

# When Trying Is Not Enough: Emotion Regulation and the Effort–Success Gap in Bipolar Disorder

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Bipolar disorder (BD) is presumed to involve difficulties in emotion regulation. Little is known, however, about the specific emotion regulation profile associated with this disorder. The present study examined the use of specific emotion regulation strategies among individuals with BD ( $n = 37$ ) and healthy controls ( $n = 38$ ). Participants' spontaneous use of reappraisal and suppression, as well as their associated effort and success at regulating their emotions, was measured in the context of three emotionally evocative films (neutral, happy, sad). Results indicated that the BD participants made greater use of spontaneous suppression and reappraisal across all films compared to the control group. BD participants also reported greater effort, but less success, when spontaneously regulating emotions. These findings suggest that bipolar disorder is associated with less success when regulating emotions despite a widespread engagement of regulatory efforts. Discussion focuses on the disjunction between troubled emotion functioning in bipolar disorder and sustained efforts to modify intense emotions.

*Keywords:* bipolar disorder, emotion regulation, reappraisal, suppression

Bipolar disorder (BD) is characterized by disrupted emotional functioning, including periods of abnormally and persistently elevated mood or mania, depressed mood and anhedonia, and mixed states with co-occurring mania and depression (American Psychiatric Association, 2000). Consistent with these clinical descriptions, models of bipolar disorder have stressed the importance of troubled emotion regulation (e.g., Johnson, Gruber, & Eisner, 2007; Gruber, 2011; Phillips & Vieta, 2007). Few empirical studies, however, have provided empirical evidence for an emotion dysregulation view of bipolar disorder. Furthermore, emotion regulation encompasses different processes that occur at different times, making it difficult to pinpoint precisely how emotion dysregulation relates to bipolar disorder (Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010; Gross & Thompson, 2007; Lewis, Zinbarg, & Durbin, 2010). Accordingly, an important next step is to specify which components of emotion regulation—such as the specific strategies implemented, the contexts in which they are implemented, and the associated effort and success—are implicated in bipolar disorder.

## Adaptive and Maladaptive Emotion Regulation

Emotion regulation refers to the processes by which individuals consciously or unconsciously modify their emotions (Gross &

Thompson, 2007). In order to examine how emotion regulation goes awry in bipolar disorder, it is useful to test a guiding conceptual framework. We adopt a process model of emotion regulation proposed by Gross (1998), which illustrates several emotion regulation strategies that can be used to increase or decrease the intensity of positive and negative emotions at different stages in the emotion generative process. Following this framework, some strategies appear to be relatively more adaptive than other strategies.

One widely discussed example of a generally adaptive strategy is *cognitive reappraisal* (or “reappraisal”; example: “I control my emotions by changing the way I think about the situation I’m in”), defined as construing an emotion-eliciting situation in such a way that it alters its emotional impact (Gross, 1998). A cardinal example of a generally maladaptive strategy is *expressive suppression* (or “suppression”; example: “I keep my emotions to myself”), defined as a response-focused form of emotion regulation involving the inhibition of emotion-expressive behavior (Gross, 1998; Gross & Levenson, 1997).

Research on cognitive reappraisal has focused on the extent to which it preemptively influences emotional reactivity. Several laboratory studies conducted in nonclinical samples indicate that cognitive reappraisal is associated with reduced emotional experience and behavior (e.g., Gross, 1998) as well as decreased neural activity in the amygdala and insula (e.g., Ochsner & Gross, 2005). The self-reported frequency of cognitive reappraisal in daily life has been associated with decreased negative emotion and increased positive emotion and well-being (Gross & John, 2003). Research on expressive suppression has demonstrated that it is associated with greater physiological activation when viewing emotional stimuli (e.g., Gross, 1998). A higher self-reported fre-

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quency of suppression in daily life has been associated with increased negative emotion and decreased positive emotion and well-being (Gross & John, 2003).

Both reappraisal and suppression have largely been assessed via self-report measures at the trait level (i.e., "one's daily life"; Gross & John, 2003) or via experimental manipulations of reappraisal and/or suppression (e.g., Gross & Thompson, 2007). Less work has examined the spontaneous use of these strategies in response to online emotions occurring in the present moment (i.e., how many strategies are used in the moment; Egloff, Schmuckle, Schwerdtfeger, & Burns, 2006; Volokhov & Demaree, 2010). Such work has important implications for isolating processes involved in the onset and maintenance of clinical disorders generally (and bipolar disorder specifically) and refining therapeutic treatments.

