Hall, 1995; Newman & Hedberg, 1999). The use of distraction to decrease negative feelings also impairs memory for emotional material (Richards & Gross, 2006).

It may seem obvious, then, that emotional disengagement is an unfruitful strategy when it comes to memory and that working through negative emotion may be a better solution. It is not known, though, whether the finding that emotional disengagement adversely affects memory for emotional information also applies to memory for subsequently presented nonemotional information. When comparing the effects of emotional engagement and disengagement on memory for educational material, emotional engagement may actually pose the greater immediate threat. According to functional theories of emotion, discrete emotions provide the motivational impetus for people to seek out information in the environment that can guide goal-directed thoughts and behaviors (e.g.,

Frijda, 1987; Lazarus, 1991; Levine & Pizarro, 2004; Oatley & Johnson-Laird, 1987). For example, fear signals danger and directs attention to threats in the environment; sadness signals irrevocable loss and directs attention to the outcomes and consequences of the loss (Levine, 1995; Levine & Burgess, 1997). Emotional engagement, with its labeling of emotions and their causes, should facilitate the search for emotionally relevant information in the environment and promote an effective response to the emotion-eliciting situation. It may do so, however, at the cost of directing attention away from material such as educational information that is not emotionally relevant.

Moreover, emotional disengagement need not always be a cognitive resource-guzzler. Because people are not very good at simply inhibiting emotional expressions, thoughts, and feelings (e.g., Gross, 1998a), they may use cognitive strategies to help them do so, such as reappraising emotional events as unimportant or temporary or attending to nonemotional information in the environment to distract themselves from their emotional state. Indeed, people who engage in repressive coping report more spontaneously distracting thoughts when instructed to focus on potentially unpleasant information (Boden & Baumeister, 1997; Bonanno, Davis, Singer, & Schwartz, 1991). Reappraisal and distraction have been shown to be effective in decreasing the intensity of negative emotions (Ayduk, Mischel, & Downey, 2002; John & Gross, 2004; Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Richards & Gross, 2006). Moreover, reappraising negative situations does not appear to impair memory for those situations (Egloff et al., 2006; for a review, see John & Gross, 2004). The effect of disengagement strategies on memory for nonemotional information, however, has yet to be examined. To the extent that people are able to use such strategies successfully to limit the attention allocated to emotional information, memory for nonemotional information may benefit.

In summary, because people may emotionally disengage by turning attention away from emotion-eliciting events and toward information in the environment, attempts to inhibit emotion may actually promote memory for nonemotional information. In contrast, emotional engagement, which involves focusing on emotions and their causes, may pose the greater immediate threat to memory for nonemotional information. Thus, although past research has shown that emotional disengagement can impair memory for emotional material, we hypothesized that this negative effect would not extend to memory for nonemotional material.

In testing this, we wanted to mimic children's experiences in educational settings. As a result, our study differed from previous research on emotion regulation and memory in three key ways. First, this study concerned children. We included younger and older elementary schoolchildren because advances in children's cognitive abilities during the elementary school years may increase the range of emotion regulation strategies they can call on or the effectiveness of those strategies. For example, during the middle childhood years, children make impressive gains in their ability to use cognitive reappraisal to down-regulate emotion (Altshuler & Ruble, 1989; Band & Weisz, 1988; Denham, 1998; Kopp, 1989; Saarni, 1999). Including younger and older children allowed us to explore age differences in the types of strategies children describe and how these strategies relate to their memory for educational material. Second, much of the research on the effects of emotional disengagement on memory has focused on expressive suppression. However, parents and peers often encourage children (explicitly or implicitly) to suppress the experience as well as the expression of emotion, conveying when it is unacceptable to feel angry, frightened, or sad (e.g., Eisenberg et al., 1998; Gottman, Katz, & Hooven, 1997). To be representative of children's experience, we asked children to suppress their feelings as well as the outward expression of emotion. Third, researchers have examined the effects of emotion regulation strategies on memory for emotional material, but the effects on memory for emotionally neutral information have yet to be investigated. Research on this issue is important because ongoing regulation efforts may influence memory for information encountered after an emotional event, for example, neutral information presented in the classroom. Thus, like the child who has to return to class after a playground quarrel and learn new material, we asked children to regulate emotion after an emotion-eliciting event had passed, rather than during it, and we assessed their memory for emotionally neutral educational material.

The Current Study

In the current study, we elicited sadness or neutral affect by having children watch a sad or neutral film. Children who saw the sad film were then instructed to engage in problem solving concerning their feelings or to emotionally disengage, or they received no emotion regulation instructions. All children then viewed a segment from an emotionally neutral, educational film and were subsequently tested on their memory for this film. We predicted that sadness would interfere with learning. Thus, when no emotion regulation instructions were given, children in a neutral affective state were expected to remember more of the educational film than children in whom sadness had been elicited. We further predicted that sad children who were instructed to disengage from their emotions would show better memory for the educational film than sad children who were instructed to work through their feelings or sad children who received no emotion regulation instructions. Finally, while watching the sad film (before receiving any emotion regulation instructions), children may have spontaneously tried to regulate their emotions. Therefore, at the end of the interview, we also asked children about strategies they used to relieve feelings of sadness while they watched the sad film. This allowed us to explore the types of spontaneous regulation strategies children generate at different ages and the relation of these strategies to memory.

