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# The Moderating Role of Autonomy and Control on the Benefits of Written Emotion Expression

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*Two studies examined the hypothesis that relative to control motivation, autonomy motivation is associated with effective written expression and regulation, leading to positive emotional, physical, and cognitive outcomes over time. Participants viewed a Hiroshima–Nagasaki documentary in each of two sessions. Study 1 showed that dispositionally autonomous participants, particularly those who expressed, had positive well-being, energy, and memory after the second viewing. Study 2 explored benefits of situational motivation by priming autonomy and control. Results showed that dispositionally controlled individuals received the same benefits as autonomous individuals only when primed with autonomy and encouraged to express. Coding of writing content revealed that the benefits of autonomy were mediated by nondefensive and effective emotional processing, as reflected in greater use of self-referencing and cognitive mechanism words and lower use of concrete words. Results support the expectation that autonomy relates to effective expression and emotion regulation, leading to positive functioning over time.*

**Keywords:** *emotion regulation; autonomy; motivation; defensiveness; LIWC*

Emotion regulation refers to the processes by which individuals influence the experience and expression of their emotions (Gross, 1998), or to the methods people use to respond and adapt to emotionally challenging or threatening events. When effective, emotion regulation strategies play an important role in reducing negative outcomes that emerge during emotionally imbued experiences. Some individuals effectively employ such

strategies, but attempts to regulate are strikingly ineffective for others. Personality theorists have attempted to identify these differences and understand the responsible processes; from these, individual differences reflecting varying levels of defensiveness have emerged as notably informative (Gross, 1998). Defensive responses are those that compartmentalize, distort, or minimize to manage overwhelming experiences (e.g., Costa, Zonderman, & McCrae, 1985). Instead of aiming at immediate reduction of distress, nondefensive responses involve openness and interest in newly introduced material. These responses are critical for integration, or the assimilation, organization, and unification of the new material with existing psychological structures (Ryan & Deci, 2000). When such assimilation fails, threatening material may remain present in the mind, inducing distress and vivid memories or rumination (van der Kolk & van der Hart, 1991) and requiring continued investment of energy (Baumeister, 2002).

## Motivation and Defensiveness

Self-determination theory (Deci & Ryan, 2000) identifies two motivational orientations, autonomy and control, as two ways of self-regulating behavior that

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relate to emotion regulation. Autonomy orientation refers to the tendency to regulate behavior on the basis of integrated goals and values, and involves a sense of choicefulness about and endorsement of one's own behavior. In contrast, controlled motivation refers to the tendency to self-regulate according to external contingencies and pressures, and involves a sense of coercion and pressure (Ryan & Deci, 2000).

Motivational orientation is one important determinant of how individuals approach a broad range of intrapersonal and interpersonal experiences (Hodgins, 2008; Hodgins & Knee, 2002). This is presumably because autonomy motivation allows for nondefensiveness toward a broad range of experience because genuine self-esteem and self-integration underlie it (Deci & Ryan, 1995). In contrast, contingent self-esteem and low self-integration characteristic of control motivation compel controlled individuals to defend against experiences that do not support their egoistic self-processes. Recent evidence supports this link between motivation orientation and defensiveness; for example, primed autonomy motivation leads to higher implicit self-esteem (Hodgins, Brown, & Carver, 2007) and lower defensive responses (Hodgins et al., 2008; Hodgins, Yacko, & Gottlieb, 2006). Because they are lower in defensiveness, autonomous individuals may regulate negative emotions more effectively (Davies & Clark, 1998).

As described previously, lower defensiveness experienced by autonomous individuals is important for effective processing of experiences (Weinberger, 1998). Though ultimately ineffective in doing so, defensive individuals attempt to avoid distress and thus require a system of self-control to maintain threatening feelings and thoughts at tolerably low levels (Showers & Ruben, 1990). Defensiveness involves juggling a set of incongruent experiences, for example, when maintaining a positive emotional state despite the presence of a negative emotion stimulus. Defensive emotional responses therefore require a continuous investment of personal resources to maintain a sense of wellness in the face of threatening material. The process is a costly one, depleting the organism of available energy that can be otherwise used toward other pursuits (Baumeister, 2002). Importantly, although nondefensive coping may also be initially depleting (because nondefensive responses require attending to threatening emotional material), defensive regulation continues to be depleting over longer periods, presumably because the material is not processed or integrated.

Thus, openness or nondefensiveness is essential for effective regulation and for recovery of personal resources such as energy after a negative emotional experience. On the other hand, when recovery is stunted, the nonverbal negative material continues to be subtly present,

cycled and re-cycled by the psyche. Cycling is thought to be a continual effort to process or integrate emotional material. When material is integrated, this process is completed and traumatic content may be put away (van der Kolk & van der Hart, 1991). Because of the persistent and uncontrollable presence of unregulated emotions, effective processing can be seen in the way people remember events. When material is unprocessed it remains cycling in thought, and its emotional contents are consequently more present and salient to the individual (Lyubomirsky, Sousa, & Dickerhoof, 2006). Accordingly, vivid or repetitive memory for threatening information content reflects unfinished business around a distressing event (Foa & Riggs, 1993). Because defended material has the counterproductive effect of intruding into memory (van der Kolk & van der Hart, 1991), defensiveness is associated with greater memory for threatening than neutral material, despite efforts to attend to neutral material (Aureille, 1999).

### Written Expression and Regulation

Effective regulation, which fosters well-being, higher levels of energy, and lower content memory, therefore requires the difficult task of opening to threatening material. A number of regulatory strategies can be utilized to facilitate this process. Notably, written expression of one's reactions to aversive emotional material facilitates regulation and promotes positive outcomes after a negative emotion stimulus. Indeed, written expression has received attention as an effective strategy for tempering negative emotions. This process of expression and consequent integration, explained by Pennebaker (1989) with the completion hypothesis, frees individuals from intrusive and unpalatable events. According to Pennebaker, the act of expressing requires that one construct a coherent narrative that facilitates organization and understanding of emotions and thoughts related to the event. Thus, expression imposes a cognitive structure on painful experiences. The completion hypothesis has gained direct support (Lepore, Ragan, & Jones, 2000), and related research shows that talking about traumatic events helps resolve emotions (Pennebaker, 1995). When individuals write about their reactions to taxing events, they incur various benefits, including decreased psychological distress (Donnelly & Murray, 1991) and improved physical health (Greenberg, Wortman, & Stone, 1996). Individual differences in expression have been related to physical health, vigor or energy, and decreased distress (Stanton et al., 2000).

Expression facilitates emotion integration and resolution; presumably, this regulatory approach may be more efficacious for autonomous individuals. Past research shows that emotion regulation strategies including

expression are differentially effectual; the same regulatory strategies are not equally effective for all persons (Diamond & Aspinwall, 2003). One possible explanation for this variability is that some people are better equipped to handle or process negative emotions and therefore more fully utilize emotion regulation strategies. Autonomous individuals, in particular, approach emotion-laden material nondefensively. Therefore, when provided with the opportunity, such individuals may more fully engage the expression process. Conversely, control motivation, and its characteristic defensiveness, may compel individuals to express superficially, incompletely, or impersonally. Thus, written expression coupled with autonomy is expected to result in the most effective emotion regulation.

