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Article

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Abstract

The present research examined the effects of expressive writing on emotion regulation and well-being outcomes among Hong Kong Chinese emerging adults between 18 and 25 years of age. A total of 126 Chinese emerging adults were recruited and randomly assigned over three consecutive days to one of the following three conditions including expressive writing, regular writing, and nil writing. Follow-up sessions were conducted one day and one month after the completion of all writing sessions. Mixed measures ANOVA indicated group differences in cognitive reappraisal, expressive suppression, life satisfaction, and general health over time. Participants from the expressive writing group reported greater improvements in these measures at the one-month follow-up than did their regular and nil writing counterparts. Follow-up mediation analysis suggested that cognitive reappraisal mediated between expressive writing and outcomes including life satisfaction and general health. Theoretical and practical implications are discussed.

Keywords: depressive symptoms, emotion regulation, expressive writing, general health, life satisfaction

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Accumulating evidence to date has indicated that disclosure of personal traumas can reduce psychological symptoms and health problems (Macready, Cheung, Kelly, & Wang, 2011; Pennebaker & Susman, 1988). As a form of disclosure, expressive writing improves both physical health (Niles, Haltom, Mulvenna, Lieberman & Stanton, 2014) and psychological health (Lepore, Greenberg, Bruno, & Smyth, 2002; Niles et al., 2014; Pennebaker & Beall, 1986; Pennebaker & Chung, 2011). Although writing about emotional and traumatic experiences leads to health benefits in diverse populations including university students (Lu & Stanton, 2010; Smyth, 1998; Yang, Tang, Duan & Zang, 2015), it is unclear whether emotion regulation serves as a mechanism between expressive writing and mental health. To fill this gap, the present study investigated the effect of expressive writing and well-being. We further examined emotion regulation as a mediating process between expressive writing and well-being outcomes encompassing life satisfaction, general health, and depressive symptoms in the Chinese context.

Expressive Writing and Mental Health: The Mediating Role of Emotion Regulation

The expressive writing paradigm was introduced over three decades ago (Pennebaker & Beall, 1986) in the form of personal writing that involves the cognitive processing of a traumatic event. According to the emotion regulation model of expressive writing (Lepore et al., 2002), emotion regulation may explain the relation between expressive writing and health. Emotion regulation refers to individuals' ability to control their experience, expression, and behavior associated with their immediate emotions (Gross, 2002). The regulatory process involves attention, habituation, and cognitive restructuring, which require individuals to pay close attention to emotional stimuli and their emotional responses (Lepore et al., 2002). When individuals experience stressful life events, writing expressively can direct their

attention to physiological or behavioral responses. Expressive writing can also facilitate desensitization and habituation to the stressful event and restructure stress-related thoughts to reduce negative emotions and physiological and affective arousal (Ehring, Caffier, Schnulle, Fischer, & Gross, 2010; Gross & John, 2003). Consequently, the regulatory processes associated with expressive writing can serve as a process associated with health improvements (Alparone, Pagliaro, & Rizzo, 2015; Pennebaker, 1997).

Consistent with the emotion regulation model (Lepore et al., 2002), the cognitive change hypothesis (Pennebaker & Seagal, 1999, see also Sloan & Marx, 2004) posits that expressive writing involves cognitive processing of traumatic events, leading the writers to acknowledge, understand, and make sense of their emotional experiences (Graybeal, Sexton, & Pennebaker, 2002; Pennebaker & Beall, 1986). By revisiting a traumatic experience, expressive writers can form a more accurate and coherent narrative that promotes insight (Poon & Danoff-Burg, 2011). As such, traumatic memories can be summarized, stored, and re-evaluated more efficiently (Pennebaker & Seagal, 1999). These cognitive benefits, in turn, are associated with reductions in depressive symptoms (Gortner, Rude, & Pennebaker, 2006; Sloan, Marx, Epstein, & Dobbs, 2008) and anxiety (Niles et al., 2014).

In a similar vein, emotional inhibition theory (Pennebaker, 1997) suggests that expressive writing reduces emotional inhibition about personal traumas. Notably, emotional disclosure is likely to reduce intrusive thoughts (Lepore, 1997) and rumination (Gortner et al., 2006) in producing long-term beneficial health outcomes (Baikie & Wilhelm, 2005; Lepore et al., 2002; Pennebaker & Beall, 1986). In a study conducted by Pennebaker, Kiecolt-Glaser, and Glaser (1988), individuals who wrote about traumatic experiences showed more improvements in their immune system than did control participants. Specifically, those who showed the greatest improvement wrote about topics that they had actively inhibited from telling others.

Altogether, extant theories and findings converged to suggest that expressive writing is associated with emotion regulation and mental health. Despite the viability of emotion regulation as a mediator, scant research has been conducted to explicitly test emotion regulation as a mechanism underlying expressive writing and mental health (see Gortner et al., 2006, for an exception).

Cognitive Reappraisal and Expressive Suppression as Emotion Regulation Strategies

Two common emotion regulation strategies, namely cognitive reappraisal and expressive suppression, have been widely examined in the literature over the last decade (e.g., Ehring et al., 2010; Zhao & Zhao, 2015). Cognitive reappraisal is defined as the process involving reinterpretation of the meaning of an emotional event, thereby leading to changes in the initial trajectory of an emotional response (Gross, 1998). Expressive suppression refers to concealing an emotional state via masking bodily and facial expressions. Although suppression reduces emotional expressions, suppressors may also experience fewer positive emotions, more negative emotions, and more inauthenticity, thereby undermining their health outcomes (Gross & John, 2003; Gross & Levenson, 1997; John & Gross, 2004).

Ample studies suggested the association between cognitive reappraisal, expressive suppression, and well-being in diverse contexts (Cheung & Park, 2010; Brewer, Zahniser, & Conley, 2016). Findings showed that cognitive reappraisal enhanced physical and mental health by diminishing negative emotions and increasing positive ones (Gross & John, 2003; Sai, Luo, Ward, & Sang, 2016; Tugade & Fredrickson, 2007; Zhao & Zhao, 2015). In contrast, expressive suppression was linked to worse outcomes among emerging adults, including less willingness to establish a friendship (Butler, Lee, & Gross, 2007), increases in sympathetic activation of the cardiovascular system (Roberts, Levenson, & Gross, 2008), and heightened depressive symptoms (Cheung & Park, 2010). As such, cognitive reappraisal is a more adaptive strategy than is expressive suppression in predicting mental health.

Expressive Writing during Emerging Adulthood

Emerging adulthood is a developmental period from late teens through the twenties (Arnett, 2000). Despite their reach of physical maturity, emerging adults commonly experience instability involving transitions in love relationships, obligations, career explorations, changes in living, work, and/or study environments, and roles and identities (Schulenberg, Sameroff, & Cicchetti, 2004). Such an instability and feelings of "in-between" adolescence and adulthood can be challenging, and are associated with heightened symptoms of depression and anxiety (Arnett, Žukauskienė, & Sugimura, 2014).