Method

Participants

Participants were 100 younger children (M = 7 years, 3 months; SD = 7 months; range = 5 years, 2 months, to 8 years, 2 months) and 100 older children (M = 10 years, 2 months; SD = 7 months; range = 8 years, 10 months, to 11 years, 4 months). Fifty-seven of the children were male. Participants were recruited from public schools (25%), private schools (58%), and after-school centers (10%) in Orange and Riverside Counties in California and by contacting parents on a list of research volunteers at the University of California, Irvine (7%). The ethnicities of the participants were European American (56%), Latino (18%), African American

(11%), Asian American/Pacific Islander (4%), and other ethnic categories (2%); 9% had parents who did not report ethnicity. The majority of children were from middle-income homes.

Design

The study used a 4 (condition) × 2 (age group) between-subjects design. The four experimental conditions were as follows: (a) neutral film and no regulation instructions, (b) sad film and no regulation instructions, (c) sad film and emotional engagement instructions, and (d) sad film and emotional disengagement instructions. Twenty-five children from each age group were randomly assigned to each of the four conditions.

Materials and Procedure

Children were interviewed individually. The experimental session lasted approximately 45 min. One experimenter was present for the emotion elicitation, emotion regulation instructions, and educational film. This experimenter then left the room and a second experimenter, who was unaware of the children's experimental condition, administered the memory measures.

Verbal fluency measure. Because the memory measures relied on verbal responses, the verbal expression subtest from the Clinical Evaluation of Language Fundamentals—Revised (CELF–R; Semel, Wiig, & Secord, 1987) was used to control for verbal ability. Previous research has demonstrated adequate validity and reliability for the CELF–R subtest (Impara & Plake, 1996).

Baseline self-report of sadness. Children's self-reported sadness was assessed immediately before the emotion elicitation procedure. Children were asked to indicate how they felt by pointing to a face in a row of five drawings of faces. The first face depicted a neutral expression and the following four faces depicted progressively sadder expressions.[1]

Sadness elicitation and self-report. All then children watched a 6-min montage of scenes from *The Champ* (Lovell & Zeffirelli, 1979). In previous research, scenes from *The Champ* have been successfully used to elicit sadness (Gross & Levenson, 1995). All children first watched a neutral scene from the film that showed a boy, Billy, getting ready for bed. Children in the neutral film condition (Condition 1) then watched several other neutral scenes from the film, whereas children in the sad film conditions (Conditions 2, 3, and 4) watched scenes that showed Billy's horse becoming lame and Billy crying because his father had been badly injured. To assess the effect of the emotion elicitation, the sadness self-report measure was readministered immediately after children had watched the neutral or sad film.

Emotion regulation instructions. The emotion regulation instructions took 2–5 min and consisted of a set of instructions and questions from the experimenter and responses from the child. This is a format often used in school-based emotion education programs (Elias & Tobias, 1996; Elias et al., 1997). The emotional engagement instructions were designed to facilitate (a) identifying emotion, (b) identifying the causes of emotion, and (c) identifying strategies to reduce negative emotion. The questions, which concerned both the emotion of the protagonist in the film and the child's own emotional reaction to the film, were as follows:

> You just saw a film about a little boy. Watching this film makes some children sad. Right now, I want to ask you some questions about the film. If you feel sad, I want you to think about your sad feelings while you answer the questions. It's okay if you feel sad now, and it's okay to let yourself make a sad face. How did the boy in the film feel? Why did the boy feel that way? What could the boy do to make himself feel better? When you watched the boy crying, how did you feel? Why did you feel that way? What can you do to make yourself feel better?

The emotional disengagement instructions asked children not to feel or display sadness. To keep the structure of the instructions parallel to those in the emotional engagement condition, children in the emotional disengagement condition also responded to questions. These questions, however, concerned the neutral scene from the film montage in which the boy was preparing for bed:

> You just saw a film about a little boy. Watching this film makes some children sad. Right now, I want to ask you some questions about the film. If you feel sad, I want you to forget about your sad feelings so that you can answer the questions. It's better that you don't feel sad now, and it's better if you don't let yourself make a sad face. How did the boy in the film get ready for bed? Why did the boy get ready for bed? What could the boy do to make himself fall asleep? When you watched the boy getting ready for bed, did you feel tired? Why did you [didn't you] feel tired? When you go to bed, what do you do to make yourself fall asleep?

The instructions given to children in the no-emotion-regulation-instructions control conditions (Conditions 1 and 2) were similar in length and structure to those given in the two emotion regulation conditions, but made no mention of emotions. They asked children questions about the neutral scene that was shown to all children.

> You just saw a film about a little boy. Right now, I want to ask you some questions about the film. You can just stay in this chair while you answer the questions. It's okay if you sit back in the chair now and answer the questions. How did the boy in the film get ready for bed? Why did the boy get ready for bed? What could the boy do to make himself fall asleep? When you watched the boy getting ready for bed, did you feel tired? Why did you [didn't you] feel tired? When you go to bed, what do you do to make yourself fall asleep?

