The Importance of Being Flexible
The Ability to Both Enhance and Suppress Emotional Expression Predicts Long-Term Adjustment

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ABSTRACT
Researchers have documented the consequences of both expressing and suppressing emotion using between-subjects designs. It may be argued, however, that successful adaptation depends not so much on any one regulatory process, but on the ability to flexibly enhance or suppress emotional expression in accord with situational demands. We tested this hypothesis among New York City college students in the aftermath of the September 11th terrorist attacks. Subjects' performance in a laboratory task in which they enhanced emotional expression, suppressed emotional expression, and behaved normally on different trials was examined as a prospective predictor of their adjustment across the first two years of college. Results supported the flexibility hypothesis. A regression analysis controlling for initial distress and motivation and cognitive resources found that subjects who were better able to enhance and suppress the expression of emotion evidenced less distress by the end of the second year. Memory deficits were also observed for both the enhancement and the suppression tasks, suggesting that both processes require cognitive resources.

Is it better to express or conceal one's emotions? Although scholars have debated this question for centuries, research over the past few decades suggests that both expressing and suppressing the expression of emotion can serve adaptive ends, but also that both behaviors may extract some cost (Bonanno, 2001; Gross, 1998b). How can these competing findings be reconciled? Recent research on coping has indicated that the crucial element in successful adaptation is not so much which particular strategies are used, but rather whether coping strategies are applied flexibly in a manner that corresponds with the nature of the stressor (e.g., Cheng, 2001). In a similar vein, emotion theorists have increasingly argued that whether one expresses or suppresses emotional expression is not as important for adjustment as is the ability to flexibly express or suppress emotional expression as demanded by the situational context (Barrett & Gross, 2001; Bonanno, 2001; Consedine, Magai, & Bonanno, 2002; Parrott, 1993; Westphal & Bonanno, 2004).

It is widely accepted that emotions are not unidimensional phenomena, but rather manifest themselves through multiple response channels, including emotional experience, expression, and physiology. Each of these components is thought to serve distinct adaptive ends and to be subject to self-regulatory processes (Bonanno, 2001; Gross, 1998b). The expression of emotion serves multiple adaptive functions, including communicating and regulating internal states (Ekman & Davidson, 1993; Izard, 1990; Zajonc, Murphy, & Inglehart, 1989) and developing and maintaining social interactions (Darwin, 1872; Ekman, 1993; Keltner, 1995). There are times, however, when expressing emotion may be harmful (Gross & Muñoz, 1995;

Kennedy-Moore & Watson, 2001). For example, the chronic expression of negative emotion (in particular, anger) is a risk factor in cardiovascular disease (Adler & Matthews, 1994). At times, it may be more adaptive to suppress rather than express emotion (Consedine et al., 2002; Parrott, 1993). The ability to hide one's feelings is useful in myriad social situations (e.g., not showing fear while presenting a speech, minimizing the expression of anger during conflict mediation) and the idea that this ability is important resonates with evolutionary considerations of the ubiquity and survival value of deception (de Waal, 1989; Trivers, 1985). In extremely adverse conditions, the ability to modulate display of negative emotions can foster the recovery of normal functioning (Bonanno & Keltner, 1997), help maintain and expand social networks (Coyne, 1976; Harber & Pennebaker, 1992), and facilitate close personal relationships (Levenson & Gottman, 1983).

Despite its potential usefulness, expressive suppression, like emotional expression, may extract serious costs if employed indiscriminately or chronically. To measure emotional suppression, Gross and Levenson (1993, 1997) developed a between-subjects paradigm in which some subjects were instructed to conceal all outward signs of emotion and then exposed to emotional stimuli. Using this paradigm, Gross and Levenson found that although suppressing subjects reported the same level of negative experience as control subjects, they exhibited heightened sympathetic activity (Gross, 1998a; Gross & Levenson, 1993, 1997), had poorer memory for the emotional stimuli (Richards & Gross, 2000), and engendered reduced rapport and willingness to affiliate in dyadic partners (Butler et al., 2003).