Given their cognitive maturity, including writing and analytic abilities (Kenny & Sirin, 2006; Schulenberg & Zarrett, 2006), expressive writing offers a timely approach for emerging adults to facilitate the processing of stage-salient challenges, potential trauma, and mental health improvements. Supporting this proposition, substantial findings have indicated the significant effects of expressive writing on mental health in college students during emerging adulthood (e.g., Yang et al., 2015). In a group of depressed college students, Gortner et al. (2006) further suggested that brooding (i.e., a subtype of rumination) mediated between expressive writing and fewer depressive symptoms, such that expressive writing was associated with reduced brooding and subsequent depressive symptoms. These findings established the relevance of expressive writing in emerging adults' mental health.

Expressive Writing in the Chinese Context

Social constraints may account for the benefits of expressive writing and explain the inconsistent findings across cultures. Importantly, Travagin, Margola and Revenson (2015) pointed out in a meta-analytic review that expressive writing is potentially more effective in situations where social constraints on emotional expressions are more prominent. According to the interdependent model of self (Markus & Kitayama, 1991), expression of emotions such as anger is discouraged in societies that highly value social connectedness, as it may reduce

social harmony and engagement. As such, emotional restraint is commonly socialized in East Asian contexts (Matsumoto et al., 2008). With roots in Confucianism, Chinese proverbs such as “和為貴” (i.e., Harmony is precious) and “家和萬事興” (i.e., All affairs prosper in harmonious families) emphasize the importance of harmonious relationships. Bringing expressive writing into context, writing expressively may enable Chinese individuals to privately express suppressed emotions, without disruptions of interpersonal harmony. Accompanied with expressive writing are increased cognitive insights and reduced intrusive and ruminative thoughts (Gortner et al., 2006; Lepore, 1997). Consequently, expressive writing may be particularly helpful in enhancing the health benefits of Chinese individuals (Lu & Stanton, 2010).

As a self-help intervention involving private disclosure (Frattaroli, 2006), research suggested that compared to the control writing condition, Chinese undergraduates who practiced expressive writing for 9 weeks showed significant improvements in physical, social and psychological health (Yang et al, 2015). Nevertheless, null findings have also been reported between expressive writing and mental health in the Chinese context (Wong & Mak, 2016). Such inconsistent findings call for replications to be conducted in the Chinese context.

Health benefits aside, little has been done to further investigate the effect of expressive writing on emotion regulation strategies, including cognitive reappraisal and expressive suppression in Chinese emerging adult community samples. The present study aims to elucidate the utility of expressive writing on Chinese emerging adults’ well-being via emotion regulation as a mechanism.

Study Aims

To extend extant research suggesting expressive writing reduced emerging adults’ depressive symptoms (Gortner et al., 2006; Sloan et al., 2008), improved life satisfaction (Zhang, Duan, Tang, & Yang, 2014), and provided general health benefits such as reduced

physical symptoms (Park & Blumberg, 2002), we examined emotion regulation as a mediator between expressive writing and these outcomes. We anticipated that expressive writing would predict better outcomes than would regular and nil writing one day and one month after the intervention. We also expected that participants who engaged in expressive writing for three consecutive days would yield greater levels of cognitive reappraisal, life satisfaction, and general health, and lower levels of expressive suppression and depressive symptoms than would those who engaged in regular or nil writing, and that emotion regulation would mediate between expressive writing and well-being over time.

Method

Participants

One hundred and twenty-one Hong Kong emerging adults ranging at 18-25 years of age (M_{age}=21.81, SD_{age}=1.67; 78 female) were recruited via advertisements and online forums. Of the participants, 2.48% (n=3) reported that they were high school graduates, 90.91% were college students (n=110), and 6.61% (n=8) were graduate students at the time of data collection. Participants did not differ on the variables as a function of their level of education, ps>.05, except for lower life satisfaction at baseline [$F(2, 118)=4.25$, $p<.05$] and one-day follow-up posttest [$F(2, 117)=3.49$, $p<.05$].

Participants were randomly assigned to one of three conditions: expressive writing (n=41), regular writing (n=38) and nil writing (n=42). Participants did not differ across groups on age, sex, education level, and all study variables, ps>.05. The retention rate was 81.81%, with 21 participants dropped out at the one-month follow-up assessment. Among them, seven participants were from the expressive writing group, four were from the regular writing group, and ten were from the nil writing group. No significant differences were found in all study variables between the dropouts and the rest of the participants, ps>.05.

Participants received a HK$50.00 supermarket coupon (~US$6.43) after the study completion for their participation.

Procedures

Baseline Assessment (Day 1). Upon informed consent, participants completed baseline measures of expressive suppression, cognitive reappraisal, depressive symptoms, general health, and life satisfaction.

Experimental Manipulation (Days 2-4). Participants were randomly assigned to expressive writing, regular writing, or nil writing condition one day after the baseline assessment. For three consecutive days, participants in the expressive writing condition were asked to write about their deepest thoughts and emotions toward a traumatic experience. The expressive writing instructions followed the standard expressive writing paradigm, which has been utilized or adapted in community samples in both American and Chinese contexts (Pennebaker, 2017; Wong & Mak, 2016). The writing instructions were as follows (see also Gortner et al., 2006), "For the next three days, I would like you to write about your deepest thoughts and feelings about any emotionally disturbing or difficult events that you are experiencing in your life. You may tie your topic in with your past stressful or traumatic experiences. In your writing, I would like you to let go and explore your very deepest thoughts and emotions. You may link your topic to your relationships with others, including your parents, lovers, friends, or relatives. You may also link your experience to your past, present, or future, or to who you have been, who you would like to be, or who you are now. You may write about the same topics or experiences in all three days of writing, or on different experiences each day. Do not worry about grammar or spelling." The writing instructions were translated into Chinese by two independent translators using the back-translation procedures (Brislin, 1970). Any discrepancies were resolved by the first and second authors through consensus prior to the conduct of the study.

Participants in the regular writing condition were asked to write about any neutral and unemotional topics. Participants in both conditions received the same writing instructions and wrote for twenty minutes in a private and quiet environment. Participants in the nil writing condition did not engage in any writing sessions.

One-Day and One-Month Follow-Up (Days 5 and 35). All participants completed follow-up measures on day 5 (One-day follow-up) and day 35 (One-month follow-up). The follow-up packets contained the same measures completed at baseline.

Measures

Previous research provided evidence of validity for the following measures in the Chinese context (Lam, Gandek, Ren, & Chan, 1998; Sachs, 2003; Yu, Tam, Wong, Lam, & Stewart, 2012). Chinese version of the following measures was used.

Emotion regulation. Participants completed the Emotion Regulation Questionnaire (Gross & John, 2003), a 10-item scale designed to measure participants' tendency to regulate emotions with a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Six items of the scale assessed cognitive reappraisal and four assessed expressive suppression. Cronbach's alpha=.79-.82 for the subscales over time.

Depressive symptoms. Participants completed the 9-item Patient Health Questionnaire-9 (Kroenke, Spitzer & Williams, 2001) as a measure of the severity of depression. Participants rated the statements on a 3-point scale from 0 (*not at all*) to 3 (*nearly every day*). Cronbach's alpha=.87-.89 over time.

General Health. Participants completed the 5-item general health subscale of the Short Form Health Survey-36 (McHorney, Ware, & Raczek, 1993) to assess their physical well-being. Participants rated the statements on a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha=.87-.89 over time.