The benefits of autonomy and expression may not be immediately apparent. A study by Mendolia and Kleck (1993) examined the impact of written expression after initial exposure to a demanding film and after a second exposure to the film 48 hr later. They found that participants who discussed their emotions in response to the film were more autonomically aroused initially than participants who discussed the facts around the film. However, upon re-exposure to the film 2 days later, participants who expressed their emotions and thought about the film between lab sessions were less autonomically aroused and showed more positive affect than other participants. The results suggest that although processing negative or threatening emotions is difficult and may be initially distressing, it allows for integration of emotions or "habituation" (Mendolia & Kleck, 1993, p. 291), which results in lower arousal and higher well-being over time. Thus, emotion regulation strategies such as written expression, although ultimately effective, may not immediately alleviate distress.

#### Linguistic Indicators of Nondefense and Processing

We have so far described the expected role of autonomous motivation in the regulation of emotions. The regulatory process is triggered by negative emotional stimuli, which elicit either a defensive or a nondefensive response set. Such nondefensiveness may be apparent in personal writing styles. Pennebaker (2004) studied various linguistic representations of mental states to understand underlying processes; of these, self-referencing terms were notable indicators of nondefensive responding. Self-referencing terms, which characterize initial approaches to threatening stimuli, indicate self-honesty (Campbell & Pennebaker, 2003), whereas the absence of self-referencing terms reflects dissociation or defense from the material expressed (Dulaney, 1982; Newman, Pennebaker, Berry, & Richards, 2003). Such terms reflect a willingness to "own" or to engage oneself in

the threatening experience. Research in support of this shows that individuals who are high in self-deception verbally distance themselves when telling personal stories (Feldman Barrett, Williams, & Fong, 2002), whereas those who are self-aware are more honest with themselves (Davis & Brock, 1975; Newman et al., 2003). This state of dissociation reflects an avoidant or defensive approach such as that used by individuals high in control, whereas self-honesty is indicative of the openness characteristic of autonomous individuals. Self-referencing pronouns are especially important indicators in early language use, when individuals respond with initial defensiveness or nondefensiveness to a negative emotional experience.

In a later stage of regulating emotional material, other aspects of language distinguish level of emotional processing. Specifically, according to multiple code theory (Bucci, 1995), as emotionally charged experience is processed, one begins to identify and name such experiences and to establish referential links among cognitions. As individuals build multidimensional connections over time, they integrate emotional experience with their broader understandings. Fragmentary verbalization and concrete language words indicate that a disturbing stimulus has not been well processed (Bucci, 1995), reflecting continuing attempts to organize unintegrated material. On the other hand, cognitive processing word use indicates that integration has occurred and thus is an important discriminator in later stage emotional processing. Concrete words refer to specific nouns (e.g., *bomb*, *gun*), whereas cognitive processing words include words related to cause and effect explanations such as *realize* and *understand*. Research unrelated to Bucci's (1995) theory shows that cognitive processing words are characteristic of well-developed emotional processing (Pennebaker, Mayne, & Francis, 1997).

#### The Present Studies

The association between motivation and experiential openness or defensiveness suggests that motivation would be a good predictor of whether individuals respond to negative emotions by avoiding the emotions or by expressing and integrating them. The current research therefore examined the relation of motivation (predominantly autonomous or controlled) to expressing emotions in a writing paradigm. We conducted Study 1 to examine whether written emotion expression is more effective for autonomy-oriented individuals. Participants first watched a film depicting World War II Hiroshima–Nagasaki bombings, which was designed to induce distress, and either wrote their thoughts and feelings about the film (expression condition) or wrote about a second, neutral film (distraction condition). Participants returned for a

second session, approximately 48 hr later and again watched the film. We assessed effectiveness of written expression after each viewing of the film by measuring well-being and energy after each viewing, and memory at the end of the second viewing.

Based on research presented earlier, we hypothesized that autonomous motivation would lead to effective regulation indicated by consequent positive outcomes in Session 2 (higher well-being, higher energy, and lower memory for the disturbing content). Second, we expected that autonomous individuals more fully engage their experience; therefore, when given the opportunity to express their emotions, these individuals would use the opportunity to integrate distressing emotions and would experience positive outcomes after the second film viewing. Third, we expected that autonomous individuals would experience positive outcomes after the second viewing because they nondefensively processed the film content (indicated by greater use of personalizing pronouns in Session 1) and more fully processed it (indicated by cognitive mechanism words and fewer concrete words in Session 2).

Study 2 was aimed at exploring whether the benefits of autonomy can be afforded to control-oriented individuals when they are primed with autonomy (and are thus autonomously functioning). To test this, a design similar to that of Study 1 was implemented with the addition, at the start of the first session, of an autonomous or controlled motivational prime.

## STUDY 1

### Method

#### *Participants*

Participants were 77 undergraduates (17 males, 60 females) who received course credit. Ages ranged from 18 to 23 years ( $M = 20$ ).

#### *Materials*

*Film inductions.* Different neutral films preceded the Hiroshima–Nagasaki film at each of two sessions. In Session 1, we showed a neutral film to provide distracted participants a subject for writing. In Session 2, we used a different neutral film to prevent anticipatory anxiety as a function of memories of the Session 1 films. The Session 1 neutral film was a 5-min documentary describing Mesa Verde National Park in Colorado, including a description of the rock formations, archeology, and history of the area. The Session 2 neutral film was a 5-min documentary discussing abbey construction.

At each of the two sessions, negative emotion was induced with a 5-min black-and-white documentary about the atomic bombings of Hiroshima and Nagasaki. The film described and showed explicit scenes of the outcomes of the bombings including initial deaths, structural devastation, and after-effects of radiation. A similar film has been used in related research (see Butler et al., 2003; Butler, Lee, & Gross, 2007; Butler, Wilhelm, & Gross, 2006).

*Moderation by motivation.* We measured individual differences in motivation orientation using the General Causality Orientation Scale (GCOS; Deci & Ryan, 1985). The GCOS assessed autonomy and control using 17 vignettes with three items each (7-point scale) describing interpersonal situations. Autonomous orientation reflects a tendency to be interested and self-initiating, whereas controlled orientation refers to the tendency to feel compelled by external contingencies and internally imposed imperatives. The GCOS has high internal reliability ( $\alpha \approx .80$ ) in past (Deci & Ryan, 1985) and present ( $\alpha$ s = .81 and .88 for control and autonomy, respectively) research. From GCOS orientations we constructed two groups: autonomy ( $Z$ -scored autonomy >  $Z$ -scored control) and control ( $Z$ -scored control >  $Z$ -scored autonomy).

*Well-being indicators.* The following outcomes were measured on three occasions: at the onset of the study, after the first film viewing (end of the first session), and after the second film viewing (end of the second session). This design permitted us to assess changes in well-being across time. Well-being questionnaires were standardized and combined to construct a single well-being composite ( $\alpha = .68$ ).

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) includes 20 adjectives reflecting positive affect (e.g., *alert, proud, strong*) and negative affect (e.g., *scared, nervous, distressed*). Participants reported how much they felt each adjective on 7-point scales (1 = *very slightly or not at all*, 7 = *extremely*; past  $\alpha$ s = .76-.85; Watson et al., 1988; present  $\alpha$ s = .83-.95 and .84-.86 for positive affect and negative affect, respectively).