In summary, the emotional engagement instructions acknowledged the possibility that children might feel sad, asked children questions about the protagonist's and their own feelings, and asked them to think of strategies for feeling better. The emotional disengagement instructions told children not to feel or express sad-

[1] To decrease the chance of experimenter expectancy effects resulting from asking only about sadness, children also were asked to rate how happy they felt. The order of asking about happiness and sadness was randomly determined. For children who watched the neutral film, ratings of happiness and sadness were not correlated at any time point (i.e., at baseline, postfilm, or end of session). For children who watched the sad film, ratings of sadness and happiness after the film were negatively correlated, $r(148) = -.39$, $p < .0001$. We also assessed the relations among children's happiness ratings over time. Both for children who watched the neutral film and for children who watched the sad film, ratings of happiness were significantly correlated across time points (rs = .26 to .49, ps = .02 to .0001). In contrast, ratings of sadness across the three time points were not significantly correlated for either group (rs = −0.13 to 0.15, ps = .07 to .82). These findings suggest that children's happiness ratings may have reflected individual differences in well-being, whereas their sadness ratings may have been more sensitive to experimental events. Analyses were conducted with children's sadness ratings.

ness and asked questions about a neutral scene in the film. Children given no emotion regulation instructions were asked the same questions about the neutral scene in the film, but emotion was not mentioned.

Educational film and memory assessment. After these instructions, all children watched a 3-min educational film depicting a girl's visit to a factory where she learns about the mass production of bread (Flux, 1985). This film was chosen because of its similarity to the type of educational films often used in classrooms and because of its emotionally neutral content. Memory tasks were administered next and were audiotaped. The first task consisted of free recall. Children were asked to tell the experimenter everything they could remember starting from the beginning of the educational film. When the child stopped providing information, the experimenter asked, "What else do you remember about the bread-making film?" Next, 10 cued recall questions were asked concerning different details of the educational film (e.g., "When they make bread in the bakery, they use many different ingredients. What ingredient did the baker say every kind of bread begins with?"). If children indicated that they did not know or remained silent for more than 30 s, they were asked to guess. Children provided a final self-report rating of sadness after the memory assessment.

Debriefing and Assessment of Self-Reported Emotion Regulation Strategies

Children were then asked whether they had seen either of the two films they watched before. None had. All children who had watched the sad film were informed that the film made many children sad and that it was fine if they had felt sad about what they saw. To find out about emotion regulation strategies that children may have used spontaneously, children were asked to describe "what you did or thought to make yourself feel less sad" during the sad movie. Finally, to facilitate children's leaving in a positive mood, they were told that the boy's horse and father had recovered and were shown brief scenes from the film showing the boy reunited with his horse and playing happily with his father on the beach.

Data Coding

Data were coded by research assistants who were unaware of the research hypotheses and of participants' demographics and experimental condition. Children's verbal fluency was assessed using the CELF–R (Semel et al., 1987) with an interrater reliability of .90. Free and cued recall responses were coded using transcriptions of the audiotapes. To code free recall, each child received a score indicating the number of discrete events from the educational film that they recalled out of a total of 75 (e.g., a child received 1 point each for indicating that bread is made with flour, bread contains salt, the girl tasted the molasses, bread is baked, and bread is left to cool). Children's free recall scores ranged from 0 to 26 (M = 8.16, SD = 5.30). For each of the 10 cued recall questions, children received a score ranging from 0 to 2 depending on the accuracy and completeness of their answer. Thus, the range of possible scores for the cued response questions was from 0 to 20. Children's cued recall scores ranged from 1 to 20 (M = 9.78, SD = 3.91). Interrater reliability was .88 for free recall and .97 for cued recall. Coding of children's self-reported regulation strategies is described in the Results section.

Results

Effectiveness of the Emotion Elicitation Procedure

To find out whether children in the four conditions differed in their baseline ratings of sadness, we conducted a 2 (age group) × 4 (condition) analysis of variance (ANOVA) on the intensity of sadness children reported before the emotion elicitation procedure. No significant differences in baseline ratings of sadness were found (M = 1.27, SE = 0.05). The same analysis was conducted on children's ratings of sadness immediately after watching either the neutral film (Condition 1) or the sad film (Conditions 2, 3, and 4). (This second rating of sadness preceded instructions to regulate emotions.) The results showed a significant main effect of condition, $F(3, 199) = 8.50$, $p < .0001$. Follow-up t tests ($p < .05$) indicated that greater sadness was reported by children who watched the sad film (M = 2.27, SE = 0.11) than by children who watched the neutral film (M = 1.46, SE = 0.12). Thus, the emotion elicitation procedure was effective. This analysis was repeated for children's final ratings of sadness after the memory assessment. The results indicated that sadness had returned to baseline levels (M = 1.17, SE = 0.04) and did not differ significantly by age group, $F(1, 199) = 2.02$, $p = .16$, or by experimental condition, $F(3, 194) = 0.63$, $p = .59$. Five children in the neutral film condition who reported feeling very sad were removed from subsequent analyses, leaving 45 participants in the neutral film condition and 50 participants in each of the other three conditions.[2]

Preliminary Analyses

In preliminary analyses, we examined the relation between children's verbal fluency scores and other study variables as well as the relation between the two memory measures. A 2 (age group) × 2 (gender) × 4 (experimental condition) ANOVA was conducted on verbal fluency. The results showed only a significant effect of age group. As expected, older children had higher verbal fluency scores (M = 11.91, SE = 0.27) than did younger children (M = 10.10, SE = 0.27), $F(3, 194) = 22.43$, $p < .0001$. We also computed Pearson partial correlations (controlling for age group) to examine the association between children's verbal fluency and their sadness ratings. Analyses of baseline sadness ratings included all participants. Analyses of sadness ratings after the emotion elicitation, and after the memory task, were conducted separately for participants in the neutral film condition (n = 45) and in the sad film conditions (n = 150). The results showed no significant