Life Satisfaction. Participants completed the 5-item Satisfaction with Life Scale (Pavot & Diener, 1993) to measure their life satisfaction on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha=.88 over time.

Demographic information. Participants provided information including age, gender, level of education.

Manipulation check. To ensure the experimental conditions were adequately administered, participants rated at the end of the one-month follow-up session on a 9-point scale from 1 (*strongly disagree*) to 9 (*strongly agree*) on the extent to which the writing content was personal, the writing revealed his/her negative emotions, and the experience that he/she wrote about was traumatic.

Analytic Strategy

First, univariate ANOVA was conducted to examine the baseline equivalence of the variables across groups. Second, mixed measures ANOVAs were conducted to investigate the differences among conditions over time. Follow-up one-way ANOVAs and paired sample t-tests were then conducted to further examine within-group changes prior to and after the intervention. Finally, a path model was conducted using MPLUS, Version 7 (Muthén & Muthén, 2012) to examine the mediating effect of emotion regulation between expressive writing and well-being over and above the effect of pretest measures. Maximum likelihood method was used to investigate the model fit to the observed matrices of variance and covariance. Full information maximum likelihood estimation was used to handle missingness.

Results

Baseline Equivalence

Univariate ANOVA was conducted to ensure the baseline equivalence on the variables among all three groups. Between-group variances for all variables were non-significant, *p*s>.05, suggesting baseline equivalence for all variables under study.

Manipulation Check

An independent samples t-test was conducted to compare participants' ratings of the writing experience between the writing conditions in the one-month follow-up. Compared to participants from regular writing condition, participants from expressive writing condition rated the writing as more personal, [$t(55)$=18.13, p<.001, $M_{expressive\ writing}$=7.91, SD=.96, $M_{regular\ writing}$=2.88, SD=.23], the experience they wrote about as more traumatic [$t(56)$=10.59, p<.001, $M_{expressive\ writing}$=7.70, SD=1.29, $M_{regular\ writing}$=3.04, SD=2.05, p<.001], and that they revealed more negative emotions, [$t(55)$=10.89, p<.001, $M_{expressive\ writing}$=7.71, SD=.89, $M_{regular\ writing}$=3.60, SD=1.89]. These findings implied that participants from both conditions adhered to the writing instructions and were able to recall the writing experience. Participants from nil writing condition did not recall any writing experience and endorsed the items as not applicable.

Emotion Regulation and Well-being

Cognitive Reappraisal. A mixed measures ANOVA by time (baseline, one-day follow-up, and one-month follow up) and conditions (expressive writing, regular writing and nil writing) was conducted to investigate the effect of expressive writing on cognitive reappraisal over time. Mauchly's test indicated that the assumption of sphericity was violated [$\chi^2(2)$=13.68, p=.001], therefore degrees of freedom (dfs) were corrected using Greenhouse-Geisser estimates of sphericity (ε = .88). The interaction effect between time and condition was significant, F(3.53, 169.29)=6.24, p<.001, η_p^2=.12 (see Figure 1). Follow-up one-way ANOVAs suggested that expressive writers reported a significantly higher cognitive reappraisal than did participants from other groups at the one-month follow-up, F(2,96)=3.85, p<.05. No differences were found between conditions at baseline and one-day follow-up, ps>.05. Paired sample t-tests further suggested that expressive writers reported a greater level of cognitive reappraisal from baseline to one-day follow-up, $t(40)$=3.30, p< .001, Cohen's

d=-.52, and one-month follow-up, *t(33)*=4.34, *p*< .001, Cohen's *d*=-.74. Participants from the other conditions did not report similar changes over time, *p*s>.05.

Expressive Suppression. Mixed measures ANOVA was conducted to investigate the effects of time and condition on expressive suppression. Mauchly's test indicated that the assumption of sphericity had been violated [$\chi^2(2)=34.26$, p <.001], therefore *df*s were corrected using Greenhouse-Geisser estimates of sphericity (ε =.77). A significant interaction effect was found between time and condition, $F(3.07, 147.38)=3.95$, $p<.01$, $\eta_p^2=.08$ (see Figure 2). Significant differences were found between conditions at the one-month follow-up [$F_{\textit{one-month follow-up}}(2, 96)=4.17$, $p<.05$], however the difference was not found in baseline and the one-day follow-up, *p*s>.05. Paired sample t-test suggested that compared to baseline, expressive writers reported a lower expressive suppression at the one-month follow-up, *t(33)*=-2.66, *p*<.05, Cohen's *d*=.46, but not at the one-day follow-up, *p*>.05, Cohen's *d*=.15. Participants from the other conditions did not report similar changes over time, *p*s>.05.

Depressive Symptoms. Mixed measures ANOVA was conducted to investigate the effect of time and condition on depressive symptoms. Mauchly's test indicated that the assumption of sphericity had been violated [$\chi^2(2)=26.23$, $p<.001$], therefore *df*s were corrected using Greenhouse-Geisser estimates of sphericity (ε =.81). The interaction effect was not significant, *p*>.05, suggesting no differentiation among writing conditions on depressive symptoms over time.

General Health. Mixed measures ANOVA was conducted to investigate the effect of time and condition on general health. Mauchly's test indicated that the assumption of sphericity had been violated [$\chi^2(2)=23.27$, p <.001], therefore *df*s were corrected using Greenhouse-Geisser estimates of sphericity (ε =.82). The interaction effect was significant, $F(3.29, 157.73)=3.72$, $p<.01$, $\eta_p^2=.07$ (see Figure 3). Follow-up paired sample t-test suggested that expressive writers reported improved general health from baseline to one-day

follow-up with $t(40)$=4.11, p<.001, Cohen's d=-.16, and one-month follow-up with $t(33)$=4.30, p<.001, Cohen's d=.60. Participants from the other conditions did not report significant changes over time, ps>.05.

Life Satisfaction. Mixed measures ANOVA was conducted to investigate the effect of time and condition on life satisfaction. Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2)=9.69$, p<.01, therefore dfs were corrected using Greenhouse-Geisser estimates of sphericity (ε =.91). As shown in Figure 4, the interaction effect was significant, $F(3.65, 175.03)=3.77$, p<.01, η_p^2=.07. Follow-up paired sample t-test suggested that expressive writers reported greater levels of life satisfaction from baseline to one-month follow-up with $t(33)$=3.47, p<.001, Cohen's d=-.74, but no differences were found from baseline to one-day follow-up, p>.05, Cohen's d=-.64. Participants from the other conditions did not report similar changes over time, ps>.05.

Mediation Analysis

Given that the regular writing group did not differ from the nil writing group on emotion regulation and well-being outcomes, in the path analysis we coded the exogenous predictor of expressive writing as 1 (expressive writing) and 0 (regular and nil writing). The model fit adequately to the data, $\chi^2(21)=25.70$, p=.22, CFI=.99, TLI=.97, RMSEA=.04 (see Figure 5). Baseline expressive writing predicted cognitive reappraisal at the one-day follow-up (β=.22, p<.01) but not expressive suppression, p>.05. Cognitive reappraisal further predicted one-month follow-up life satisfaction and general health (β=.21, p< .01 and .23, p <.001, respectively), but not depressive symptoms, p>.05. One-day follow-up expressive suppression predicted one-month follow-up depressive symptoms (β=.25, p<.001), but not life satisfaction and general health, ps>.05. Table 1 shows the unstandardized B, standard errors, and the 95% bootstrap confidence intervals (BCI) based on 1000 bootstrap samples with replacement.