The State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) assessed state anxiety by asking participants to agree on a 7-point scale to statements that describe how they are feeling (e.g., “I feel calm,” “I feel jittery,” and “I feel anxious”). Past reliability coefficients were around .60 (Spielberger, 1983; present study  $\alpha$ s = .88-.91).

Participants completed the seven-item Subjective Vitality Scale (SVS; Ryan & Frederick, 1997), which assesses perceived vitality. Items include “I feel alive and vital” and “I feel I have energy and spirit.” Reliabilities ranged from .84

to .86 in past samples (Ryan & Frederick, 1997) and from .63 to .81 in the present study.

In the Physical Symptoms Checklist (Emmons, 1992), participants indicated the extent to which they experienced nine symptoms (e.g., headaches, shortness of breath, stiff/sore muscles). The measure has shown high reliability in past research ( $\alpha = .90$ ; Elliot & Sheldon, 1998; present study  $\alpha s = .61-.75$ ).

The handgrip measure of energy objectively assessed energy fluctuations across sessions. We used a handgrip task adapted from Baumeister, Bratslavsky, Muraven, and Tice (1998) that uses a handgrip exerciser for building hand muscles. Participants were timed while holding a marker in the handgrip by squeezing the two arms together. Handgrip times have been used to measure energy or ego depletion and are indicative of high self-control (Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002).

We measured memory for the Hiroshima–Nagasaki film after the second viewing to test the extent that film details were prominent in participants' minds and therefore not processed adequately. Memory was not tested in Session 1 to prevent priming participants with emotional film material (by reintroducing film content) before the Session 2 viewing and outcomes. Neutral film memory was measured for baseline memory and controlled for in analyses. Participants were asked to recognize items presented in the Hiroshima–Nagasaki and abbey films. Thirty-two randomized items reflecting specific concepts or objects in the films (16 present, 16 nonpresent) were presented for the Hiroshima–Nagasaki film (e.g., America, mushroom, prison, innocent) and for the abbey film (e.g., artifact, dwelling, art, cardigan). Summary memory scores reflect total correct responses for both present and nonpresent objects (Hiroshima scores:  $M = 12.34$ , Abbey scores:  $M = 11.48$ ; neutral and emotional film memory correlated  $r = .44$ ).

*Indicators of processing.* Linguistic Inquiry and Word Count (Pennebaker, Francis, & Booth, 2001) is a text-analytic strategy that counts selected words or groups of words in text. The program assesses emotional and cognitive components in language use and has been used to demonstrate the effects of writing on physical and mental well-being (Pennebaker, 1997). The use of self-referencing pronouns is an important indicator of self-honesty and low defense in early-stage emotional processing; therefore, we measured self-referencing pronouns in Session 1 by subtracting the number of second- and third-person pronouns (e.g., *him, her, they*) from the number of first-person pronouns (e.g., *I, we, our*). Higher scores reflected higher self-honesty or lower defensiveness. In contrast to early stage processing, “healthy”

emotional processing at a later stage is reflected in greater use of cognitive mechanisms words such as *understand, think, and realize* (Pennebaker & Seagal, 1999) and by less frequent use of concrete words (e.g., specific nouns such as *bomb, tree, and man*; Bucci, 1995; Campbell & Pennebaker, 2003). Therefore, in Session 2, we measured use of cognitive mechanism and concrete words that discriminate differences in the later stage of emotional processing.

*Covariates.* Covariates controlled for biased responding to the questionnaires, which are susceptible to self-deception or desire to appear positively to others, and for personal factors confounding emotional reactions to the challenging film content.

The Balanced Inventory of Desirable Responding (BIDR) measures biased responding, reflecting attempts to inflate participants' view of themselves or present more favorably to others. We used the self-deceptive enhancement and impression management subscales (40 items). The BIDR has shown decent internal consistency in past ( $\alpha s = .68-.88$ ; Paulhus, 1988) and present ( $\alpha s = .76-.80$ ) research.

The 10-item brief measure of the Big Five traits (Gosling, Rentfrow, & Swann, 2003) asks participants to use 7-point scales to rate themselves on adjectives reflecting neuroticism as well as other Big Five traits. We focused on neuroticism because this construct is intimately tied to a stable presence of negative emotions in responding and may induce negative reactivity to the film content independently of either motivation or emotion expression (neuroticism  $\alpha = .78$ ).

To control for negative reactions to the film due to violence sensitivity, we developed the Media Questionnaire, which assesses exposure to media and sensitivity to media violence using six items on 7-point scales. Sample items are: “About how many movies (in the cinema, on TV, or videos) have you watched in the last month?” “Please rate how violent the TV programs are that you usually watch,” and “Please rate how tolerant you are to watching violence in media.” Unstandardized responses were compiled to create a rough estimate of exposure to violent media, comprising both quantity and quality of experiences with violent media. Although with relatively low reliability ( $\alpha = .57$ ), this measure was designed to thoroughly and broadly distinguish individuals who are frequently exposed to violence in TV and movies from those who do not watch much or tolerate violent media.

### Procedure

Students participated in two sessions 48 hr apart. In the first session, participants completed the GCOS,

**TABLE 1:** Zero-Order Correlations Between Major Study Indicators: Writing Construct Mediators and Outcomes

	<i>Well-Being</i>	<i>Handgrip</i>	<i>Memory</i>	<i>Self-Referencing</i>	<i>Cognitive Mechanism</i>	<i>Concrete Words</i>
Well-being	—	.24*	-.13	.30**	.22*	-.31**
Handgrip	.22*	—	-.09	.32**	.25*	-.18
Memory	-.35**	-.09	—	-.28*	-.23*	.27*
Self-referencing	.26**	.29**	-.26**	—	.23*	-.29*
Cognitive mechanism	.21*	.25**	-.17*	.37**	—	-.26*
Concrete words	-.18*	-.22*	.25**	-.35**	-.42**	—

NOTE: Study 1 results presented above the diagonal. Study 2 results presented below the diagonal.

\* $p < .05$ . \*\* $p < .01$ .

BIDR, Big Five, baseline well-being questionnaires (STAI, SVS, PANAS, Physical Symptoms Checklist), and baseline handgrip. After watching both films, participants wrote for 8 min on a topic specific to their randomly assigned condition. Participants in the express condition wrote about their thoughts and reactions while watching the Hiroshima–Nagasaki film, whereas participants in the distract condition wrote about their thoughts and feelings while watching the Mesa Verde film. After the writing period, participants again completed the well-being questionnaires and engaged in the handgrip task.

The second session was structured similarly to the first, with the exception that the abbey film was shown instead of the Mesa Verde film. After watching the Hiroshima–Nagasaki film, all participants were asked to write about their thoughts and feelings while watching the films. At the end of the second session participants completed the media questionnaire and were debriefed.

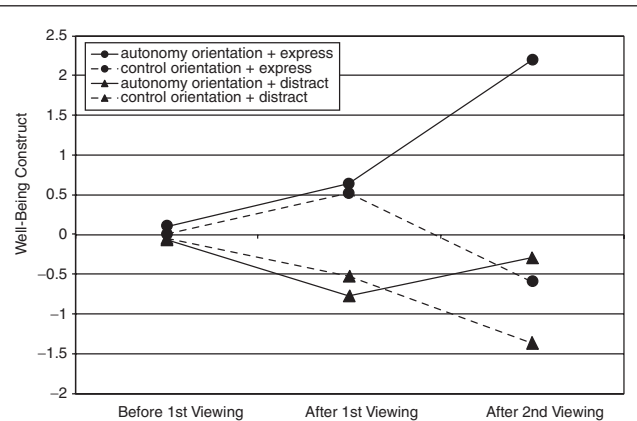
Of the 77 participants, 20 were autonomous and expressing, 20 were controlled and expressing, 18 were autonomous and distracted, and 19 were controlled and distracted.