### Emotion Regulation in Bipolar Disorder

Studies to date provide suggestive evidence that people with BD exhibit difficulties regulating positive and negative emotions. With respect to positive emotions, BD participants exhibit heightened startle eyeblink magnitude during a 3- to 5-s period following the removal of positive photos, whereas unipolar depressed and healthy controls do not exhibit this prolonged response (Forbes, Miller, Cohn, Fox, & Kovacs, 2005). Second, both remitted BD patients and college students at risk for BD report sustained elevations in positive emotion across varying stimuli contexts compared to controls (Farmer et al., 2006; Gruber et al., 2008). Third, BD participants tend to dwell on positive feelings and thoughts following a positive life event, rather than spontaneously down-regulate, compared to unipolar depressed and control participants (Johnson, McKenzie, & McMurrich, 2008). With respect to negative emotion, findings suggest that BD subjects endorse ruminating about negative emotion more than controls (Gruber, Eidelman, Johnson, Smith, & Harvey, in press; Thomas, Knowles, Tai, & Bentall, 2007) but at levels comparable to those with unipolar depression (Johnson et al., 2008). Furthermore, Depue, Kleiman, Davis, Hutchinson, and Krauss (1985) found that BD spectrum participants exhibit higher cortisol levels 3 hr after a stressful math task compared to controls. Despite these initial indications that BD is a disorder of emotion regulation, the precise nature of spontaneous emotion regulation is not well understood.

### The Present Study

The goal of the present study was to examine spontaneous emotion regulation in healthy participants versus those with BD. More specifically, we sought to assess (a) the particular emotion regulation strategies associated with BD and (b) the effort and success participants experienced when engaging in spontaneous emotion regulation.

For emotion regulation strategy use, we tested the hypothesis that BD subjects would report higher levels of maladaptive (i.e., suppression) and lower levels of adaptive (i.e., reappraisal) spontaneous regulation strategies compared to controls for positive and negative, but not neutral, stimuli. This was based on the finding that BD is associated with a tendency to engage in ineffective or maladaptive regulation strategies for positive and negative emotions (e.g., Feldman, Joorman, & Johnson, 2008; Gruber et al., in press; Johnson et al., 2008; Thomas et al., 2007). For effort, we

reasoned that BD subjects would report greater effort in regulating positive and negative emotions, based upon models that posit exaggerated efforts to control internal affective states (Mansell, Morrison, Reid, & Lowens, 2007). For success, we predicted that BD subjects would report decreased success in regulating positive and negative emotions compared to controls (e.g., Johnson et al., 2007). We predicted that these findings would still hold when controlling for baseline levels of subjective and behavioral emotion reactivity.

## Method

### Participants

Participants were 37 persons diagnosed with BD Type I ( $n = 34$ ) or type II ( $n = 3$ ) who were currently interepisode (i.e., neither manic nor depressed),<sup>1</sup> and 38 healthy controls who did not meet current or past criteria for any *Diagnostic and statistical manual of mental disorders (DSM-IV-TR)* Axis I disorder (American Psychiatric Association, 2000). Exclusion criteria included history of severe head trauma, stroke, neurological disease, and autoimmune disorder, or current alcohol and/or substance abuse or dependence in the past month. Demographic and clinical characteristics are listed in Table 1.

The average age at onset for the BD group was 17.97 ( $\pm 11.41$ ) years, and average illness duration was 17.28 ( $\pm 12.51$ ) years. The lifetime average of manic/hypomanic episodes for BD participants was 8.17 ( $\pm 10.52$ ) and for major depressive episodes was 9.33 ( $\pm 9.67$ ). The average number of psychotropic medications for the BD group was 1.73 ( $\pm 1.04$ ), including lithium ( $n = 7$ ), anticonvulsants ( $n = 16$ ), antidepressants ( $n = 22$ ), neuroleptics ( $n = 12$ ), benzodiazepines ( $n = 4$ ), and sedative-hypnotics ( $n = 3$ ). BD participants were not excluded on the basis of comorbid disorders (aside from current substance or alcohol use disorders) given that BD is commonly comorbid with other disorders (e.g., Kessler et al., 2005), though BD was the primary diagnosis. BD participants had an average of 0.76 ( $\pm 0.87$ ) current Axis I comorbidities, including panic disorder ( $n = 2$ ), agoraphobia ( $n = 2$ ), social phobia ( $n = 4$ ), specific phobia ( $n = 9$ ), obsessive-compulsive disorder ( $n = 2$ ), posttraumatic stress disorder ( $n = 2$ ), generalized anxiety disorder ( $n = 7$ ), hypochondriasis ( $n = 1$ ), pain disorder ( $n = 1$ ), and binge eating disorder ( $n = 1$ ).