Using these data, the 95% BCI based on 1000 bootstrap samples with replacement indicated the indirect effect between expressive writing and depressive symptoms via cognitive reappraisal included a 0 [BCI:(-.23, -.03)], suggesting no mediation effect. However, indirect effects between expressive writing and life satisfaction and general health via cognitive reappraisal did not include 0s [BCIs:(.03, .27), (.02, .21), respectively], suggesting cognitive reappraisal as a mediator. Indirect effect between expressive writing and well-being outcomes via expressive suppression included 0s, indicating expressive suppression was not a mediator.

Discussion

Supporting the cognitive change hypothesis (Pennebaker & Seagal, 1999) and the emotion regulation model of expressive writing (Lepore et al., 2002), the present findings suggested longitudinal benefits of expressive writing during emerging adulthood. Compared to participants in the regular writing and the nil writing groups, expressive writers showed improvements in cognitive reappraisal, life satisfaction, and general health, and decreases in expressive suppression at the one-month follow-up. Follow-up analyses revealed that cognitive reappraisal mediated between expressive writing and emerging adults' well-being, including, life satisfaction and general health, over and above the effects of pretest measures. These novel findings highlighted the significance of expressive writing in the well-being of Chinese emerging adults.

Compared to participants from other conditions, expressive writers who engaged in the three-day intervention reported greater cognitive reappraisal and lesser expressive suppression at the one-month follow-up. These findings suggested that the parallel cognitive processing nature between expressive writing and cognitive reappraisal might have resulted in similar psychological benefits. Notably, individuals who utilized cognitive reappraisal strategies made attempts to revisit, reinterpret, and reappraise a given situation. Likewise,

expressive writers had an opportunity to re-evaluate a traumatic event, which could be beneficial to mental health. The present findings also echoed with previous research (Ramzan & Amjad, 2017) in suggesting that expressive writers demonstrated a lower tendency to hide or suppress their pre-existing emotions caused by a traumatic event. Given expressive writers were encouraged to privately express and disclose their emotions caused by the traumatic events, expressive suppression was reduced in the long run.

Turning to well-being, expressive writers reported better life satisfaction and general health than did regular and nil writers one month after the intervention. The findings corroborated with previous research illuminating the benefits of expressive writing (Sai et al., 2016; Tugade & Fredrickson, 2007; Zhao & Zhao, 2015), such that repeated practice of expressive writing led to well-being improvements in the Chinese context. Not surprisingly, null findings were revealed for the outcome variables at the one-day follow-up, except for cognitive reappraisal and general health. The non-significant findings may be due, in part, to expressive writers' difficulties in shifting their attention from negative emotions shortly after the end of an intervention (Joormann & Gotlib, 2008) – Perhaps individuals experienced even more negative emotions immediately after an expressive writing intervention (Smyth, 1998). Moreover, writing about a negative experience without having sufficient time to process the experience may cause repetitive and intrusive thoughts that increase negative emotions temporarily (Consedine, Magai & Bonanno, 2002; Lepore, 1997).

Mediating Role of Emotion Regulation

Unique to this study is that cognitive reappraisal mediated between expressive writing and subsequent life satisfaction and general health. These novel findings are consistent with theories highlighting the mechanisms between expressive writing and well-being (Sloan & Marx, 2004). Specifically, the path analysis revealed that repeated practice of expressive writing predicted improvements in life satisfaction and general health via cognitive

reappraisal (see also Lepore et. al., 2002). Surprisingly, however, in the path model neither expressive writing nor cognitive reappraisal was related to depressive symptoms. Given previous research (Frattaroli, 2006) suggested that individuals with existing health problems or trauma-related history benefited more significantly from expressive writing, it is speculated that our non-depressed sample might have precluded us from understanding how writing impacted psychopathology. Also, the positive relation between cognitive reappraisal and depressed outcomes might have differed between Asian and Western cultures, as affective inhibition is more common in Asian contexts (Matsumoto et al., 2008). Future experimental and longitudinal work involving multiple methods and measures is needed to elucidate the relations between expressive writing, cognitive reappraisal, and depressive symptoms, particularly in diverse Chinese samples.

Although the path model indicated that expressive suppression was associated with depressive symptoms over time, mediation findings were not established, as expressive writing did not significantly predict expressive suppression. One possible explanation is that mental health improvements associated with expressive writing might take more than one day or one month to occur, as indicated by previous studies involving Chinese emerging adults (Yang et al., 2015). Alternatively, the cultural emphasis of harmony (Markus & Kitayama, 1991) and the writing of suppressed emotions might have created an emotional dissonance, i.e., a mismatch of emotions held by an individual vs. a group (Middleton, 1989). Such a dissonance or incongruence might be stressful (Maertz, Hassan, & Magnusson, 2009), and might rise to emotional challenges.

The present findings have important implications for clinical practice and translational research. As an appropriate and cost-effective way of re-evaluating past experiences, expressive writing is particularly useful in this developmental period, given emerging adults' maturity in writing and analytic skills (e.g., Kenny & Sirin, 2006) and their

experiences of stress and instability involving family, love, career, and geographical transitions (Arnett, 2000; Schulenberg et al., 2004). Previous studies found that Chinese individuals had a high preference for self-help tools rather than professional help (Han & Pong, 2015), potentially due to prevalence of stigmatization toward mental illness (Cheung, Mak, Tsang, & Lau, 2018; Mak & Cheung, 2010). As a self-regulatory exercise that promotes emotion regulation strategies (Bonanno, 2001), expressive writing might be useful among Chinese emerging adults.

The present findings must be interpreted in light of several limitations. First, we collected one-day and one-month follow-up data after the intervention. Future studies should consider including long-term follow-up to detect the health benefits of expressive writing. With additional time points, growth curve modeling can further illuminate potential group differences and individual trajectories. Second, to ensure the writing was fully private, participants' essays were not collected. Consequently, we were unable to conduct content analysis to reveal the nature of the traumatic events or to control for writing ability. However, expressive writers did report that the writing content was more personal, that the topics were deemed as more traumatic, and that they revealed more negative emotions than did other participants. Given previous research indicated differential effects of private vs. public written disclosure (Frattaroli, 2006; Macready et al., 2011), future research should investigate the role of expressive writing on emotion regulation and well-being as a function of covariates, such as the degree of privacy and participants' writing ability. Likewise, we did not inquire the participants if they had ever sought psychotherapy or other forms of support to process past traumatic or difficult events, which might have served as an important covariate. Relatedly, previous research suggested that potential confounds including gender, risk status, culture, length of intervention, and time between assessments could foster inconsistent findings for the effects of expressive writing (Frattaroli, 2006; Travagin et al., 2015), which

merit future investigation. Next, this study utilized self-report questionnaires. Future studies may consider using a multi-method and multi-informant approach to maximize the objectivity of the present findings. Finally, previous research suggested that expressive writing was associated with other well-being outcomes, such as anxiety (Baikie, Geerligs, & Wilheim, 2012; Niles et al., 2014) and somatic symptoms (Swanbon, Boyce, & Greenberg, 2008). Future studies may examine the significance of emotion regulation between expressive writing and other mental health or stage-salient outcomes in emerging adulthood.