## Results and Discussion

### *Well-Being Indicators*

To examine well-being and handgrip, we estimated a 2 (dispositional motivation: autonomy, control)  $\times$  2 (writing: express, distract)  $\times$  3 (time: baseline, after first viewing, after second viewing) mixed measures ANCOVA, controlling for gender, neuroticism, biased responding, and sensitivity to media. Two repeated measures ANCOVAs predicted well-being and handgrip, separately, at each of the three times. Table 1 summarizes correlations between these outcomes and memory.

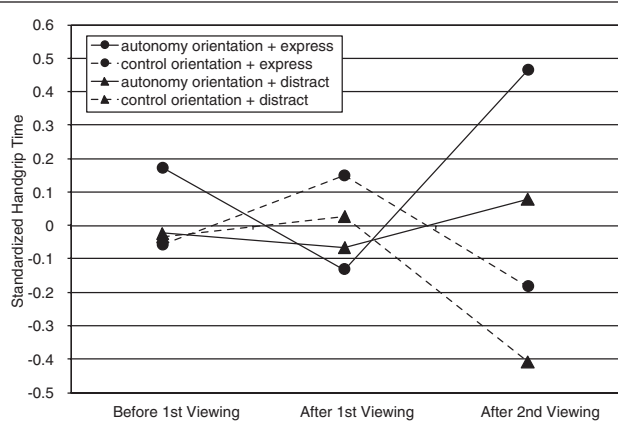
*Well-being.* Neuroticism was the only significant covariate predicting well-being,  $F(2, 136) = 3.43$ ,  $p < .05$ , other  $ps > .05$ . A three-way Motivation Orientation  $\times$



**Figure 1** Study 1 effects of motivation orientation and writing instructions on well-being assessed at three time points.

Writing Condition  $\times$  Time interaction,  $F(2, 136) = 3.29$ ,  $p < .05$  (Figure 1), qualified the main effect of time,  $F(2, 136) = 3.54$ ,  $p < .05$ ; the Motivation  $\times$  Time interaction,  $F(2, 136) = 4.76$ ,  $p < .05$ ; and the Writing Instructions  $\times$  Time interaction,  $F(2, 136) = 2.69$ ,  $p < .08$ .

We examined implications of the three-way interaction by assessing the main and interacting effects of motivation orientation and writing condition at each of the three time points. At Time 1, there were no group differences,  $F(1, 69) = 0.05$ ,  $p > .10$ . Unexpectedly, after watching the film the first time, expressing participants reported higher well-being than distracted participants,  $F(1, 69) = 5.14$ ,  $p < .05$ . Unlike past research, this result suggested initial well-being benefits of expressing feelings. However, motivation did not affect well-being,  $F(1, 69) = 0.05$ ,  $p > .10$ , and did not interact with writing,  $F(1, 69) = 0.06$ ,  $p > .10$ . Notable group differences were present in the second session. After the second viewing, main effects of autonomy orientation,  $F(1, 69) = 13.89$ ,  $p < .01$ , and expression instructions,  $F(1, 69) = 11.79$ ,  $p < .01$ , were qualified by the Autonomy Orientation  $\times$  Writing interaction,  $F(1, 69) = 6.75$ ,  $p < .05$ . Tukey post hoc comparisons showed that autonomous participants who expressed had higher well-being than all other



**Figure 2** Study 1 effects of motivation orientation and writing instructions on standardized handgrip time assessed at three time points.

groups: control/express,  $t(39) = 4.42, p < .05$ ; autonomy/distract,  $t(37) = 3.79, p < .05$ ; and control/distract,  $t(38) = 4.56, p < .05$ . None of the other groups differed significantly,  $ts(37-39) = 0.05-1.22, ps > .10$ .

**Handgrip.** Results showed no significant effects for covariates,  $ps > .05$ . The three-way Motivation Orientation  $\times$  Writing Directions  $\times$  Time interaction was significant,  $F(2, 136) = 3.12, p < .05$  (Figure 2), and qualified the effects of the Motivation  $\times$  Time interaction,  $F(2, 136) = 6.09, p < .01$ ; the Writing Condition  $\times$  Time interaction,  $F(2, 136) = 2.70, p < .08$ ; and marginally the Handgrip  $\times$  Time interaction,  $F(2, 136) = 2.39, p < .10$ .

To explore this result, we examined the effects of motivation orientation and writing at each time point. There were no group differences when first arriving at the lab,  $Fs(1, 69) = 0.23-0.73, ps > .10$ . After the first viewing, control-oriented participants had higher handgrip than autonomy-oriented participants,  $F(1, 69) = 5.64, p < .05$ , although there were no differences between writing conditions as there had been for well-being,  $F(1, 69) = 1.02, p > .10$ , or an interaction effect,  $F(1, 69) = 1.70, p > .10$ . Two effects emerged after the second viewing. First, dispositional autonomy positively predicted handgrip times,  $F(1, 69) = 6.20, p < .05$ . Second, although writing did not directly affect handgrip,  $F(1, 69) = 1.39, p > .10$ , writing and motivation orientation interacted to predict handgrip times,  $F(1, 69) = 8.62, p < .01$ . Tukey post hoc comparisons showed that autonomously oriented, expressing participants held the handgrip longer than all other groups: mean difference autonomy/distract,  $t(37) = 3.78$ ; control/express,  $t(39) = 4.12$ ; control/distract,  $t(38) = 4.52, ps < .05$ . There were no other significant differences,  $ts(37-39) = 0.25-1.82, ps > .05$ .

**Memory.** ANCOVAs were used to test memory from motivation orientation and writing condition, controlling for the four covariates described previously and for memory for the neutral film. None of the covariates significantly predicted memory,  $ps > .05$ . As predicted, autonomous individuals exhibited less memory for the content in the Hiroshima–Nagasaki film,  $F(1, 68) = 5.05, p < .05$  ( $M_{\text{autonomy}} = 11.10, M_{\text{control}} = 12.60$ ), as did participants who expressed,  $F(1, 68) = 7.39, p < .01$  ( $M_{\text{express}} = 11.10, M_{\text{distract}} = 12.70$ ). However, inconsistent with our hypotheses, motivation and writing did not interact in predicting memory,  $F(1, 68) = 1.01, p > .10$ . Main effects were largely consistent with the prediction that autonomously oriented and expressing individuals remember fewer negative events by the second session.

### Mediation by Language Use

We predicted that autonomous individuals would experience positive outcomes after the second viewing because they are more open and less defensive and thus are better able to process emotionally charged information. To explore the mediating effects of openness (reflected in use of self-referencing pronouns in Session 1) and effective emotional processing (reflected in use of cognitive mechanisms and absence of concrete words in Session 2), we tested mediational models for well-being, handgrip, and memory using ordinary least squares regression analyses outlined by Baron and Kenny (1986). Table 1 presents correlations between mediating factors.