Although the confluence of this evidence clearly suggests that successful adaptation depends on the ability to both enhance and suppress emotional expression and to do so flexibly in accord with situational demands, this idea has never been tested directly. The current investigation was designed to redress this deficit by examining subject's performance in a laboratory study of expressive regulation as a prospective predictor of their adjustment following a potentially stressful life transition. More specifically, we modified the between-subjects suppression paradigm developed by Gross and Levenson (1993) in two important ways. First, to examine the ability of individuals to flexibly regulate emotional expression both upward and downward, we developed a within-subjects task that included conditions for the enhancement and the suppression of emotional expression, as well as a control condition in which participants were instructed to behave as they would normally. Our inspiration for this design was a recent within-subjects study of enhancement and suppression of emotional experience (Jackson, Malmstadt, Larson, & Davidson, 2000). By manipulating expressive regulation within subjects, we were also able to examine whether the memory deficits associated with suppression might also be observed following expressive enhancement. Richards and Gross (2000) suggested this deficit was due to the cognitive load associated with suppressing. We assumed that expressive enhancement would also tax cognitive resources and therefore produce a similar memory deficit.

Second, we examined the ability to regulate emotional expression upward and downward as a prospective predictor of long-term adjustment in a sample of New York City college students. Many students experience at least some increase in distress during the transition to college life (Gerdes & Mallinckrodt, 1994). The students in the current study began college in New York City just prior to the September 11th terrorist attacks, and this transition was likely to have been particularly difficult for students with poor emotion-regulation skills. On the basis of the assumption that the ability to flexibly enhance and suppress the expression of emotion promotes adaptation, we predicted that greater ability to perform these tasks soon after beginning college would be correlated with better adjustment by the end of the second year in college.

METHOD

Subjects and Procedure

Within 1 month after beginning college, 101 New York City undergraduates (67 female, 34 male; mean age = 18.05 years, $SD = 0.59$) completed a 32-item version of the Symptom Checklist-90-Revised (Derogatis, 1983) as a measure of initial (T1) distress. One to 3 months later, these subjects participated individually in an expressive-regulation experiment. Long-term adjustment was assessed by repeating the distress measure at the end of the second academic year (T2). Fourteen subjects (14%) dropped out of the study before T2, leaving 87 subjects for longitudinal analyses. Subjects who dropped out did not differ from remaining subjects on any variable measured in this study ($p > .15$). Subjects were paid $250 for each year they participated.

For the expressive-regulation task, subjects were seated before a desktop computer and filmed from a one-way mirror positioned above their line of vision. They were instructed in how to interact with software that displayed blocked sequences of five digitized picture stimuli selected from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1995). College-student norms (Lang et al., 1995) were used to balance stimuli for valence and arousal across blocks. Within each block, each stimulus was presented for 10 s, with 4 s between stimuli. For practice, subjects viewed randomly presented blocks of positive or negative stimuli, and following each block rated the degree to which they felt “negative emotion (e.g., anger, revulsion, sadness, distress),” by typing a number between 1 (*no negative emotion*) and 7 (*extreme negative emotion*), and then the degree to which they felt “positive emotion (e.g., happiness, joy, amusement, interest),” using a similar scale.

Following practice trials, subjects were told that there was another subject in the adjacent room who would also take part in the experiment (another subject was not actually present in the adjacent room); that they would not see the other person, but the other person would sometimes be able to view them on a video monitor; that they would always be informed when the monitor was on and when it was off; and that the other person could not hear them or see the picture stimuli but would attempt to guess their emotions for each block of stimuli. The instructions further explained that when the experiment began, the computer would (a) sometimes ask subjects to enhance their expression of emotion so the observer could more easily guess what they were feeling, (b) sometimes ask them to suppress their expression of emotion so the observer could not easily guess what they were feeling, and (c) sometimes inform them that the monitor was turned off and that the observer would be unable to see them, in which case they should behave as they would normally. Subjects were then shown three paragraphs, one describing each condition.