Conclusion

The present study investigated the effect of expressive writing on the emotion regulation and well-being. Consistent with the theoretical underpinnings of expressive writing (Sloan & Marx, 2004), findings indicated that expressive writing partially enhanced adaptive emotion regulation and subsequent well-being. As a cost-effective tool, expressive writing can be more commonly utilized among Chinese emerging adults.

Reference

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S.(2010). Emotion-regulation strategies across psychopathology:A meta-analytic review. *Clinical Psychology Review, 30(2),* 217-237. doi:10.1016/j.cpr.2009.11.004

Alparone, F.R., Pagliaro, S., & Rizzo, I.(2015). The words to tell their own pain: Linguistic markers of cognitive reappraisal in mediating benefits of expressive writing. *Journal of Social and Clinical Psychology, 34(6),* 495-507. doi:10.1521/jscp.2015.34.6.495

Arnett, J.J.(2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55(5),* 469. doi:10.1037/0003-066X.55.5.469

Arnett, J.J., Žukauskienė, R., & Sugimura, K.(2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *The Lancet Psychiatry, 1(7),* 569-576. doi:10.1016/S2215-0366(14)00080-7

Baikie, K.A., Geerligs, L., & Wilhelm, K.(2012). Expressive writing and positive writing for participants with mood disorders: An online randomized controlled trial. *Journal of Affective Disorders, 136(3),* 310-319. doi:10.1016/j.jad.2011.11.032

Baikie, K.A., & Wilhelm, K.(2005). Emotional and physical health benefits of expressive writing. *Advances in Psychiatric Treatment, 11,* 338-346. doi:10.1192/apt.11.5.338

Bonanno, G.A.(2001). Grief and emotion: A social–functional perspective. In M.S. Stroebe, R.O. Hansson, W. Stroebe, & H. Schut (Eds.), *Handbook of Bereavement research: Consequences, coping, and care*(pp.493-515). Washington, DC, US: American Psychological Association. doi:10.1037/10436-021

Brewer, S.K., Zahniser, E., & Conley, C.S.(2016). Longitudinal impacts of emotion regulation on emerging adults: Variable-and person-centered approaches. *Journal of Applied Developmental Psychology, 47,* 1-12. doi:10.1016/j.appdev.2016.09.002

Brislin, R.W.(1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1(3),* 185-216. doi:10.1177/135910457000100301

Butler, E.A., Lee, T.L., & Gross, J.J.(2007). Emotion regulation and culture: Are the social consequences of emotion suppression culture-specific? *Emotion, 7(1),* 30-48. doi:10.1037/1528-3542.7.1.30

Cameron, L.D., & Nicholls, G.(1998). Expression of stressful experiences through writing: Effects of a self-regulation manipulation for pessimists and optimists. *Health Psychology, 17(1),* 84-92. doi:10.1037/0278-6133.17.1.84

Cheung, R.Y.M., Mak, W.W., Tsang, P.S., & Lau, J.T.(2018). Stigma of psychosis: Do diagnostic label, symptom manifestation, and gender matter?. *American Journal of Orthopsychiatry, 88(5),* 529-537. doi:10.1037/ort0000315

Cheung, R.Y.M., & Park, I.J.K.(2010). Anger suppression, interdependent self-construal, and depression among Asian American and European American college students. *Cultural Diversity and Ethnic Minority Psychology, 16(4),* 517-525. doi:10.1037/a0020655.

Consedine, N.S., Magai, C., & Bonanno, G.A.(2002). Moderators of the emotion inhibition-health relationship: A review and research agenda. *Review of General Psychology, 6(2),* 204-228. doi:10.1037/1089-2680.6.2.204

Ehring, T., Tuschen-Caffier, B., Schnülle, J., Fischer, S., & Gross, J.J.(2010). Emotion regulation and vulnerability to depression: spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion, 10(4),* 563. doi:10.1037/a0019010

Frattaroli, J.(2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin, 132(6),* 823-865. doi:10.1037/0033-2909.132.6.823

Gortner, E.M., Rude, S.S., & Pennebaker, J.W.(2006). Benefits of expressive writing in lowering rumination and depressive symptoms. *Behavior Therapy, 37(3),* 292-303. doi:10.1016/j.beth.2006.01.004

Graybeal, A., Sexton, J.D., & Pennebaker, J.W.(2002). The role of story-making in disclosure writing: The psychometrics of narrative. *Psychology and Health, 17(5),* 571–581. doi:10.1080/08870440290025786

Gross, J.J.(1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2(3),* 271-299. doi:10.1037/1089-2680.2.3.271

Gross, J.J., & John, O.P.(2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85(2),* 348-362. doi:10.1037/0022-3514.85.2.348

Gross, J.J., & Levenson, R.W.(1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106(1),* 95-103. doi:10.1037/0021-843X.106.1.95

Han, M., & Pong, H.(2015). Mental health help-seeking behaviors among Asian American community college students: The effect of stigma, cultural barriers, and acculturation. *Journal of College Student Development, 56(1),* 1-14. doi:10.1353/csd.2015.0001

John, O.P., & Gross, J.J.(2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality, 72(6),* 1301-1334. doi:10.1111/j.1467-6494.2004.00298.x

Joormann, J., & Gotlib, I.H.(2008). Updating the contents of working memory in depression: Interference from irrelevant negative material. *Journal of Abnormal Psychology, 117(1),* 182-192. doi:10.1037/0021-843X.117.1.182

Kenny, M.E., & Sirin, S.R.(2006). Parental attachment, self-worth, and depressive symptoms among emerging adults. *Journal of Counseling & Development, 84(1),* 61-71. doi:10.1002/j.1556-6678.2006.tb00380.x

Kroenke, K., Spitzer, R.L., & Williams, J.B.(2001). The PHQ-9. *Journal of General Internal Medicine, 16(9),* 606-613. doi:10.1046/j.1525-1497.2001.016009606.x

Lam, C.L., Gandek, B., Ren, X.S., & Chan, M.S.(1998). Tests of scaling assumptions and construct validity of the Chinese (HK) version of the SF-36 Health Survey. *Journal of Clinical Epidemiology, 51(11),* 1139-1147. doi:10.1016/S0895-4356(98)00105-X

Lepore, S.J.(1997). Expressive writing moderates the relation between intrusive thoughts and depressive symptoms. *Journal of Personality and Social Psychology, 73(5),* 1030-1037. doi:10.1037/0022-3514.73.5.1030

Lepore, S.J., Greenberg, M.A., Bruno, M., & Smyth, J.M.(2002). Expressive writing and health: Self-regulation of emotion-related experience, physiology, and behavior. In S.J. Lepore & J.M. Smyth (Eds.), *The Writing Cure: How Expressive Writing Promotes Health and Emotional Well-Being*(pp.99-117). Washington, DC: American Psychological Association.