Analyses showed that interacting effects of motivation and writing on the linguistic predictors were non-significant,  $Fs(1, 68) = 0.63-1.24, ps > .05$ ; therefore, we could not test mediations for this interaction. Although it was possible to collapse across writing conditions, an additional concern was that the linguistic indicators did not reflect the same underlying processes in each writing condition. For example, self-referencing terms were directed at the neutral stimulus in the distract condition but at the emotional stimulus in the express condition. Furthermore, expressing participants wrote twice about the emotional film rather than once as in the distract condition, which may have influenced the use of concrete and cognitive terms. With these concerns in mind, we examined mediation only for participants in the express condition to explore autonomous participants' capacity for capitalizing on opportunities to express. Well-being and handgrip analyses controlled for initial standing on these variables.

Analyses demonstrated effects on all three potential mediators. Results showed that autonomous participants used more self-referencing pronouns,  $\beta = .31, F(1, 38) = 9.65, p < .01$ ; more cognitive mechanisms,  $\beta = .28, F(1, 38) = 8.72, p < .01$ ; and fewer concrete words,  $\beta =$

-.27,  $F(1, 38) = 8.64$ ,  $p < .01$ . These effects satisfy the predictor to mediator path requirement for mediational analyses on all three outcomes.

*Well-being mediations.* Autonomous participants reported higher well-being after the second viewing,  $\beta = .42$ ,  $F(1, 38) = 11.12$ ,  $p < .01$ . Well-being was also predicted by self-referencing terms,  $\beta = .29$ ,  $F(1, 35) = 9.01$ ,  $p < .01$ ; cognitive mechanism use,  $\beta = .21$ ,  $F(1, 35) = 7.56$ ,  $p < .01$ ; and less concrete word use,  $\beta = -.19$ ,  $F(1, 35) = 6.36$ ,  $p < .05$ . When controlling for these, motivation no longer predicted well-being,  $\beta = .09$ ,  $F(1, 35) = 1.53$ ,  $p > .10$ . Sobel's test for indirect effects was  $Z = 2.16$ ,  $p < .05$  for self-referencing terms;  $Z = 2.01$ ,  $p < .05$  for cognitive mechanisms; and  $Z = 1.92$ ,  $p < .06$  for concrete mechanisms.

*Handgrip mediations.* Autonomy predicted higher handgrip scores after the second viewing,  $\beta = .42$ ,  $F(1, 38) = 11.11$ ,  $p < .01$ , as did self-referencing terms,  $\beta = .41$ ,  $F(1, 35) = 9.84$ ,  $p < .01$ , and cognitive mechanisms,  $\beta = .32$ ,  $F(1, 35) = 6.91$ ,  $p < .05$ , but not concrete words,  $\beta = -.16$ ,  $F(1, 35) = 2.56$ ,  $p > .10$ . When controlling for these, motivation no longer predicted handgrip times,  $\beta = .10$ ,  $F(1, 35) = 1.61$ ,  $p > .10$ . Sobel's test for self-referencing terms was  $Z = 2.21$  and for cognitive mechanisms was  $Z = 1.96$ ,  $ps < .05$ .

*Memory mediations.* Autonomous participants had poorer film memory,  $\beta = -.32$ ,  $F(1, 38) = 7.92$ . Poor memory was also predicted by self-referencing terms,  $\beta = -.34$ ,  $F(1, 35) = 11.73$ ; cognitive mechanisms,  $\beta = -.35$ ,  $F(1, 35) = 12.01$ ; and concrete words,  $\beta = .28$ ,  $F(1, 35) = 9.73$ ,  $ps < .01$ . When controlling for these, motivation no longer predicted memory as in the first model,  $\beta = .05$ ,  $F(1, 35) = 1.02$ ,  $p > .10$ . Sobel's test was  $Z = 2.30$  for self-referencing terms,  $Z = 2.25$  for cognitive mechanisms, and  $Z = 2.14$  for concrete mechanisms,  $ps < .05$ .

### Conclusion

In Study 1, autonomous participants experienced similar or lower well-being and energy (indicated by handgrip time) after the first viewing. Thus, benefits of autonomy were not immediately apparent. Only after the second viewing did autonomy facilitate positive outcomes (high well-being and energy, and low content memory). In addition, after the second viewing, participants who expressed had higher well-being and lower content memory, but they had similar energy to those who distracted. Moreover, only autonomous participants benefited from expression directions. Autonomous participants'

capacity to benefit from written expression was indicated by their reported well-being and energy, which were higher than all other groups.

We hypothesized that benefits were derived because autonomous participants were more open to their experiences and were better able to process their negative emotions. Mediational analyses showed that self-referencing pronoun use (indicative of openness or nondefense) as well as cognitive mechanism and lower concrete word use (indicative of effective emotional processing) mediated the relation between motivation and subsequent outcomes.

In Study 2 we extended these findings by manipulating autonomous and controlled motivation using primes. With the prime manipulation, Study 2 examined the interacting effects of *situational* and *individual* motivation. That is, we examined the extent to which contextually induced autonomy can produce some of the same benefits found in Study 1 for controlled individuals, particularly when they are also prompted to express their emotions. As in Study 1, we examined mediation by linguistic indicators.

## STUDY 2

### Method

#### Participants

Participants were 80 undergraduates (20 males, 60 females) aged 18-23 ( $M = 20$ ); most (85%) were native English speakers. Native English speakers did not differ from non-native English speakers on major study variables,  $ps > .05$ .

#### Materials

As in Study 1, we controlled for Media Questionnaire ( $\alpha = .56$ ), BIDR ( $\alpha = .79$ ), and Big Five neuroticism items ( $\alpha = .76$ ), and measured well-being with the PANAS ( $\alpha s = .88-.94$  and  $.83-.91$  for positive affect and negative affect, respectively), STAI ( $\alpha s = .89-.92$ ), SVS ( $\alpha s = .89-.96$ ), and Physical Symptoms Checklist ( $\alpha s = .67-.79$ ). As in Study 1, PANAS, STAI, SVS, and Physical Symptoms Checklist were standardized and combined into a well-being composite ( $\alpha = .71$ ). Handgrip and recognition film memory were again measured (neutral and emotional film memory correlated,  $r = .41$ ).

#### Moderation by Motivation

*Dispositional autonomy.* As in Study 1, the GCOS was used to measure individual differences in motivation ( $\alpha s = .80$  and  $.74$  for control and autonomy, respectively).



**Motivation priming.** A sentence scramble task primed autonomy and control motivations using 30 items (15 motivation relevant, 15 neutral), each containing five words to be constructed into grammatically correct four-word sentences (for actual items, see Hodgins et al., 2007). Examples of autonomy words were *choiceful*, *opportunity*, *autonomous*; examples of control words were *must*, *should*, *ought*. In previous studies, primed motivation has influenced defensiveness (Hodgins et al., 2006; Hodgins et al., 2008) and implicit self-esteem (Hodgins et al., 2007).

### Procedure

The Study 2 procedure was similar to Study 1 except that it included a second independent variable of primed motivation. Thus, Study 2 used a mixed-subjects design with four between-subject conditions: (a) express writing and primed autonomy, (b) distract writing and primed autonomy, (c) express writing and primed control, and (d) distract writing and primed control. Participants were fairly evenly distributed across motivation orientations, prime conditions, and writing conditions; cells ranged from 9 to 11 participants and averaged 10 participants.