The paragraph for the *expression condition* was as follows:

The monitor is on. Shortly, you will be presented with a set of images. Please view each image carefully. While viewing the images, please do your best to ***express*** as fully as possible the emotions you feel while viewing the images. Remember that the person viewing you on the monitor can only see your head and part of your upper torso, and cannot hear you. It is important for the sake of this study that you do your best to ***communicate what you are feeling***. So please do the best you can to ***behave in such a way that the person viewing you on a monitor will be***

able to guess what you are feeling while viewing the images. When you have viewed each image, you will be asked to rate the emotional reactions you had to the images.

The *suppression condition* was described as follows:

> ***The monitor is on***. Shortly, you will be presented with a set of images. Please view each image carefully. While viewing the images, please do your best to ***suppress*** as fully as possible any expression of the emotions you feel while viewing the images. Remember that the person viewing you on the monitor can only see your head and part of your upper torso, and cannot hear you. It is important for the sake of this study that you do your best to ***conceal what you are feeling***. So please do the best you can to ***behave in such a way that the person viewing you on a monitor will not be able to guess what you are feeling while viewing the images***. When you have viewed each image, you will be asked to rate the emotional reactions you had to the images.

The third paragraph described the *monitor-off* condition:

> ***The monitor is off***. Shortly, you will be presented with a set of images. Please view each image carefully. ***The person in the other room will not be able to see you*** while you view this set of images. Simply view the images in any way you would naturally do so. When you have viewed each image, you will be asked to rate the emotional reactions you had to the images.

Subjects were informed that one of the instruction paragraphs would precede each block of stimuli, and that emotion ratings would follow each block of stimuli. Six blocks of experimental trials (enhancement, suppression, or control instruction using positive or negative stimuli) were then presented in random order.

At the completion of all six trials, subjects were administered a 10-min filler task consisting of sixth-grade-level math and word problems, with the instruction to complete as many problems as possible. After the filler task, subjects were given an unexpected memory test consisting of questions about the first four picture stimuli in each block of trials. Four questions were asked about each picture, for a total of 96 questions: Half pertained to emotional details and half pertained to nonemotional details.

Observer Ratings of Emotional Expression

Three master's-level psychology students who were blind to the goals and hypothesis of the study rated videotapes of subjects' performance for emotional expression. Observers used the same positive and negative scales as the subjects used. Onset and offset of each block of trials were indicted by an auditory signal, and observers had no knowledge of the subject's instructions for any given block. Overall observer agreement was high (intraclass correlation coefficient = .91) and did not differ significantly by expression condition or stimulus valence. Final scores for observer-rated expression were calculated by averaging across three raters.

RESULTS

Preliminary analyses of subjective and observer-rated emotion indicated that only the ratings matching the valence of the stimuli (e.g., negative ratings following negative stimuli) produced meaningful effects, and that the opposite-valence ratings (e.g., positive ratings following negative stimuli) were relatively low and did not vary across conditions. Accordingly, only the matching-valence ratings were used in subsequent analyses. There was a significant main effect of gender on emotion, $F(1, 99) = 9.35$, $p < .01$. Overall average emotion (subjective and observer rated) was greater for female ($M = 2.16$, $SD = 0.37$) than male ($M = 1.96$, $SD = 0.54$) participants. Gender was not involved in any significant interaction effects and did not moderate distress or any of the expressive-regulation findings reported ($p > .10$).