Lu, Q., & Stanton, A.L.(2010). How benefits of expressive writing vary as a function of writing instructions, ethnicity and ambivalence over emotional expression. *Psychology and Health, 25(6),* 669-684. doi:10.1080/08870440902883196

Macready, D.E., Cheung, R.Y.M., Kelly, A.E., & Wang, L.(2011). Can public versus private disclosure cause greater psychological symptom reduction? *Journal of Social and Clinical Psychology, 30(10),* 1015-1042. doi:10.1521/jscp.2011.30.10.1015

Maertz Jr, C.P., Hassan, A., & Magnusson, P.(2009). When learning is not enough: A process model of expatriate adjustment as cultural cognitive dissonance

reduction. *Organizational Behavior and Human Decision Processes, 108(1),* 66-78. doi:10.1016/j.obhdp.2008.05.003

Mak, W.W.S., Cheung, R.Y.M.(2010). Self-stigma among concealable minorities in Hong Kong: Conceptualization and unified measurement. *American Journal of Orthopsychiatry, 80(2),* 267-281. doi:10.1111/j.1939-0025.2010.01030.

Markus, H.R., & Kitayama, S.(1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98(2),* 224-253. doi:10.1037/0033-295X.98.2.224

Matsumoto, D., Yoo, S.H., Nakagawa, S., Alexandre, J., Anguas-Wong, A.M., Arriola, M., . . . Zengeya, A.(2008). Culture, emotion regulation, and adjustment. *Journal of Personality and Social Psychology, 94(6),* 925-937. doi:10.1037/0022-3514.94.6.925

McHorney, C.A., Ware Jr, J.E., & Raczek, A.E.(1993). The MOS 36-Item Short-Form Health Survey(SF-36):II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. *Medical Care,* 247-263. Retrieved from http://www.jstor.org/stable/3765819

Middleton, D.R.(1989). Emotional style: The cultural ordering of emotions. *Ethos, 17(2),* 187-201. doi:10.1525/eth.1989.17.2.02a00030

Muthén, L.K., & Muthén, B.O.(2012). MPLUS Version 7 user's guide. Los Angeles, CA:Muthén & Muthén.

Niles, A.N., Haltom, K.E.B., Mulvenna, C.M., Lieberman, M.D., & Stanton, A.L.(2014). Randomized controlled trial of expressive writing for psychological and physical health: The moderating role of emotional expressivity. *Anxiety, Stress & Coping, 27(1),* 1-17. doi:10.1080/10615806.2013.802308

Park, C.L., & Blumberg, C.J.(2002). Disclosing trauma through writing: Testing the meaning-making hypothesis. *Cognitive Therapy and Research, 26(5),* 597-616. doi:10.1023/A:1020353109229

Pavot, W., & Diener, E.(1993). Review of the satisfaction with life scale. *Psychological Assessment, 5(2),* 164-172. doi:10.1037/1040-3590.5.2.164

Pennebaker, J.W.(1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8(3),* 162-166. doi:10.1111/j.1467-9280.1997.tb00403.x

Pennebaker, J.W.(2017). Expressive Writing in Psychological Science. *Perspectives on Psychological Science,* 1745691617707315. doi:10.1177/1745691617707315

Pennebaker, J.W., & Beall, S.K.(1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95(3),* 274-281. doi:10.1037/0021-843X.95.3.274

Pennebaker, J.W., & Chung, C.K.(2011). Expressive writing: Connections to physical and mental health. In H.S. Friedman (Ed.), *Oxford handbook of health psychology*(pp.417-437). New York, NY: Oxford University Press.

Pennebaker, J.W., Kiecolt-Glaser, J.K., & Glaser, R.(1988). Disclosure of traumas and immune function:Health implications for psychotherapy. *Journal of Consulting and Clinical Psychology,* 56*(2),* 239-245. doi:10.1037/0022-006X.56.2.239

Pennebaker, J.W., & Seagal, J.D.(1999). Forming a story: The health benefits of narrative. *Journal of Clinical Psychology, 55(10),* 1243-1254. doi:10.1002/(SICI)1097-4679(199910)55:10<1243::AID-JCLP6>3.0.CO;2-N

Pennebaker, J.W., & Susman, J.R.(1988). Disclosure of traumas and psychosomatic processes. *Social Science & Medicine, 26(3),* 327-332. doi:10.1016/0277-9536(88)90397-8

Poon, A., & Danoff-Burg, S.(2011). Mindfulness as a moderator in expressive writing. *Journal of Clinical Psychology, 67(9),* 881-895. doi:10.1002/jclp.20810

Ramzan, N., & Amjad, N.(2017). Cross cultural variation in emotion regulation: A systematic review. *Annals of King Edward Medical University, 23(1),* 77-90. doi:10.21649/akemu.v23i1.1512

Roberts, N.A., Levenson, R.W., & Gross, J.J.(2008). Cardiovascular costs of emotion suppression cross ethnic lines. *International Journal of Psychophysiology, 70(1),* 82-87. doi:10.1016/j.ijpsycho.2008.06.003

Sachs, J.(2003). Validation of the satisfaction with life scale in a sample of Hong Kong university students. *Psychologia, 46(4),* 225-234.

Sai, L., Luo, S., Ward, A., & Sang, B.(2016). Development of the tendency to use emotion regulation strategies and their relation to depressive symptoms in Chinese adolescents. *Frontiers in Psychology, 7,* 1222. doi:10.3389/fpsyg.2016.01222

Schulenberg, J.E., Sameroff, A.J., & Cicchetti, D.(2004). The transition to adulthood as a critical juncture in the course of psychopathology and mental health. *Development and Psychopathology, 16(4),* 799-806. doi:10.1016/S2215-0366(14)00080-7

Schulenberg, J.E., & Zarrett, N.R.(2006). Mental health during emerging adulthood: Continuity and discontinuity in courses, causes, and functions. In J.J. Arnett & J.L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century*(pp. 135-172). Washington, DC: American Psychological Association. doi:10.1037/11381-006

Shahar, B., Carlin, E.R., Engle, D.E., Hegde, J., Szepsenwol, O., & Arkowitz, H.(2012). A pilot investigation of emotion-focused two-chair dialogue intervention for self-criticism. *Clinical Psychology & Psychotherapy, 19,* 496–507. doi:10.1002/cpp.762

Sloan, D.M., & Marx, B.P.(2004). Taking pen to hand: Evaluating theories underlying the written disclosure paradigm. *Clinical Psychology: Science and Practice, 11(2),* 121-137. doi:10.1093/clipsy/bph062

Sloan, D.M., Marx, B.P., Epstein, E.M., & Dobbs, J.L.(2008). Expressive writing buffers against maladaptive rumination. *Emotion, 8(2),* 302. doi:10.1037/1528-3542.8.2.302

Smyth, J.M.(1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66(1),* 174-184. doi:10.1037/0022-006X.66.1.174

Swanbon, T., Boyce, L., & Greenberg, M.A.(2008). Expressive writing reduces avoidance and somatic complaints in a community sample with constraints on expression. *British Journal of Health Psychology, 13(1),* 53-56. doi:10.1348/135910707X251180