### Clinical Diagnosis and Symptoms

BD and CTL group status was confirmed using the Structured Clinical Interview for *DSM-IV* (SCID-IV; Spitzer, Williams, Gibbon, & First, 1990) administered by trained clinical psychology doctoral students and postdoctoral fellows. Fifteen random audiotapes were rated by an independent reviewer and ratings matched 100% ( $\kappa = 1.00$ ) of primary diagnoses (i.e., BD or CTL).

Current interepisode mood status for the BD and CTL groups was verified using the SCID-IV, and cutoff scores from the Clinician-Rated Inventory of Depressive Symptoms (IDS-C  $\leq 11$ ;

<sup>1</sup> Examining interepisode BD participants enabled us to examine whether emotion regulation disturbances were trait-like (i.e., independent of current mood episode).

Table 1  
Demographic and Clinical Participant Characteristics

	BD	CTL	Statistic
Age (years)	36.38 (12.27)	36.79 (10.84)	$F = 0.24$
Female (%)	71	74	$\chi^2 = 0.11$
Caucasian (%)	60	71	$\chi^2 = 1.11$
Education (years)	15.65 (2.10)	15.53 (2.18)	$F = 0.06$
YMRS	2.94 (2.46)	1.03 (1.34)	$F = 16.47^*$
IDS-C	8.11 (4.04)	3.54 (2.93)	$F = 31.30^*$

Note. BD = bipolar disorder group; CTL = healthy control group; YMRS = Young Mania Rating Scale; IDS-C = Inventory to Diagnose Depression. Mean values are displayed with standard deviations in parentheses where applicable.

\* $p < .01$  for BD vs. CTL.

Rush et al., 1996) and the Young Mania Rating Scale (YMRS  $\leq 7$ ; Young et al., 1978). The YMRS is an 11-item, clinician-rated measure of current manic symptoms, with scores ranging from 0 to 60, and the IDS-C is a 30-item, clinician-rated measure of current depressive symptoms with scores ranging from 0 to 84. Higher scores on the YMRS and IDS-C indicate greater symptom severity. Intraclass correlations (ICC) for absolute agreement between the interviewer and an independent rater were strong for the IDS-C ( $= 0.98$ ) and YMRS ( $= 0.99$ ).

### Emotion Regulation Strategy

For the present study, we developed a modified version of the Emotion Regulation Questionnaire (Gross & John, 2003) to examine the spontaneous use of reappraisal and suppression, which included four reappraisal and three suppression items. This is consistent with prior work using a modified spontaneous version of the Emotion Regulation Questionnaire with acceptable internal consistency and stability over time (Egloff et al., 2006). The reappraisal subscale consisted of two items (“Changing the way I was thinking to feel more positive emotion” and “Changing the way I was thinking to feel less negative emotion”) as well as two additional items to assess the down-regulation of positive emotion (“Changing the way I was thinking to feel less positive emotion”) and up-regulation of negative emotion (“Changing the way I was thinking to feel more negative emotion”). Suppression items consisted of three items (“Keeping my emotions to myself,” “Being careful not to express positive emotions,” and “Being careful not to express negative emotions”). Participants were asked to “indicate to what extent you used each the following strategies to regulate, or alter, your emotional experience” on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. Internal consistency was adequate for the reappraisal ( $\alpha_{\text{average}} = 0.74$ ) and suppression ( $\alpha_{\text{average}} = 0.72$ ) subscales.

### Emotion Regulation Effort and Success

Two questions assessed the extent to which they were successful (“I was successful at regulating my emotions”) and expended effort (“I tried to regulate my emotions”) regulating emotions on the same 1 (*strongly disagree*) to 7 (*strongly agree*) scale.