[2] The analytic strategy used in this study was to contrast children in a neutral affective state with those who had been induced to feel sadness (and subsequently received different emotion regulation instructions). To have a true neutral affect comparison group, we omitted 5 children (4 younger and 1 older) from the neutral condition who reported feeling very sad for reasons that may have been unrelated to the study. These participants met conventional criteria for outliers. The sum of their sadness ratings before and after the neutral film ranged from 6 to 9, more than 2 standard deviations above the summed rating for children in the neutral condition (M = 2.88, SD = 1.51). Including these outliers does not change the findings concerning the effects of experimental condition on memory, with the exception of one contrast: The significant difference between cued recall scores in the neutral film–no instructions condition and the sad film–no instructions condition becomes a trend ($p = .13$).

associations between verbal fluency and sadness ratings (rs = −.11 to .13, ps = .09 to .98). Pearson correlations were also computed to assess the relation between children's verbal fluency scores and their memory for the educational film. Greater verbal fluency was associated with higher scores for free recall, $r(193) = .44$, $p < .0001$, and for cued recall, $r(193) = .31$, $p < .0001$. Therefore, verbal fluency was included as a covariate in all analyses of memory. Finally, Pearson correlations were computed between children's free and cued recall scores. A fairly high correlation was found between the two memory measures, $r(193) = .49$, $p < .0001$.[3]

Effects of Sadness and Emotion Regulation Instructions on Memory

Next, we examined the effects of viewing a sad versus a neutral film, and the effects of emotion regulation instructions, on children's memory for the educational film. Figure 1 shows children's mean free recall and cued recall scores by condition. Separate 2 (age group) × 4 (condition) analyses of covariance were conducted on children's scores for free recall and for cued recall, controlling for verbal fluency. The results for free recall showed that older children recalled more of the educational film ($M_{adjusted} = 10.29$, $SE = 0.45$) than did younger children ($M_{adjusted} = 6.30$, $SE = 0.46$), $F(1, 194) = 35.82$, $p < .0001$. A significant effect of the covariate, verbal fluency, was also found, $F(1, 194) = 24.03$, $p < .0001$. Although Figure 1 shows the same general pattern of results for free and cued recall, no significant effect of condition was found for free recall, $F(1, 194) = 0.11$, $p = .96$, and no interaction between age and condition was found.

With respect to cued recall, older children again recalled more of the educational film ($M_{adjusted} = 12.03$, $SE = 0.31$) than did younger children ($M_{adjusted} = 7.73$, $SE = 0.32$), $F(1, 194) = 88.72$, $p < .0001$. A significant effect of the covariate, verbal fluency, was again found, $F(1, 194) = 4.80$, $p = .03$. In addition, as shown in Figure 1B, children's cued recall scores differed significantly by condition, $F(3, 194) = 2.94$, $p = .03$. Follow-up planned comparisons showed that children who viewed a neutral film and received no emotion regulation instructions recalled more details from the subsequent educational film ($M_{adjusted} = 10.25$, $SE = 0.45$) than did children who viewed a sad film and received no regulation instructions ($M_{adjusted} = 9.05$, $SE = 0.43$), $t(194) = 1.94$, $p = .05$, $r^2_{pb} = .04$. As predicted, then, viewing a sad film interfered with children's memory for subsequent educational material. Also as predicted, among children who saw the sad film, those instructed to disengage from sadness recalled more details from the educational film ($M_{adjusted} = 10.70$, $SE = 0.42$) than those who received no emotion regulation instructions ($M_{adjusted} = 9.05$, $SE = 0.43$), $t(194) = 2.73$, $p = .007$, $r^2_{pb} = .07$. Children instructed to disengage also recalled more details than children instructed to work through feelings of sadness ($M_{adjusted} = 9.54$, $SE = 0.42$), $t(194) = 1.95$, $p = .05$, $r^2_{pb} = .04$. Children given no emotion regulation instructions and those instructed to work through sadness did not differ significantly in their cued recall scores, $t(194) = 0.80$, $p = .42$. No interaction between age and condition was found.

Children's Self-Reported Emotion Regulation Strategies

We were also interested in how children regulated their feelings while watching the sad film, before receiving the emotion regulation instructions. To avoid interfering with the instructions given after the sad film, we waited until the end of the experimental session to ask children how they had regulated their feelings. As a result, some children may have forgotten strategies they used. Moreover, children's responses may have been influenced by the emotion regulation instructions they received. Nevertheless, their reports are useful for exploring the types of strategies children describe at different ages, as well as for examining associations between these strategies and memory for educational material.

Of the 150 children who saw the sad film, 137 were asked what they did or thought to make themselves feel less sad during the film. (The remaining 13 children were not asked this question because of time constraints.) Children's strategies were coded as "cognitive engagement" if they described reappraising the content of the sad film (e.g., "I thought the horse would get better" and "I thought everything would turn out good and Billy would get over [that] his dad was sick") or thinking about the film more generally ("I thought about the movie and I started to feel better"). Strategies were coded as "cognitive disengagement" if they described reappraising the importance of the sad film (e.g., "It was just a movie and that's all," "I thought about it was just pretend," and "thinking this will be over with") or distraction (e.g., "Just stop thinking about it," "I just forgot about it," "Thought about something else," and "I thought about my friends and how they are nice to me"). Strategies were coded as behavioral if they described suppressing or changing emotional expressions (e.g., "Usually I cry during sad movies . . . but I tried not with this one" or "Tried to smile), gaze aversion (e.g., "I closed my eyes"), or watching the film (e.g., "Just watched it"). Responses were coded as "no strategy" if children did not describe regulating at all (e.g., "I couldn't help it, I kept being sad," "Nothing," and "I don't know"). When children reported more than one strategy ($n = 8$), the first strategy was coded. Two raters who were unaware of children's age, experimental condition, and memory scores coded children's self-reported strategies and agreed on 96% of the categorization decisions ($\kappa = 0.95$).