Expressive-Regulation Task

Analyses of the emotion ratings supported the validity of the expression manipulation. A repeated measures analysis of variance for rating source (subject, observer), expression condition (enhancement, suppression, no monitor), and stimulus valence (positive, negative) revealed a significant main effect for stimulus valence, $F(1, 98) = 29.75$, $p < .001$; ratings overall were higher for negative emotion ($M = 4.09$, $SD = 0.84$) than for positive emotion ($M = 3.72$, $SD = 0.75$). The main effect of source was also significant, $F(1, 98) = 450.30$, $p < .001$; subjective ratings were higher ($M = 4.96$, $SD = 1.03$) than observer ratings ($M = 2.84$, $SD = 0.7$). Most important, the qualifying Condition X Source interaction, $F(2, 97) = 156.08$, $p < .001$, supported the efficacy of the manipulation: Subjective ratings did not differ significantly across conditions, $F(2, 99)= 0.33$, whereas observer ratings did, $F(2, 98) = 224.20$, $p < .001$ (see Fig. 1). In further accord with the manipulation, Student-Newman-Keuls tests ($p < .05$) showed that subjects expressed significantly greater emotion in the enhancement condition ($M = 4.27$, $SD = 1.20$) than the control, no-monitor condition ($M = 2.73$, $SD = 1.12$) and significantly greater emotion in the control condition than the suppression condition ($M = 1.54$, $SD = 0.53$).

Memory for Emotion Stimuli

We anticipated that the additional cognitive load required to regulate emotional expression would reduce memory for stimuli presented in both the enhancement and suppression conditions. Recognition accuracy was above chance in all conditions. As predicted, however, there was a significant main effect of condition, $F(2, 99) = 5.51$, $p < .01$, and recognition was significantly weaker in the enhancement ($M = 51.8\%$, $SD = 13.0$) and suppression ($M = 54.0\%$, $SD = 13.0$) conditions than in the control condition ($M = 57.5\%$, $SD = 13.7$).

Adjustment

Despite the temporal proximity to the September 11th terrorist attacks, distress for the sample at T1 ($M = 0.75$, $SD = 0.53$) was within the range typically observed among college students (e.g., Todd, Deane, & McKenna, 1997). There was a trend toward lower distress at T2 ($M = 0.67$, $SD = 0.49$), $t(86) = 1.37$, $p = .17$. However, distress scores at T1 and T2 were only moderately correlated ($r = .36$, $p < .001$), indicating considerable variability across time.

Correlations between distress and raw emotion variables in each condition are presented in Table 1. None of the subjective emotion variables were associated with distress at either time point. T1 distress was inversely correlated with the expression of positive emotion in both the enhancement and the suppression conditions (i.e., highly distressed subjects were less able to enhance and better able to suppress the expression of positive emotion). T2 distress was inversely correlated with the expression of both positive and negative emotion in the enhancement condition and with the expression of negative emotion in the control condition.

Thus, individual correlations, similar to those that would be generated from a between-subjects design, indicated only that subjects who expressed more emotion tended to have less distress over time.

Expressive Flexibility as a Predictor of Change in Long-Term Adjustment

Our primary hypothesis was that the ability to both enhance and suppress the expression of emotion would predict reduced distress over time. To test this hypothesis, we created separate variables for expressive-enhancement ability and expressive-suppression ability by calculating for each subject the difference between the total levels of emotion (positive and negative) expressed in the enhancement and control conditions and the difference between the total levels of emotion expressed in the suppression and control conditions. The enhancement and suppression ability scores were then summed to create an overall flexibility score (i.e., higher overall scores indicated greater ability to both enhance and suppress).

To examine the predicted relationships of enhancement and suppression ability to improved long-term adjustment, we conducted a series of hierarchical regressions using T2 distress as the dependent variable. The first step in each analysis included distress at T1 as a control for initial levels of distress. The T1 distress variable also controlled for the possibility that deficits in cognitive resources and motivation among highly distressed individuals influenced their performance in the expressive-regulation task. As an additional control for this factor, the initial step in each analysis also included the number of problems completed during the 10-min filler task ($M = 35.39$, $SD = 8.04$). This variable was mildly inversely correlated with T1 distress ($r = -.19$, $p < .05$) and mildly positively correlated with expressive ability ($r = .20$, $p = .05$). The regression analyses are summarized in Table 2.