### Emotion Reactivity as a Contributor to Spontaneous Emotion Regulation

We examined the influence of emotion response on our observed emotion regulation findings by measuring self-reported and behavioral displays of emotion reactivity and down-regulation. Emotion reactivity scores were calculated by subtracting the baseline period from the respective film period following convention (Rogosa & Willett, 1983). Emotion down-regulation scores were calculated by subtracting the film period from the respective postfilm period.

Self-reported positive (PA) and negative (NA) affect was assessed using the 10-item short form of the Positive and Negative Affect Schedule (PANAS; MacKinnon et al., 1999) with good internal consistency in the present study ( $PA_{\text{average}} \alpha = .89$ ;  $NA_{\text{average}} \alpha = .72$ ).

Behavioral displays of PA (i.e., happiness: AU6 [cheek raiser] + AU12 [lip corner puller]) and NA (i.e., sadness: AU6 [cheek raiser], AU15 [lip corner depressor]) were coded during the baseline, film, and postfilm period using the Emotion Facial Action Coding System (Ekman & Rosenberg, 1997). Following the Facial Action Coding System (FACS) scoring criteria, an emotional expression received an intensity score from 1 (*trace*) to 5 (*marked*), or 0 (*absent*). Three FACS-certified coders coded all displays. Coders independently coded approximately half ( $n = 28$ ) of all participants and demonstrated good intraclass correlations for absolute agreement ( $ICC_{\text{happy}} = 0.87$ ,  $ICC_{\text{sad}} = 1.00$ ). Average values were computed across coders for this participant subset, and the remaining participants were divided among individual coders. The average intensity for happy and sad displays was used in final analyses. For further information on baseline group differences in emotion response in the same population presented in this study, see Gruber, Harvey, and Purcell (2011).<sup>2</sup>

### Emotion-Eliciting Stimuli

Film clips are widely used as a reliable and standardized emotion elicitor (e.g., Rottenberg, Ray, & Gross, 2007). In the present study, two happy, two sad, and two neutral films were used. Happy films included figure skater Sarah Hughes winning the Olympic gold medal (150 s) and Andy Roddick winning the US Open (181 s). Sad films included a young boy watching his father die (170 s) and a mother crying over the death of her husband and children (231 s). Neutral films depicted mundane scenes of a man and woman doing household tasks (94 s) and a man and his friend sitting quietly in a room (131 s). The neutral film came first and either the sad or happy film followed (order counterbalanced). The specific film for a given valence (e.g., Sarah Hughes vs. Andy Roddick for the happy film) was also counterbalanced to ensure observed differences were not due to a specific film.

<sup>2</sup> We note that Gruber et al. (2011) found that the BD group reported greater PA reactivity across films but there was no interaction for any specific film valence, consistent with prior findings in college-aged students at risk for BD (Gruber et al., 2008). Importantly, the authors did not find differences in NA emotion reactivity. We also note that this article contained a subset of those participants reported in the present study.

## Procedure

Upon arrival to the laboratory, informed consent was obtained after which the SCID-IV, YMRS, and IDS-C were administered. Participants were then seated in front of a 17-inch high-resolution computer monitor. Questionnaires, films, and instructions were presented using computerized software (MediaLab v2006, Atlanta, GA). Remotely controlled digital video cameras were monitored from a separate control room.

Before each film, the following instructions were presented on the computer monitor: "Please relax and watch the screen for the next minute." After the 1-min baseline period, participants completed the PANAS. Next, they received the following instructions: "We will now be showing you a short film clip. It is important that you watch the film clip carefully." These instructions were followed by the neutral, happy, or sad film. At the end of each film, participants again completed the PANAS, and then instructions appeared on the computer monitor: "Please remain seated for the next two minutes." This served as a 2-min spontaneous emotion regulation postfilm period, consistent with prior work (Fredrickson & Levenson, 1998). Once the spontaneous emotion regulation period ended, participants completed spontaneous emotion regulation questions referencing the period after the film ended. We opted to measure spontaneous emotion regulation during the post-film period for two reasons. First, given that those with BD exhibit difficulty recovering after an emotion provocation (Farmer et al., 2006; Forbes et al., 2005), we wanted to examine whether differences in spontaneous down-regulation were associated with specific regulation strategies. Second, our a priori interest in examining emotion regulation during the postfilm period precluded us from also examining emotion regulation immediately following the film clip but before the postfilm period (i.e., doing so would have interrupted the temporal sequence of the emotion generative process once the film ended in order to examine the recovery of emotion immediately following the film without interruption.