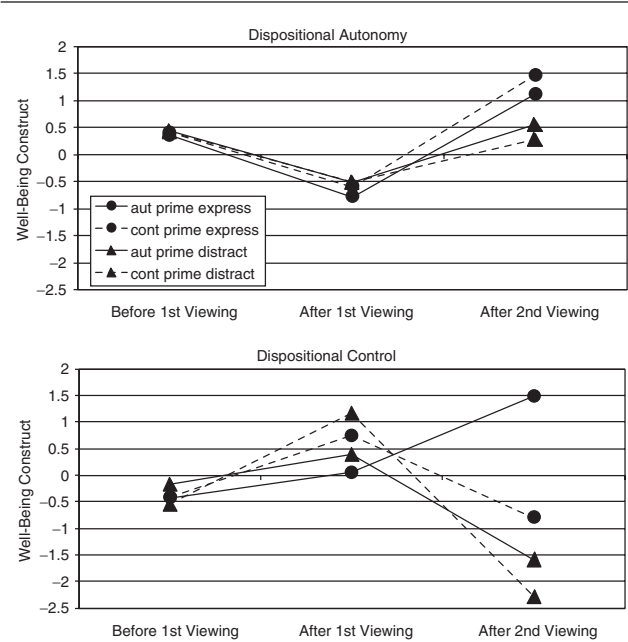
## Results and Discussion

### Well-Being Indicators

Two mixed ANCOVAs examined well-being and handgrip using a 2 (dispositional motivation: autonomy or control)  $\times$  2 (primed motivation: autonomy or control)  $\times$  2 (writing condition: express or distract)  $\times$  3 (time: before first viewing, after first viewing, after second viewing) design.

**Well-being.** Of the covariates, only neuroticism predicted well-being over time,  $F(2, 136) = 3.83, p < .05$ , other covariates,  $ps > .05$ . A four-way Time  $\times$  Motivation Orientation  $\times$  Motivation Prime  $\times$  Writing Instruction interaction,  $F(2, 136) = 3.97, p < .05$  (Figure 3), qualified the two-way Dispositional Motivation  $\times$  Time interaction,  $F(2, 136) = 9.56, p < .01$ , and Primed Motivation  $\times$  Time interaction,  $F(2, 136) = 4.43, p < .05$ . Other effects were nonsignificant,  $F_s(2, 136) = 0.04-2.10, ps > .05$ .

To understand the interaction, the effect of the Dispositional Motivation  $\times$  Primed Motivation  $\times$  Writing Condition interaction was examined at each time point. At Time 1, there were no main effects or interactions,  $F_s(1, 68) = 0.01-2.27, ps > .10$ . After first watching the film, dispositional autonomy predicted lower well-being as predicted,  $F(1, 68) = 3.99, p < .05$ . All other effects were nonsignificant,  $F_s(1, 68) = 0.01-0.60, ps > .10$ . After watching the film the second time, a number of

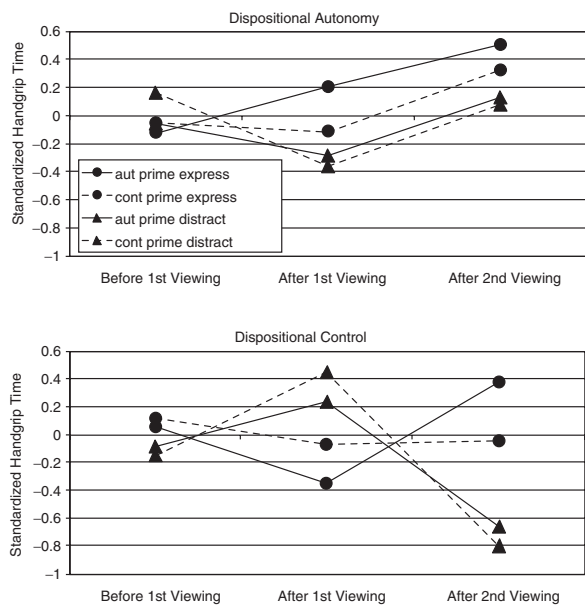


**Figure 3** Study 2 effects of motivation orientation, motivational primes, and writing instructions on well-being assessed at three time points.

effects emerged. First, all main effects were significant; notably, dispositional autonomy predicted higher well-being,  $F(1, 68) = 20.40, p < .01$ , as did primed autonomy,  $F(1, 68) = 15.15, p < .01$ , and written expression,  $F(1, 68) = 4.76, p < .05$ .

Main effects were qualified by a three-way Dispositional Motivation  $\times$  Primed Motivation  $\times$  Writing Condition interaction,  $F(1, 68) = 4.35, p < .05$ , examined with Tukey paired comparisons. Importantly, all autonomy-oriented participants had similar well-being,  $t_s(18-21) = 0.80-3.25, ps > .10$ , suggesting that being autonomous led to higher well-being regardless of condition. In contrast, writing condition affected dispositionally controlled participants: Those primed with autonomy and expressing had higher well-being than all other control-oriented groups,  $t_s(17-19) = 5.03-5.27, ps < .01$ . In fact, this group experienced well-being that was similar to participants who were autonomy oriented, autonomously primed, and expressing,  $t(19) = 0.93, p > .05$ . All other control-oriented groups had lower well-being than all autonomy-oriented participants,  $t_s(17-21) = 4.63-4.89, ps < .05$ . No other comparisons were significant,  $t_s(17-21) = 1.02-2.05, ps > .05$ .

**Handgrip.** Media sensitivity predicted lower handgrip,  $F(2, 136) = 3.06, p < .05$ , other covariates,  $ps > .05$ . Handgrip times were influenced by the four-way



**Figure 4** Study 2 effects of motivation orientation, motivational primes, and writing instructions on standardized handgrip time assessed at three time points.

interaction between Time, Orientation, Prime, and Writing,  $F(2, 136) = 4.49, p < .05$  (see Figure 4), which qualified the Prime  $\times$  Time interaction,  $F(2, 136) = 3.82, p < .05$ . Other interactions with time were nonsignificant,  $F_s(2, 136) = 0.62-1.87, p_s > .05$ .

To understand the four-way interaction, effects of dispositional motivation, primed motivation, and writing condition were examined at each time point. There were no differences between predictors at Time 1,  $F_s(1, 68) = 0.01-0.83, p_s > .05$ , or after the first viewing,  $F_s(1, 68) = 1.18-1.52, p_s > .05$ . After the second viewing, several effects were present. Specifically, autonomy orientation predicted higher handgrip,  $F(1, 68) = 6.43, p < .05$ , and autonomy prime predicted marginally higher handgrip,  $F(1, 68) = 2.63, p < .10$ ; writing condition was nonsignificant,  $F(1, 68) = 1.52, p > .05$ . These effects were subsumed by a three-way Dispositional Motivation  $\times$  Primed Motivation  $\times$  Writing Condition interaction,  $F(1, 68) = 7.22, p < .01$ . Post hoc analyses showed that all autonomy-oriented participants had similar handgrip times,  $t_s(18-21) = 0.28-1.93, p_s > .05$ . In contrast, control-oriented participants who were autonomy primed and expressed had higher times than all other dispositionally controlled groups,  $t_s(17-19) = 4.61-5.17, p_s < .05$ . Thus, contextual cues influenced dispositionally controlled but not dispositionally autonomous participants. In addition, all dispositionally autonomous groups were higher in handgrip times than control-oriented, control-primed, distracting

participants,  $t_s(18-21) = 4.45-5.23, p_s < .05$ , indicating that this group had particularly low handgrip after the second viewing.