The first half of Table 1 shows the percentage of children who reported each type of strategy by age group. A 2 (age group) × 5 (strategy type) chi-square analysis showed that children's strate-

[3] Preliminary analyses revealed no differences in sadness ratings or memory measures by gender or ethnicity. Therefore, gender and ethnicity were not included in subsequent analyses. Specifically, separate ANOVAs were conducted on children's sadness ratings at baseline, after the emotion elicitation, and at the end of the session. The independent variables were gender, neutral versus sad film conditions, and their interaction. The results showed no significant main effect of gender or interaction. Next, separate analyses of covariance (controlling for verbal fluency) were conducted on children's cued and free recall scores. The independent variables were gender, experimental condition, and their interaction. The results showed no significant main effect of gender or interaction. Similar analyses, substituting ethnicity for gender, revealed no significant differences in sadness ratings or memory scores as a function of ethnicity and no significant interactions. Finally, chi-square analyses indicated that the frequency of children's self-reported strategies did not differ by gender or ethnicity.

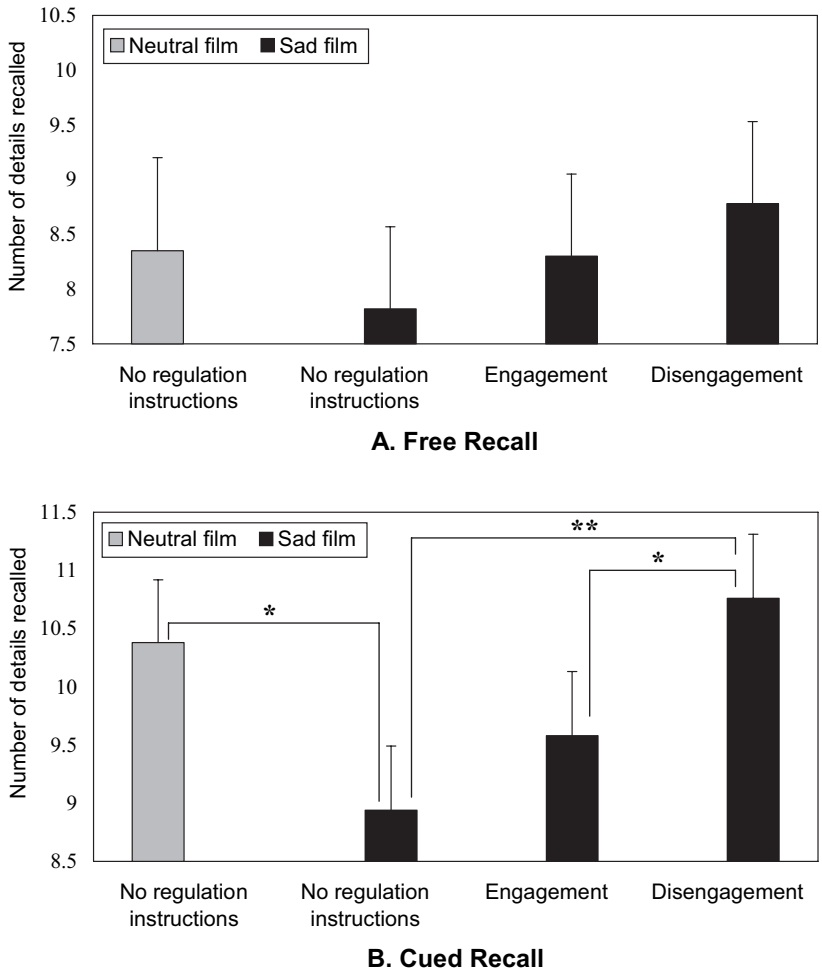

Figure 1. Mean free recall and cued recall of details of an educational film by experimental condition. Bars represent the standard error of the means. *$p = .05$. **$p < .01$. (Means adjusted for age and verbal fluency are reported in the text.)

gies differed by age group, $\chi^2(4, N = 137) = 23.44$, $p < .0001$. Older children reported reappraising the outcome of the sad film, and reappraising the importance of the sad film, more often than did younger children. In contrast, younger children reported using distraction or no strategy more often than did older children. The frequency of reporting behavioral strategies was similar for older and younger children. A 3 (experimental condition) × 5 (strategy type) chi-square analysis showed no significant difference in the types of strategies children described by experimental condition, $\chi^2(8, N = 137) = 6.35$, $p = .61$. This suggests that the emotion regulation strategies children reported having used during the sad film were not influenced by the instructions they received afterward.[4]

In preparation for further analyses, we then grouped children's strategies into three general types corresponding to the focus of our investigation: cognitive engagement, cognitive disengagement, and behavioral or no strategy. Behavioral strategies were combined with no strategy because they were both infrequent and diverse (expressive suppression, $n = 4$; gaze aversion, $n = 5$; and watching the film, $n = 3$).[5] The second half of Table 1 shows the percentage of children who reported each general type of strategy by age group. For this broader grouping, chi-square analyses again showed that children's strategies differed by age group, $\chi^2(2, N = 137) = 12.65$, $p = .002$, but not by experimental condition, $\chi^2(4, N = 137) = 4.27$, $p = .37$.