The initial regression step combining T1 distress and number of filler problems was significant, accounting for 11% of the variance in T2 distress. Adding the two variables representing expressive-enhancement and expressive-suppression ability on a subsequent step explained an additional 7% of the variance in T2 distress and significantly increased the overall R^2 of the equation to .18, $F(2, 76) = 3.13$, $p < .05$. In the next analysis, we replaced the enhancement and suppression variables with the summed flexibility score, which also explained an additional 7% of the variance in T2 distress, $F(1, 77) = 6.33$, $p < .05$. Together, these analyses indicate that the abilities to enhance and suppress the expression of emotion each independently contributed to long-term adjustment regardless of level of adjustment prior to the experiment or cognitive resources and motivation. Thus, people who possess both of these abilities (i.e., expressive flexibility) will tend to have the best long-term adjustment, and people low in both abilities will tend to have the poorest long-term adjustment.

A possible alternative explanation for these findings is that generally people tend to show greater ability in one form of expressive regulation than the other and that the combined score, rather than representing flexibility, may represent extreme polarity (i.e., extremely high scores on one ability). Indeed, although we expected expressive enhancement and expressive suppression to be mildly positively correlated, these variables were actually moderately inversely correlated ($r = -.34$, $p < .001$). To examine this issue further, we created an additional summary variable representing polarity in expressive regulation. The polarity variable was calculated as the absolute value of the discrepancy between expressive-enhancement and expressive-suppression ability; thus, higher polarity scores represent more extreme asymmetry in expressive regulation. Entering the polarity variable instead of the flexibility variable in a third regression analysis did not explain any additional variance in T2 distress and did not increase R^2 beyond its value in the first step of the analysis, $F(1, 77) = 0.33$, n.s. Thus, extreme ability in one form of expressive regulation over the other does not predict change in long-term adjustment.

DISCUSSION

This study provides the first direct empirical support for the assumption that successful adaptation is linked to the ability to flexibly enhance or suppress emotional expression. To test this assumption, we used a within-subjects manipulation to examine expressive enhancement and suppression as a prospective predictor of distress among New York City undergraduates beginning college in the immediate aftermath of the September 11th terrorist attacks (T1) and again prospectively one and a half years later (T2). Although the sample on average did not show elevated distress, there was considerable variability in distress scores from T1 to T2. Regardless of their level of adjustment, subjects experienced the emotion-evoking stimuli in much the same way. However, as predicted by the expressive-flexibility hypothesis, the abilities to enhance and to suppress the expression of emotion each independently predicted reduced T2 distress, over and above the effects accounted for by T1 distress and the number of problems completed during the filler task (included as a measure of individual differences in cognitive resources and motivation). Moreover, combining expressive-enhancement and -suppression abilities into an overall flexibility score also predicted reduced distress, whereas a polarity score, reflecting asymmetry between expressive and suppressive abilities, was unrelated to adjustment.

At a more general level, the findings of the current study complement and extend the corpus of studies that have examined emotion regulation using between-subjects designs. As in the previous studies, expressive suppression did not influence the subjective experience of emotion but attenuated the overt expression of emotion and reduced memory for emotional stimuli. When we instructed the same subjects to enhance the expression of emotion, although the experience of emotion was again not influenced, subjects did show greater overt displays of emotion relative to the control condition and also exhibited a memory deficit comparable to that observed for the suppression task, presumably because both tasks increase cognitive load.

There were several limitations to the study. First, we used only one kind of emotional stimuli, a set of standardized emotion-evoking picture stimuli, and one type of social action, communicating or concealing one’s emotions from an observer in another room. Although this approach enabled us to vary stimuli and experimental condition on every block of trials, it will be important for future studies of expressive flexibility to explore other types of stimuli (e.g., evocative films) and other types of social interaction (e.g., dyadic interactions), and to examine whether suppression and enhancement produce different effects for specific emotions. The current study was also limited by its use of college students. The methodological and conceptual advantages of manipulating emotion regulation within subjects, demonstrated here and in other studies (e.g., Jackson et al., 2000), suggest the value of exploring this paradigm in future studies using more varied samples.