Travagin, G., Margola, D., & Revenson, T.A.(2015). How effective are expressive writing interventions for adolescents? A meta-analytic review. *Clinical Psychology Review, 36,* 42-55. doi:10.1016/j.cpr.2015.01.003

Tugade, M.M., & Fredrickson, B.L.(2007). Regulation of positive emotions: Emotion regulation strategies that promote resilience. *Journal of Happiness Studies, 8(3),* 311-333. doi:10.1007/s10902-006-9015-4

Wong, C.C., & Mak, W.W.(2016). Writing can heal: Effects of self-compassion writing among Hong Kong Chinese college students. *Asian American Journal of Psychology, 7(1),* 74-82. doi:10.1037/aap0000041

Yang, Z., Tang, X., Duan, W., & Zhang, Y.(2015). Expressive writing promotes self-reported physical, social and psychological health among Chinese undergraduates. *International Journal of Psychology, 50(2),* 128-134. doi:10.1002/ijop.12081

Yu, X., Tam, W.W., Wong, P.T., Lam, T.H., & Stewart, S.M.(2012). The Patient Health Questionnaire-9 for measuring depressive symptoms among the general population in Hong Kong. *Comprehensive Psychiatry, 53(1),* 95-102. doi:10.1016/j.comppsych.2010.11.002

Zhang, Y., Duan, W., Tang, X., & Yang, Z.(2014). Can virtues enhance the benefits of expressive writing among healthy Chinese? A pilot study. *Journal of Mental Health, 23(5),* 231-235. doi:10.3109/09638237.2014.924050

Zhao, Y., & Zhao, G.(2015). Emotion regulation and depressive symptoms: Examining the mediation effects of school connectedness in Chinese late adolescents. *Journal of Adolescenc*e, *40,* 14-23. doi:10.1016/j.adolescence.2014.12.009

Table 1.

Parameter Estimates, Standard Errors, and Bootstrap Confidence Intervals of the Path Model

Parameters	*Unstandardized estimates (SEs)*	*95% bootstrap confidence intervals*[†]
Path Model		
Baseline Expressive Writing		
→ Time 2 Cognitive Reappraisal	.38 (.12)**	.10, .66
→ Time 2 Expressive Suppression	-.15 (.17)	-.57, .26
→ Time 3 Depressive Symptoms	-.14 (.04)	-.30, .03
→ Time 3 Life Satisfaction	.41 (.16)**	.10, .73
→ Time 3 General Health	.48 (.11)***	.25, .68
Time 2 Cognitive Reappraisal		
→ Time 3 Depressive Symptoms	-.08 (.05)	-.18, .00
→ Time 3 Life Satisfaction	.26 (.09)**	.08, .54
→ Time 3 General Health	.25 (.07)***	.07, .41
Time 2 Expressive Suppression		
→ Time 3 Depressive Symptoms	.12 (.04)***	.04, .19
→ Time 3 Life Satisfaction	-.09 (.07)	-.22, .02
→ Time 3 General Health	-.04 (.05)	-.12, .05
Error Covariance at Time 3		
Depressive Symptoms ↔ Life Satisfaction	-.07 (.03)**	-.16, -.01
Depressive Symptoms ↔ General Health	-.06 (.02)***	-.11, -.03
Life Satisfaction ↔ General Health	.10 (.04)**	.02, .22
Baseline Measures at Pretest →		
Time 2 Cognitive Reappraisal	.61 (.07)***	.42, .79
Time 2 Expressive Suppression	.54 (.06)***	.40, .68
Time 3 Depressive Symptoms	.48 (.07)***	.29, .66
Time 3 Life Satisfaction	.57 (.07)***	.40, .72
Time 3 General Health	.68 (.06)***	.57, .80

Note. [†]95% bootstrap confidence interval based on 1000 bootstrap samples with replacement; $^{*}p$ =/< .05, $^{**}p$ =/< .01, $^{***}p$ =/< .001