*Memory.* Covariates did not predict memory,  $p_s > .05$ . ANCOVAs tested effects of the predictors on memory for the distressing film. Results were similar to Study 1 in that autonomy-oriented individuals had poorer memory for the Hiroshima–Nagasaki film content ( $M = 12.27$ ) than did control-oriented participants ( $M = 13.51$ ),  $F(1, 68) = 14.64, p < .01$ . Furthermore, participants who expressed in writing had poorer memory ( $M = 12.36$ ) than did those who distracted ( $M = 13.43$ ),  $F(1, 68) = 11.41, p < .01$ . The hypothesized main effect of primed motivation and interaction effects were not found,  $F_s(1, 68) = 1.01-2.17, p_s > .10$ ; therefore, there is no evidence that situational variables moderated the effects of dispositional ones.

#### Mediation by Language Use

As in Study 1, we tested mediation by self-referencing, cognitive processing, and concrete term use. Consistent with Study 1, interactions involving writing were nonsignificant,  $F_s(1, 68) = 0.28-2.53, p_s > .05$ ; therefore, we could not test mediation for these interacting effects. As in Study 1, we focused on participants in the express condition because of the content differences elicited by the two writing conditions. To explore the interacting effects of autonomy orientation and prime, Study 2 used mediated moderation analyses outlined by Muller, Judd, and Yzerbyt (2005), which are based on Baron and Kenny (1986) recommendations. Well-being and handgrip analyses controlled for initial standing on these variables.

*Language use.* Table 1 presents correlations between linguistic mediators. Results show that for the three mediators, autonomy primes facilitated healthy language use for dispositionally controlled, but not dispositionally autonomous, individuals. Specifically, self-referencing pronouns were predicted by the Disposition  $\times$  Prime interaction,  $\beta = -.33, F(1, 37) = 8.96, p < .01$ . Simple slope analyses showed that control-oriented individuals self-referenced more when primed with autonomy than control,  $\beta = .27, F(1, 16) = 4.72, p < .05$ , whereas no effect of prime was present for dispositional autonomy,  $\beta = -.12, F(1, 20) = 0.31, p > .50$ .

Second, an interaction predicted cognitive mechanisms,  $\beta = -.33, F(1, 37) = 9.23, p < .05$ , such that dispositionally controlled individuals used more such terms when autonomy primed,  $\beta = .54, F(1, 16) = 11.62, p < .01$ ; autonomous orientation,  $\beta = .31, F(1, 20) = 2.04, p > .15$ .

Finally, an interaction predicting concrete words,  $\beta = -.23$ ,  $F(1, 37) = 4.30$ ,  $p = .05$ , indicated that control-oriented individuals used fewer such words when primed with autonomy,  $\beta = -.55$ ,  $F(1, 16) = 7.72$ ,  $p < .05$ , but prime did not influence dispositionally autonomous individuals,  $\beta = -.32$ ,  $F(1, 20) = 2.77$ ,  $p > .10$ .

*Well-being mediations.* Dispositional and primed motivation interacted in predicting well-being,  $\beta = -.41$ ,  $F(1, 36) = 4.85$ ,  $p < .05$ , such that control-oriented individuals had higher well-being when primed with autonomy,  $\beta = .67$ ,  $F(1, 16) = 15.36$ ,  $p < .01$ , but prime did not affect autonomy-oriented individuals,  $\beta = .21$ ,  $F(1, 20) = 0.95$ ,  $p > .30$ . Well-being was also predicted by self-referencing terms,  $\beta = .52$ ,  $F(1, 34) = 11.33$ ,  $p < .01$ ; cognitive mechanism use,  $\beta = .48$ ,  $F(1, 34) = 13.01$ ,  $p < .01$ ; and less concrete word use,  $\beta = -.46$ ,  $F(1, 34) = 10.52$ ,  $p < .01$ . When controlling for linguistic mediators, the Dispositional  $\times$  Primed Motivation interaction no longer predicted well-being,  $\beta = .13$ ,  $F(1, 33) = 1.22$ ,  $p > .10$ . Sobel tests were  $Z = 2.24$ ,  $p < .05$  for self-referencing;  $Z = 2.33$ ,  $p < .05$  for cognitive mechanism; and  $Z = 1.75$ ,  $p = .08$  for concrete words.

*Handgrip mediations.* A Dispositional  $\times$  Primed Motivation interaction influenced handgrip,  $\beta = -.46$ ,  $F(1, 36) = 9.51$ ,  $p < .01$ , such that dispositionally controlled individuals had higher handgrip times when autonomy primed,  $\beta = .75$ ,  $F(1, 16) = 18.93$ ,  $p < .01$ , but there was no effect of prime for dispositionally autonomous participants,  $\beta = -.04$ ,  $F(1, 20) = 0.09$ ,  $p > .30$ . Handgrip was also predicted by self-referencing terms,  $\beta = .49$ ,  $F(1, 34) = 9.82$ ,  $p < .01$ ; cognitive mechanisms,  $\beta = .31$ ,  $F(1, 34) = 5.64$ ,  $p < .05$ ; and marginally by concrete word use,  $\beta = -.18$ ,  $F(1, 34) = 2.85$ ,  $p < .10$ . When including linguistic mediators, the interaction no longer predicted handgrip,  $\beta = .15$ ,  $F(1, 33) = 1.85$ ,  $p > .18$ . Sobel tests for indirect effects were  $Z = 2.16$ ,  $p < .05$  for self-referencing terms;  $Z = 1.87$ ,  $p = .06$  for cognitive mechanisms; and  $Z = 1.31$ ,  $p = .19$  for concrete words.

*Memory mediations.* Unlike for well-being and handgrip time the Dispositional  $\times$  Primed Motivation interaction did not predict memory,  $\beta = .08$ ,  $F(1, 36) = 0.58$ ,  $p > .50$ ; we therefore examined main effects. Dispositional autonomy predicted poor memory,  $\beta = -.32$ ,  $F(1, 34) = 4.67$ ,  $p < .05$ , but primed motivation did not predict memory,  $\beta = -.14$ ,  $F(1, 34) = 2.76$ ,  $p > .10$ . Also, memory was predicted by less use of self-referencing terms,  $\beta = -.32$ ,  $F(1, 34) = 10.42$ ,  $p < .01$ , and more concrete word use,  $\beta = .29$ ,  $F(1, 34) = 9.94$ ,  $p < .01$ , but there was no effect for cognitive mechanisms,  $\beta = -.17$ ,  $F(1, 34) = 2.34$ ,  $p = .13$ . When self-referencing and concrete terms were controlled for, primed motivation no longer predicted

well-being,  $\beta = -.13$ ,  $F(1, 33) = 1.86$ ,  $p > .10$ . Sobel's test for indirect effects was  $Z = 2.19$ ,  $p < .05$  for self-referencing terms and  $Z = 1.74$ ,  $p = .08$  for concrete words.