## Results

### Demographic and Clinical Characteristics

As seen in Table 1, BD and CTL participants did not significantly differ with respect to age, gender, ethnicity, or education ( $ps > .20$ ). Both groups scored below standardized cutoffs on the YMRS ( $\leq 7$ ) and IDS-C ( $\leq 11$ ), though the BD group scored somewhat higher on both measures ( $ps < .01$ ).<sup>3</sup>

### Emotion Regulation Strategy

Four repeated-measures ANOVA were conducted separately for reappraisal, suppression, success, and effort with Film (neutral, happy, sad) as the within-subjects factor and Group (BD, CTL) as the between-subjects factor. A Greenhouse-Geisser correction was used, and adjusted  $F$  and  $p$  values (two-tailed) are reported.<sup>4</sup>

For spontaneous reappraisal, the main effect of Film,  $F(2, 144) = 16.37, p < .001, \eta_p^2 = 0.19$ , and Group,  $F(1, 72) = 4.66, p < .05, \eta_p^2 = 0.06$ , were significant. The Film  $\times$  Group interaction was not significant,  $F(2, 144) = 0.68, p > .50, \eta_p^2 = 0.001$ . For the Film main effect, pairwise comparisons indicated that the sad film ( $M = 2.33, SD = 0.12$ ) was associated with greater

reappraisal compared to both the happy ( $M = 1.64, SD = 0.09$ ) and neutral ( $M = 2.07, SD = 0.10$ ) films ( $ps < .05$ ). The neutral film was associated with greater reappraisal than the happy film ( $p < .001$ ). For the Group main effect, pairwise comparisons revealed that the BD group endorsed greater reappraisal across all three films compared to the CTL group (see Figure 1).

For spontaneous suppression, the main effect for Group was significant,  $F(1, 72) = 10.97, p < .001, \eta_p^2 = 0.13$ . The Film main effect,  $F(2, 144) = 0.32, p > .70, \eta_p^2 = 0.00$ , and Film  $\times$  Group interaction,  $F(2, 144) = 0.08, p > .90, \eta_p^2 = 0.001$ , were not significant. For the Group main effect, pairwise comparisons revealed that the BD group endorsed greater suppression across all three films compared to the CTL group (see Figure 1).

### Emotion Regulation Effort and Success

For reported effort, both the main effect for Film,  $F(1.61, 69.12) = 14.48, p < .001, \eta_p^2 = 0.25$ , and Group,  $F(1, 43) = 5.31, p < .05, \eta_p^2 = 0.11$ , were significant. The Film  $\times$  Group interaction was not significant,  $F(1.61, 69.12) = 0.54, p > .50, \eta_p^2 = 0.01$ . For the Film main effect, pairwise comparisons indicated that the sad film ( $M = 3.59, SD = 0.29$ ) was associated with greater effort compared to the happy ( $M = 2.04, SD = 0.21$ ) and neutral ( $M = 2.49, SD = 0.22$ ) films ( $ps < .01$ ), and the neutral film was associated with more effort than the happy film ( $p < .05$ ). For the Group main effect, pairwise comparisons revealed that the BD group reported more effort regulating across all films compared to the CTL group (see Figure 1).

For reported success, the main effect for Group was significant,  $F(1, 72) = 4.63, p < .05, \eta_p^2 = 0.06$ . The Film main effect,  $F(1.85, 132.84) = 0.19, p > .80, \eta_p^2 = 0.003$ , and Film  $\times$  Group interaction,  $F(1.85, 132.84) = 0.66, p > .50, \eta_p^2 = 0.01$ , were not significant. For the Group main effect, pairwise comparisons revealed that the BD group reported less success regulating across all films compared to the CTL group (see Figure 1).