[4] To find out whether the children's strategies were related to their verbal fluency, we conducted a 5 (strategy type) × 2 (age group) ANOVA with verbal fluency as the dependent variable. The result showed a main effect of age, but children's verbal fluency scores did not differ significantly by strategy type. To find out whether children's strategies were related to the intensity of sadness they reported feeling after watching the sad film, we conducted a 3 (strategy type) × 2 (age group) ANOVA with self-reported sadness as the dependent variable. Children's sadness ratings did not differ significantly by age or strategy type.

[5] Children who reported behavioral strategies did not differ from children who reported no strategy on measures of verbal fluency, intensity of sadness, or memory performance. The frequency of reporting behavioral strategies was similar across experimental conditions (no instructions, $n = 5$; disengagement, $n = 2$; and engagement, $n = 5$).

Table 1
Percentage of Children Reporting Specific Emotion Regulation Strategies and General Types of Strategies by Age Group (N = 137)

Type of strategy	Younger (n = 65)	Older (n = 72)
Specific		
Cognitive engagement: Reappraise or focus on sad events[a]	5	21
Cognitive disengagement: Reappraise importance of sad film	6	28
Cognitive disengagement: Distraction	38	25
Behavioral strategy[b]	11	7
No strategy	40	19
General		
Cognitive engagement	5	21
Cognitive disengagement	45	53
Behavioral or no strategy	51	26

[a] Cognitive engagement strategies primarily consisted of reappraising the events depicted in the sad film (n = 15); a few children described focusing on the film more generally (n = 3). [b]Behavioral strategies included suppressing or changing emotional expressions (n = 4), gaze aversion (n = 5), and watching the film (n = 3).

Children's Self-Reported Strategies and Memory

To explore the relation between children's self-reported strategies and their memory for educational material, we conducted separate hierarchical regression analyses on children's free and cued recall scores, including children's self-reported strategies and experimental condition as predictors. Regression analyses were conducted because of the marked variation in the frequencies with which children reported different strategies. In the first step of the analyses, we included age group (younger = 0, older = 1) and verbal fluency (centered) as predictors. We also included self-reported strategy with cognitive disengagement strategy and cognitive engagement strategy represented as two indicator variables (both coded 0, 1) and no strategy or a behavioral strategy used as the reference group. Similarly, we included experimental condition with the disengagement and engagement conditions represented as two indicator variables (both coded 0, 1) and the no-emotion-regulation-instructions condition used as the reference group.

We were also interested in whether a memory advantage might be found when children's self-reported strategies matched the instructions they received afterward. Therefore, in Step 2 we added two interaction terms: Cognitive Disengagement Strategy × Disengagement Condition and Cognitive Engagement Strategy × Engagement Condition. Finally (as can be seen in Table 1), the types of cognitive disengagement strategies reported by younger and older children differed. Younger children most often reported using distraction, and older children were about equally as likely to report using distraction and reappraising the importance of the sad film. Therefore, we included a third interaction term, Age Group × Cognitive Disengagement Strategy. No significant interactions were found for either analysis, so these terms were dropped from the final model. The final model thus included age group, verbal fluency, cognitive disengagement strategy, cognitive engagement strategy, disengagement condition, and engagement condition.

The results showed that better free recall performance was associated with being older, $t(136) = 6.13$, $p < .0001$, $\beta = 0.44$; with greater verbal fluency, $t(136) = 3.57$, $p = .0005$, $\beta = 0.25$; and with reporting a cognitive disengagement strategy relative to no strategy or a behavioral strategy, $t(136) = 3.49$, $p = .0007$, $\beta = 0.26$. These factors accounted for somewhat less than half of the variance in free recall scores ($R^2 = .43$), $F(6, 136) = 16.08$, $p < .0001$. Better cued recall performance was associated with being older, $t(136) = 8.86$, $p < .0001$, $\beta = 0.59$; with reporting a cognitive disengagement strategy relative to no strategy or a behavioral strategy, $t(136) = 3.08$, $p = .003$, $\beta = 0.21$; and with being in the disengagement condition relative to the no instructions condition, $t(136) = 3.08$, $p = .003$, $\beta = 0.23$. These factors accounted for half of the variance in cued recall scores ($R^2 = .50$), $F(6, 136) = 21.73$, $p < .0001$. Thus, reporting a cognitive disengagement strategy was associated with better free and cued recall of subsequent educational material relative to reporting no strategy or a behavioral strategy.

Discussion

The results of this study demonstrate that feeling sad can interfere with children's memory for educational material. Children who watched a sad film showed a deficit in their ability to recall subsequent educational material compared with children who watched a neutral film. This finding is consistent with the view that aversive emotions exert a demand on cognitive resources such that attention becomes more focused on goal-relevant information and is diverted from processing other information (e.g., Frijda, 1987; Lerner & Keltner, 2000; Levine & Pizarro, 2004). It also supports the suggestion that experiencing aversive emotions in the classroom creates a learning disadvantage (Faber & Mazlish, 1995). The fact that sad children remembered less educational material underscores the importance of promoting effective emotional regulation in the classroom.

But what regulatory strategies should be taught? To address this question, we compared the effects on memory of two broad types of regulatory strategies: emotional engagement (i.e., "working through" negative emotion) versus disengagement. We found that instructing children to disengage after watching a sad film facilitated their memory for subsequently presented material. Specifically, children coached to curb both the feeling and the expression of sadness performed better on a test of cued recall of an educational film than did children coached to work through negative emotion or children who received no emotion regulation instructions.