### Conclusion

Study 2 indicated that autonomy-oriented participants had lower Session 1 well-being than control-oriented participants but had the same levels of energy. Unlike Study 1, expressing participants did not report higher well-being in Session 1. Study 2 replicated Study 1 by demonstrating positive effects of dispositional autonomy after repeated exposure to an emotional stimulus. In particular, autonomous individuals experienced higher well-being and energy regardless of their primed motivation or opportunity for written expression. Control-oriented participants experienced high well-being after the second viewing only when primed for autonomy and invited to express their emotions; those who were primed with control and distracted showed the lowest levels of energy. Presumably, dispositionally controlled participants lack adaptive stable self-regulation strategies; when not given contextual autonomy support and opportunity for express, this group experienced the largest energy drain from emotional material that remained unprocessed. In addition, dispositionally autonomous and expressing participants had worse memory for the distressing film content, suggesting that these groups effectively regulated emotional material and did not continue ruminating on it.

Mediational analyses were conducted on express writing participants. Interaction effects showed that autonomous priming led to higher well-being and energy only for those who were dispositionally controlled but did not affect dispositionally autonomous participants. Linguistic coding analyses showed that self-referencing, cognitive mechanisms, and concrete words mediated this interaction (although concrete words only marginally mediated handgrip). Use of self-referencing terms and concrete words also mediated main effects of dispositional autonomy on memory.

## GENERAL DISCUSSION

The present studies explored the role of autonomous and controlled motivation on effective use of expression after repeated exposure to a negative stimulus and on outcomes that reflected the effectiveness of emotional regulation. Results of Study 1 showed that immediate (Session 1) well-being benefits were apparent for written emotion expression, although this unexpected effect was not replicated in Study 2. Autonomy motivation did not benefit individuals immediately after the first

exposure to the negative film. Instead, participants who regulated negative emotion effectively, either because they were dispositionally autonomous or encouraged to express feelings in writing, experienced similar or lower well-being and a decrease in energy in Session 1 compared to other groups. Excepting positive well-being results for expression in Session 1, these results are similar to past research (Mendolia & Kleck, 1993) in showing that openly and nondefensively experiencing difficult emotions may initially seem disadvantageous.

As expected, the advantages of autonomy emerged after a 2-day delay when participants were exposed to the same negative stimulus. Notably, in both studies, dispositionally autonomous participants experienced higher well-being and energy across conditions. Written expression of feelings also predicted higher well-being after the second viewing, although it did not directly affect energy. These results are interesting because they suggest that both autonomy and written expression led individuals to process thoughts and emotions but that autonomy may have especially facilitated nondefense, which ultimately freed up available energy. The result for well-being replicates past research demonstrating the beneficial effects of expression after repeated exposure to emotional material (e.g., Mendolia & Kleck, 1993).

In the present research, motivation was a key moderator for the effects of written expression. In Study 1, autonomous participants who expressed reported higher well-being than all other groups. In addition, this group experienced higher energy than control-oriented participants. We suggest that dispositional autonomy facilitated nondefensiveness, allowing participants to make better use of the opportunity to express feelings and to regulate negative emotions. Embracing rather than avoiding the opportunity to face experience subsequently led to benefits for well-being and energy.

Using motivational primes, we examined whether contextually induced autonomy afforded the same benefits as dispositional autonomy. Situational activation of motivation positively affected both well-being and energy after the second viewing. This effect was largely carried by the influence of priming on control-oriented participants who were encouraged to express. Specifically, Study 2 showed that control-oriented participants experienced higher well-being only when primed with autonomy and expressing. It appears that environmental contexts that foster autonomy can compensate for deficits in dispositional motivation to encourage effective emotion regulation. When control-oriented participants experienced situational autonomy, they used the opportunity to express their feelings and consequently experienced positive outcomes. Furthermore, control-oriented participants experienced the lowest energy when primed with control and distracted from expressing feelings. We

interpret this as showing that control-oriented participants are especially vulnerable to ineffective emotional regulation when in situations that further elicit control motivation and discourage contact with their own feelings. Participants with this toxic combination of factors may have attempted to manage negative emotions in ways that were especially costly, draining their energy and undermining their well-being over 2 days.

Notable effects were also present for memory of the details of the emotional film. Results showed that memory was worse for dispositionally autonomous participants and for those who expressed their feelings. These findings are interesting in light of past research, which postulates that unprocessed emotional material is maintained in memory and cycles until it is organized and integrated (Martin & Tesser, 1989). Related to this, studies suggest that writing is an effective channel that leads to the release of painful emotions and ends the cycle of rumination (Lyubomirsky et al., 2006; van der Kolk & van der Hart, 1991). Findings for memory suggest that participants equipped with autonomy or who expressed experienced a sense of closure or psychological integration of the stressful experience (Pennebaker, 1989).

Although the present studies specifically assessed these effects using written emotion expression, we believe that these findings may generalize to other contexts offering the potential for emotion expression, including interpersonal contexts offering vocal emotion expression. Nonwritten expression has demonstrated similar long-term effects on well-being to those of written expression (Murray & Segal, 1994). More important, similar effects of autonomy on nondefensive threat response have been demonstrated in interpersonal situations (Hodgins et al., 2008). However, this speculation should be assessed in empirical studies.

Results showing that control-oriented participants primed with autonomy had higher well-being and energy, and that autonomous participants showed these benefits as well as poor content memory, support our hypothesis that autonomy facilitates effective regulation leading to positive outcomes. We suggest that nondefensiveness toward experience allowed effective processing of negative emotions, leading to these outcomes. This hypothesis was examined by coding language use in Sessions 1 and 2 writing. Results showed that autonomy orientation (Study 1) and an Orientation  $\times$  Prime interaction (showing positive effects of autonomy prime for control-oriented participants; Study 2) predicted lower defense or greater openness in Session 1 writing (reflected in use of self-referencing pronouns, Campbell & Pennebaker, 2003) and more fully processed by Session 2 (reflected in use of cognitive processing words, Pennebaker, 1997; and fewer concrete words, Bucci, 1995). When controlling for relevant linguistic mediators, initial main or interacting effects became nonsig-

nificant. It therefore appears that autonomy motivation allowed individuals to process negative emotions more openly, and more thoroughly, and that integrative emotional processing led to higher subsequent well-being, greater physical energy, and lower remaining memory of film content.

The present research has several limits. First, inconsistencies were present in the results of the two studies. The most notable difference was that autonomy-oriented participants benefited from expression at the end of Session 1 in Study 1 but not in Study 2. It is possible that this occurred because the benefits of autonomy demonstrated in Study 1 were subdued by motivation priming in Study 2. A second limitation was the lack of a no-film comparison group in Study 1, which makes it difficult to ascertain which effects were specific to emotion regulation. Finally, the absence of a neutral prime or no prime condition in Study 2 disallows interpretation of the causal directions of priming effects, that is, whether autonomy facilitates emotion regulation or control motivation hinders it.

Despite these limits, the research provides compelling evidence for the importance of motivation orientations for emotional regulation. These results extend past findings by showing that situational and dispositional autonomy motivation is an important determinant of whether individuals engage in the most beneficial emotional regulation, that of engaging and expressing their experiences. The current studies also support the assertion that autonomous individuals tend to approach negative emotional experience openly and nondefensively and as a result experience positive emotional, physical, and cognitive outcomes over time. Moreover, the present research suggests that when autonomy is primed, it provides similar benefits as dispositional autonomy to those lacking it.

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