### Emotion Reactivity as a Contributor to Spontaneous Emotion Regulation

We examined the influence of emotion reactivity on our observed emotion regulation findings. To do so, we examined whether previously documented differences in emotion reactivity (Gruber et al., 2011) might explain group differences in spontaneous emotion regulation observed in the present study. Results suggested that group differences generally remained significant when controlling for self-reported and behavioral emotion reactivity. We note that two results

<sup>3</sup> The rationale for not covarying for symptoms in our main analyses was threefold. First, controlling for current symptoms violates important statistical assumptions, as they are intended to minimize within group variability, not between-group variability, especially where group status is not randomly assigned (Miller & Chapman, 2001). Second, BD and CTL groups both scored significantly below cutoffs on symptom measures. Third, correlations between our primary dependent measures and symptoms did not reach significance. We suggest that future studies compare BD participants who score high and low on symptom measures to examine the relative influence of symptoms on emotion regulation.

<sup>4</sup> We examined gender as a between-subjects variable for our emotion regulation variables. No significant main effects or interactions emerged ( $ps > .10$ ).



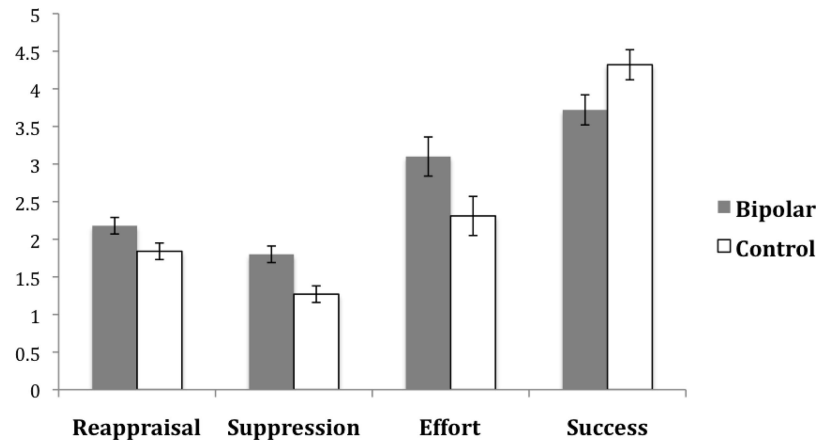


Figure 1. Emotion regulation strategy (reappraisal, suppression), effort, and success collapsed across films.

slightly exceeded conventional significance levels (i.e., reappraisal controlling for NA,  $p = .054$ ; effort controlling for NA,  $p = .08$ ; effort controlling for happy displays,  $p = .05$ ; and success controlling for sad displays,  $p = .07$ ). However, controlling for sad displays eliminated group differences in success ( $p = .11$ ).

We note that no Group  $\times$  Reactivity interactions emerged in these analyses, suggesting that our group differences in spontaneous emotion regulation did not generally hinge on emotion reactivity. Across all participants several main effects for Film emerged, suggesting that as emotion reactivity increased (i.e., for PA, happy displays, and sad displays) so did reported reappraisal and effort ( $ps > .05$ ) but not consistently for suppression or success. This suggests that across both groups of participants, greater reactivity was associated with greater reappraisal use and effort ratings. For present purposes, however, what is most crucial is that ANCOVAs in which we controlled for reactivity still yielded group differences in regulation. This finding is important because it indicates that the group differences we observed in emotion regulation cannot simply be explained by group differences in reactivity.

## Discussion

BD is thought to be associated with difficulties regulating emotions (Johnson et al., 2007; Phillips & Vieta, 2007). However, it is not clear which strategies are involved and in what contexts and what are the perceived effort and success of these strategies. The present study adopted a multimethod experimental approach to examine whether individuals with BD differ from healthy controls in spontaneous emotion regulation following emotionally evocative stimuli.

### Emotion Regulation Strategy

Consistent with the first hypothesis, BD participants reported greater maladaptive (i.e., suppression) strategies compared to controls across happy and sad films. This finding is consistent with the notion that BD is associated with a tendency to engage in ineffective or maladaptive regulation strategies (e.g., Gruber et al., in press; Johnson et al., 2008). Contrary to our predictions, we found that the BD group also reported greater use of adaptive strategies (i.e., reappraisal) and that there was a heightened endorsement of regulation strategies more generally across positive, negative, and