These findings extend previous research on emotional disengagement. In past research, attempts to regulate emotion using expressive suppression, distraction, and repressive coping have all been associated with poorer memory for emotional stimuli or events (Davis & Schwartz, 1987; Holtgraves & Hall, 1995; John & Gross, 2004; Newman & Hedberg, 1999; Richards & Gross, 2006). Reappraisal preserves memory for emotional material (e.g., John & Gross, 2004) but has not been shown to improve it. In the current study, children asked to inhibit emotion showed better memory for subsequently presented educational material. Taken together, these findings indicate that although emotional disengagement does not enhance memory for emotional material, it can enhance memory for subsequent material that is emotionally neutral in nature. It is important to emphasize that the sequence of events in this study (i.e., emotion elicitation, emotion regulation,

and encoding) mirrors a common occurrence outside the laboratory. Children often experience emotions in response to events and then attempt to regulate these emotions. Attempts to regulate emotion often precede other events to which children must devote their attention. The finding that emotional disengagement facilitated memory for educational information is noteworthy given the need in the real world (e.g., the classroom) to regulate emotions even after the immediate cause of emotion has passed.

This research provides an important first step toward understanding the immediate cognitive consequences of different broad types of emotion regulation strategies in children. Further research is needed, however, to identify the precise mechanisms through which disengagement enhanced memory. Children instructed to emotionally disengage may have recruited cognitive strategies to help them do so, such as turning their attention toward nonemotional information or minimizing the importance of the emotion-eliciting event. This in turn may have allowed our young Stoics to attend to subsequent educational material.

The results concerning children's spontaneous emotion regulation strategies are consistent with this view. Near the end of the experimental session, children were asked what they did or thought to make themselves feel better while they were watching the sad film. Thus, children were describing strategies they used before they received instructions to regulate emotion, and analyses showed that these self-reported strategies were independent of experimental condition. Children reported having used a range of strategies including cognitive disengagement (distraction or reappraising the importance of the sad film), cognitive engagement (reappraising or attending to the content of the sad film), behavioral strategies (looking at or away from the film or trying not to cry), and not regulating at all.

Although we asked children what they "did or thought" to make themselves feel less sad, cognitive strategies were reported far more frequently than behavioral strategies by both age groups. Younger and older children differed, however, in the types of cognitive strategies they described. Younger children (averaging 7 years of age) reported distracting themselves more often than did older children (e.g., "Just stop thinking about it" and "I thought of something more happy"). Older children (averaging 10 years of age) reported reappraising the importance of the sad film (e.g., "It was just a movie and that's all") or reappraising the content of the sad film (e.g., "I thought the horse would get better") far more often than did younger children. These findings support past research showing that children make impressive gains in their ability to engage in reappraisal across the middle childhood years (Altshuler & Ruble, 1989; Band & Weisz, 1988; Kopp, 1989; Saarni, 1999).

Turning to memory, we found that reporting a cognitive disengagement strategy (primarily distraction for younger children and either distraction or reappraisal for older children) was associated with better memory for the educational film relative to reporting no strategy or a behavioral strategy. This finding is based on correlational data. So unlike the finding that instructions to disengage promoted memory for nonemotional information, a causal link cannot be made between children's self-reported cognitive disengagement strategies and their memory. The results suggest, however, that children asked to suppress emotion can make effective use of cognitive strategies to help them do so, allowing them to turn their attention to nonemotional information.

Alternative Explanations

Several alternative explanations for the finding that emotional disengagement enhanced children's memory are inconsistent with the results of the current study or with the findings of a substantial body of past research. One such explanation is that suppressing facial and bodily expression of emotion, rather than using cognitive disengagement strategies, enhanced children's memory for nonemotional information. We did not ask children to describe the specific strategies they used to follow our instructions to inhibit sadness. When children were asked what they did or thought to regulate sadness during the sad film, however, only 3% reported engaging in expressive suppression, whereas 62% reported having used some type of cognitive strategy. In addition, previous research has shown that expressive suppression depletes regulatory resources needed for performing subsequent cognitive tasks (Baumeister et al., 1998; Schmeichel, Vohs, & Baumeister, 2003). In future research, it will be important to distinguish the effects of behavioral and cognitive disengagement strategies on memory for educational material. Children's self-reported strategies and past research findings suggest, however, that children in this study used primarily cognitive strategies to follow our instructions to inhibit sadness.

A second alternative explanation is that emotionally neutral questions embedded in the emotional disengagement instructions were sufficient to distract children from their sad feelings. Children instructed to disengage and those who received no regulation instructions responded to identical questions about the protagonist's bedtime routine. Had questions about the neutral scene been sufficient to distract children from feelings of sadness, then we would have found no difference in memory performance between the disengagement and no-instructions groups. Instead, children instructed to emotionally disengage showed better memory performance.

Finally, it is unlikely that the emotional engagement instructions encouraged rumination, a response style associated with poor outcomes (e.g., Lyubomirsky et al., 1998). Rumination has been defined as thinking repetitively and passively about one's negative emotions, focusing on symptoms of distress, and worrying about the meaning of this distress (Nolen-Hoeksema, 1998). The engagement and disengagement instructions referred to sadness equally as often. In the engagement condition, the interviewer acknowledged the possibility that children might feel sad; asked children to identify the protagonist's and their own feelings; and then asked what the protagonist could do, and what they could do, to feel better. These instructions undoubtedly directed children's attention to sad feelings and events, but because they moved quickly from identifying emotion to generating coping strategies or solutions, they were unlikely to have led to rumination.