Within the context of these limitations, the experimental measurement of expressive flexibility presents several new avenues for investigating expressive regulation in relation to psychological and physical health. Much of the contemporary research on emotion regulation and adjustment has focused on the frequency with which people express or suppress emotion and, consequently, has relied heavily on self-reports of emotional behavior (e.g., Gross & John, 1997). Although this work has led to considerable advances in understanding of these behaviors, there are limits to when and how well people can accurately report on their emotional life over time (Robinson & Clore, 2002). This concern is to a large extent obviated by the type of within-subjects experimental paradigm employed in the current study, which focused on regulatory ability rather than self-reported frequency. Future studies might examine how the experimental measurement of expressive flexibility compares to self-report measures of both emotional experience and expression, or to other related processes such as linguistic flexibility (Campbell & Pennebaker, 2003). It should also be fruitful to compare how expressive flexibility relates to more broadly defined positive emotion concepts, such as emotional intelligence (Barrett & Gross, 2001; Salovey, 2001).

The flexibility paradigm also offers a relatively objective, standardized method for examining the relation between emotion regulation and adjustment across different populations and situations. For example, expressive flexibility might be examined as a predictor variable among individuals exposed to highly stressful events or in comparative studies of emotional difficulties across different forms of psychopathology (Kring & Bachorowski, 1999). In a similar vein, the measurement of expressive flexibility offers a novel perspective on the health costs associated with expressive suppression. Although emotional suppression can serve adaptive ends, considerable evidence suggests that chronic suppression holds adverse consequences for physical health (Gross & Levenson, 1997; Robinson & Pennebaker, 1991; Sapolsky, 1998). The findings of the current study suggest that the health costs of emotional suppression may emerge only among individuals who fail to show expressive flexibility (Salovey, 2001). The within-subjects design used in the current study should make it possible to explore this possibility in future research.

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Fig. 1. Subjects' ratings of their own (subjective) emotion and observers' ratings of emotion expressed by subjects in the three expressive-regulation conditions. Higher ratings indicate greater emotion.

Table 1. Distress at T1 and T2 in relation to raw values for subjective emotion and expressed emotion

Subjective emotion	*T1 Distress*	*T2 distress*
Enhanced expression – negative	-.14	-.12
Enhanced expression – positive	-.06	-.15
Suppressed expression – negative	.08	-.02
Suppressed expression – positive	-.01	.05
Control – negative	-.07	-.10
Control – positive	-.04	-.14
Expression of emotion	*T1 Distress*	*T2 distress*
Enhanced expression – negative	-.13	-.28*
Enhanced expression – positive	-.22*	-.40***
Suppressed expression – negative	.08	.01
Suppressed expression – positive	-.24*	-.02
Control – negative	-.04	-.20+
Control – positive	.09	-.07

+ = $p < .10$; * = $p < .05$; *** = $p < .001$.

Table 2. Hierarchical regression analyses predicting T2 distress.

	R^2	Beta	Partial	F change

	R^2	Beta	Partial	F change
1. T1 distress	.11	.26*	.34	F(2,78)=5.08**
Number of filler problems completed		-.03	-.12	
2. Expressive enhancement ability	.18	-.24*	-.23	F(2,76)=3.13*
Expression suppression ability		-.23*	-.23	

	R^2	Beta	Partial	F change
1. T1 distress	.11	.26*	.34	F(2,78)=5.08**
Number of filler problems completed		-.03	-.12	
2. Expressive flexibility (enhancement + suppression)	.18	-.27*	-.28	F(1,77)=6.33*

	R^2	Beta	Partial	F change
1. T1 distress	.11	.26*	.34	F(2,78)=5.08**
Number of filler problems completed		-.03	-.12	
2. Expressive polarity (|enhancement - suppression|)	.11	-.02	-.02	F(1,77)=0.33

* = *p* <.05; ** = *p*<.01