even neutral stimuli. This finding is compatible with the idea that individuals with BD use more regulation strategies overall than controls, perhaps because of their frequently intense mood experiences. Interestingly, some of the strategies endorsed might be incompatible or conflicting in their intended outcome (e.g., Thomas et al., 2007; Johnson et al., 2008). This might involve simultaneous use of strategies that require a different cognitive or behavioral skill set (e.g., reappraisal and suppression) or where the desired emotional goal is conflicting (e.g., increase and decrease positive emotion levels). More generally such findings converge with a growing body of research suggesting that emotion response deficits—both reactivity and regulation—persist across varying contexts in BD (Gruber, 2011; Gruber et al., 2008). Perhaps BD individuals possess a less-nuanced roadmap to guide strategy-specific implementation (i.e., reappraisal vs. suppression) according to the unique nuances of the context (i.e., emotional vs. non-neutral contexts). This begs the question—what is the degree of effort and success associated with such strategies?

### Emotion Regulation Effort and Success

The second aim was intended to address the effort–success question. Consistent with our predictions, BD participants reported greater effort but less success in spontaneously regulating their emotions across neutral, positive, and negative films. This finding is consistent with models of BD suggesting heightened efforts to regulate emotional states (Mansell et al., 2007) and unsuccessful emotion regulation attempts (e.g., Johnson et al., 2007). There are several possible explanations for this apparent “effort–success gap.” First, BD participant’s increased efforts in the present study did not appear to be localized to a target strategy in a given context (i.e., reappraisal to a sad film) but were enacted more diffusely in the context of all novel stimuli. This pattern might be part of a nonspecific regulatory system that does not successfully decrease (or increase) emotion intensity. Second, another possibility is that BD participants overestimate the degree of energy put into regulating emotions and feel unsuccessful when their efforts do not substantially alter their emotions. Third, it may also be the case that those with BD exhibit greater intensity of emotion reactions that are more difficult to manage and hence lead to reduced

success in regulating such intense affective states. We note that group differences in effort and success were no longer observed when controlling for behavioral displays of emotion. Such findings underscore the intertwined nature of reactivity and regulation in understanding BD. Indeed, emotion regulation effort versus specific strategy might tap into divergent processes in BD, with effort more directly linked to the degree of emotion response. Those with BD likely expend more efforts regulating as a result of coping with chronically heightened levels of affect. Furthermore, it may be the case that emotion displays specifically serve as an important—but potentially inaccurate—cue to those with BD as to how well their regulation efforts are working. In other words they may draw heavily from their emotional behavior to gauge how well they are tuning down their emotions. Future research is warranted to investigate whether intense displays of emotion reactivity directly contribute to diminished success in regulating and the need to expend more effort regulating emotion in BD.

### Limitations and Future Directions

Findings from the present study should be interpreted within the confines of several limitations. First, results were largely based upon self-reported assessments. As such, the accuracy of these estimates could represent a potential over- or underestimation and be susceptible to potential demand characteristics. It will be important for future research to generate convergent findings across multiple channels of emotion responding, including psychophysiological and behavioral measures. Second, the spontaneous emotion regulation period in the laboratory was time limited, and so it is uncertain whether these findings generalize to everyday regulatory efforts and deficits in BD. Third, we included a tightly focused study on two well-specified forms of emotion regulation and so did not report all possible regulatory strategies, stressing the need for narrative or other open-ended response formats. Fourth, the present study focused on regulating laboratory induced emotion states in response to emotional films. It will be important to examine whether these findings generalize to regulation of more intense mood periods of mania and depression in BD. Fifth, BD participants were not excluded on the basis of comorbidities to ensure a more ecologically valid sample. It is thus less clear how the presence of other comorbid disorders might account for observed group differences (or a lack thereof). Finally, given the possible confound of psychotropic medication, future studies with random assignment to different medication classes are warranted.<sup>5</sup>

Despite these limitations, this study represents a first step toward elucidating emotion regulation in BD. The results suggest that individuals with BD report widespread engagement in strategies aimed at harnessing emotions, yet experience less success at doing so.

<sup>5</sup> Levels of each class of medication were recorded using the Somato-therapy Index (Bauer, McBride, Shea, & Gavin, 1997). Bivariate correlations conducted between intensity of medication dosage in the BD group and the regulation strategy variables yielded a pattern of modest and inconsistent findings. Specifically, three of 108 correlations reached significance, of which all but one did not survive a Bonferroni-adjusted cutoff ( $p < .0005$ ).

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