Limitations

This study had several limitations. Children were given broad instructions to inhibit both the feeling and the expression of sadness, and they were not asked how they had regulated in response to these instructions. In future research, to determine the effects on memory of specific disengagement strategies (i.e., expressive suppression, thought suppression, distraction, or reappraisal), it will be important to instruct children to use specific

types of disengagement strategies and to have them describe how they went about following those instructions. It will also be important to assess the effects of disengagement strategies on memory for emotional information and subsequently presented nonemotional information in the same study.

In the current study, we judged that asking children how sad they felt, right after instructing them not to feel sad, would be unlikely to yield useful information. Therefore, we waited until after children had watched and recalled an educational film and been debriefed to get a final rating of sadness. By this time, however, sadness ratings had returned to baseline levels and did not differ for children who had received different emotion regulation instructions. This made it impossible to assess whether a decrease in sadness following instructions to disengage mediated the positive effect of these instructions on memory. In future research, experimenters might assess this important potential mediator by videotaping children's facial expressions or by having a second interviewer ask children about their "true" feelings shortly after instructions to regulate emotion as well as after a delay.

The extent to which the current findings generalize to other types of emotion-eliciting events also needs to be examined. The film used to evoke sadness in the current study concerned issues of attachment and loss that are relevant to children. But children were aware that they were watching fictional events that did not involve them personally. Moreover, they inhibited emotion for only a brief period of time. Under these conditions (i.e., short-term emotional disengagement from a fairly benign sad event that had few or no lasting implications for the child), emotional disengagement facilitated memory for emotionally neutral information. Future research is needed to determine whether emotional disengagement promotes memory for neutral information when emotions are evoked by personal experiences with lasting consequences (e.g., family discord, being teased on the playground, or receiving a poor grade on a test) and when emotional disengagement is prolonged.

Implications and Conclusions

In summary, we found that children instructed to emotionally disengage were able to successfully direct their attention away from emotion-eliciting events to attend to and remember educational material. On the basis of the associations found between children's self-reported strategies and their memory, it seems likely that children accomplished this by recruiting cognitive disengagement strategies such as distraction and reappraisal of the importance of emotion-eliciting events.

A few studies support the view that emotional disengagement can potentially fulfill adaptive functions that extend beyond the ages and emotion-eliciting events in the current study. In one study, for instance, adults watched a disturbing video depicting a rape and were then interviewed in a manner that challenged or validated their emotional response. Two days later, adults who had been challenged with an emotionally distanced perspective on the video were less distressed and had fewer intrusive thoughts compared with adults whose feelings had been validated (Lepore, Fernandez-Berrocal, Ragan, & Ramos, 2004). Other investigators have found an association between the use of repressive coping strategies and better overall adjustment among adolescent girls with histories of sexual abuse (Bonanno, Noll, Putnam, O'Neill, & Trickett, 2003) and middle-aged adults coping with the recent death of a spouse (Bonanno, Keltner, Holen, & Horowitz, 1995).

It would be a mistake, however, to conclude that emotional disengagement is in general a healthy and effective strategy. Disengagement in the face of ongoing or traumatic events has also been linked with prolonged distress (e.g., Cioffi & Holloway, 1993; Coffey, Leitenberg, Henning, Turner, & Bennett, 1996; Epping-Jordan et al., 1999) and with symptoms of posttraumatic stress (Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). The effects of disengagement are particularly negative if there is a continuous threat to well-being (Carver & Scheier, 1999). The specific conditions under which emotional disengagement promotes or impairs cognitive and emotional functioning are promising avenues for future research.

Nor can one conclude that emotional engagement is ineffective. Studies have shown that children's academic performance improved when they were enrolled in emotion education programs that incorporated elements of emotional engagement (Aber et al., 1996; Elias et al., 1997; Goleman, 1995; Greenberg & Kusche, 1998; Zins, Weissberg, Wang, & Walberg, 2004). Moreover, benefits of expressing distress may take time to emerge (Kennedy-Moore & Watson, 2001). For example, in studies showing positive effects of expressive writing about trauma, the immediate consequences of expression were often increased arousal (Frattaroli, 2006). Thus, in the current study, emotional engagement may have first increased the intensity of children's feelings because the strategy requires an initial focus on the aversive emotion. The finding that emotional engagement did not enhance memory suggests, however, that the effects of emotional engagement on learning in the classroom may be indirect rather than direct. Emotional engagement may foster general socioemotional development that, in turn, facilitates social relationships and a classroom environment conducive to learning.

In conclusion, this study demonstrated that sadness impairs, and disengaging from sadness can promote, memory for educational material. The cognitive costs of several forms of emotional disengagement are well documented, but we may want to reappraise their value. When nonemotional matters demand attention, children asked to briefly inhibit mild negative emotion appear to be able to do so, and with positive results for learning. These findings underscore the need to judge the adaptiveness of emotion regulation strategies in a broad context (Bonanno et al., 2004; Clark & Finkel, 2004). A strategy that is harmful in one set of circumstances may be well suited to another, and temporary disengagement from emotion while deferring the use of other regulatory strategies may often be an adaptive approach (Kennedy-Moore & Watson, 2001). The current findings demonstrate that emotional disengagement can serve this "stopgap" function and be beneficial when time is limited and nonemotional matters must be addressed. Within this broader context, the Stoics' contentions have merit. Temporary emotional disengagement may help children concentrate on learning until they have the time and resources to call on other regulation strategies that are more adaptive in the long run.

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