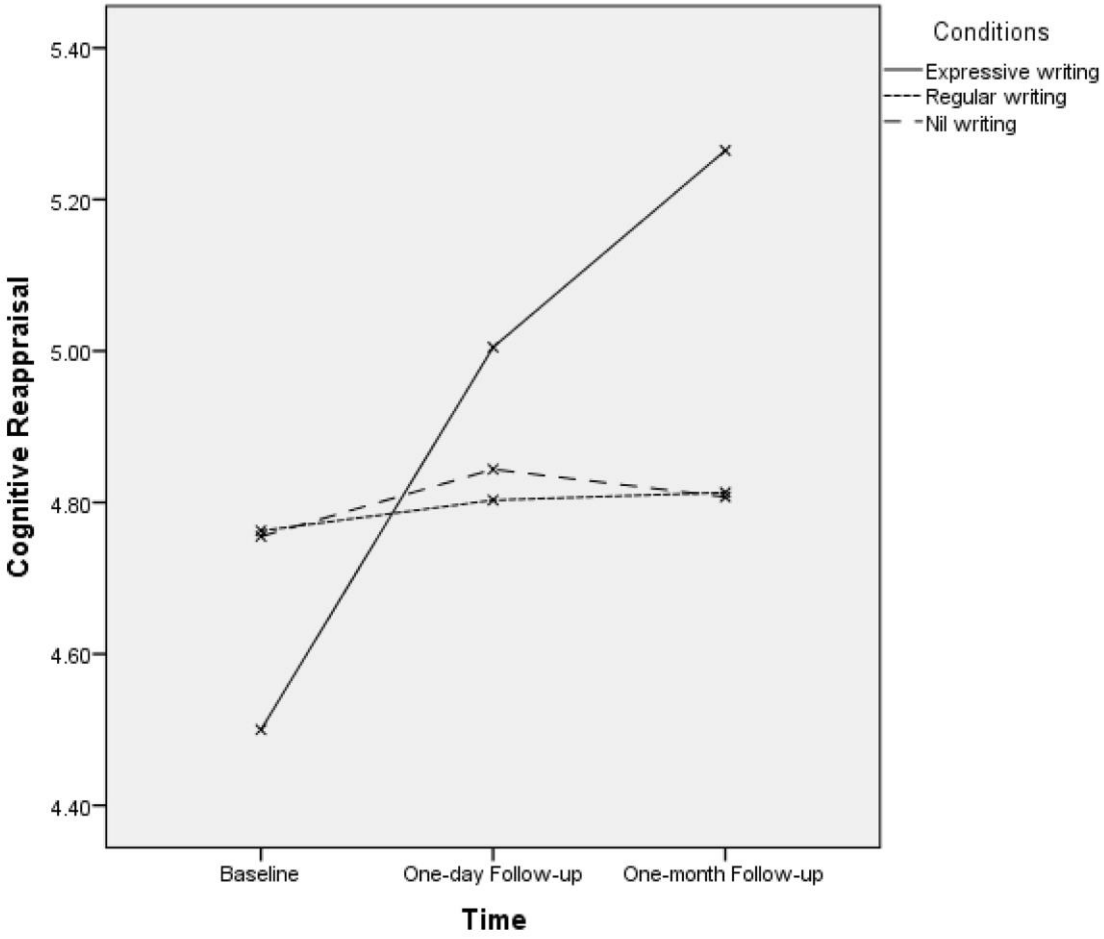

Figure 1. Cognitive Reappraisal Across Conditions Over Time

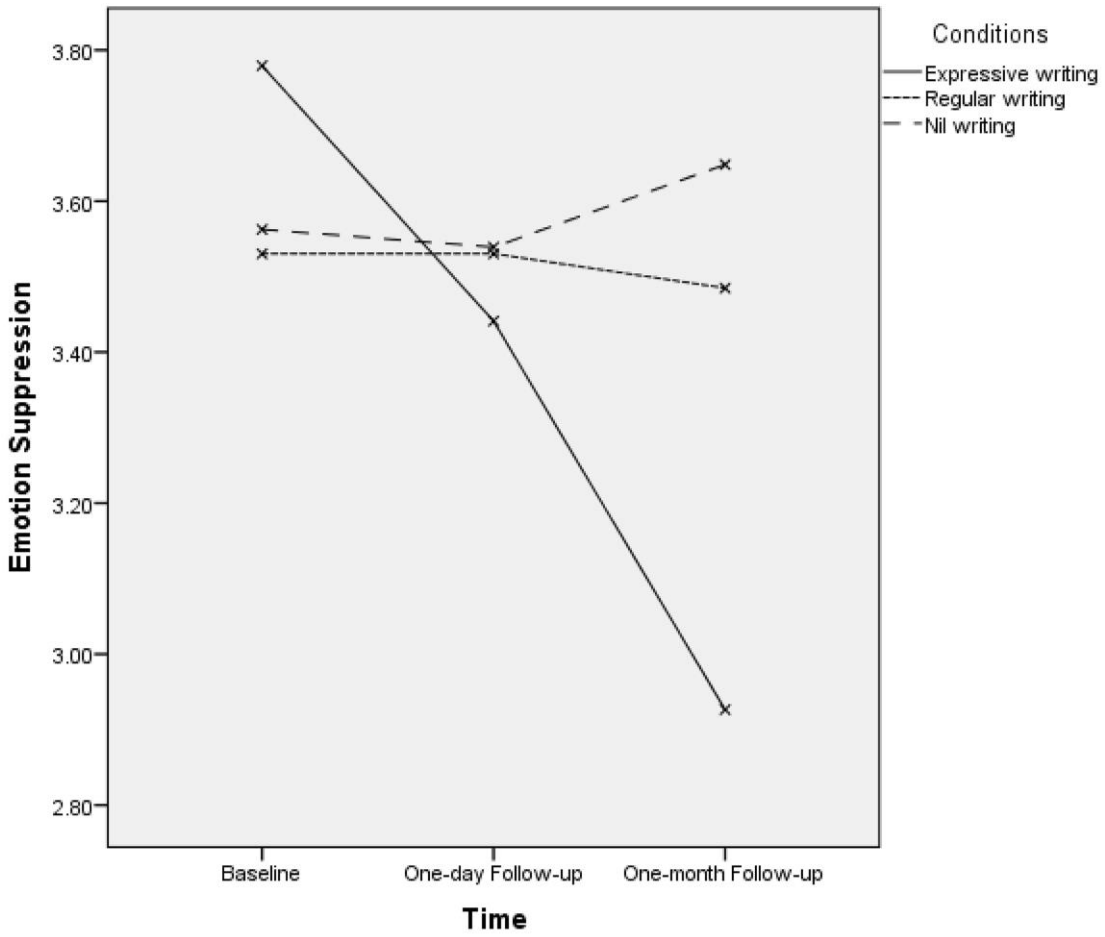

Figure 2. Emotion Suppression Across Conditions Over Time

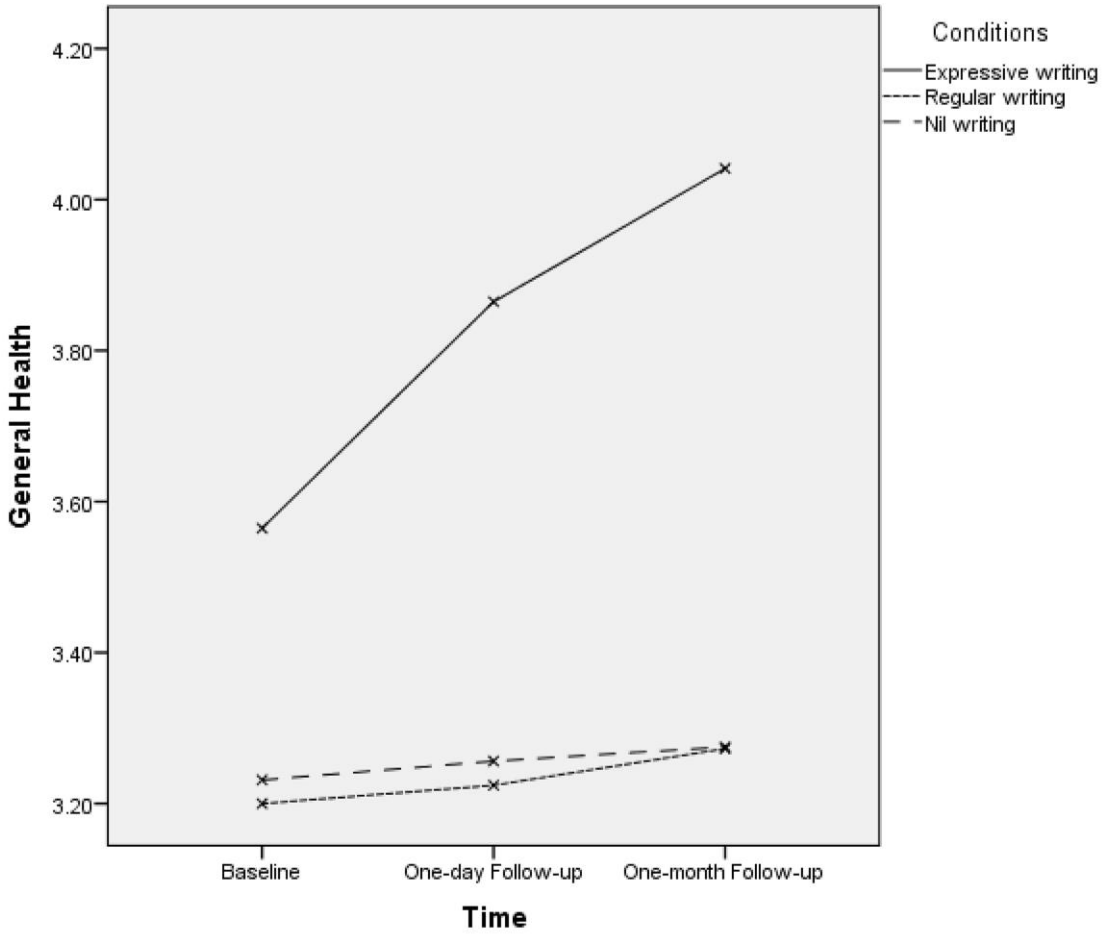

Figure 3. General Health Across Conditions Over Time

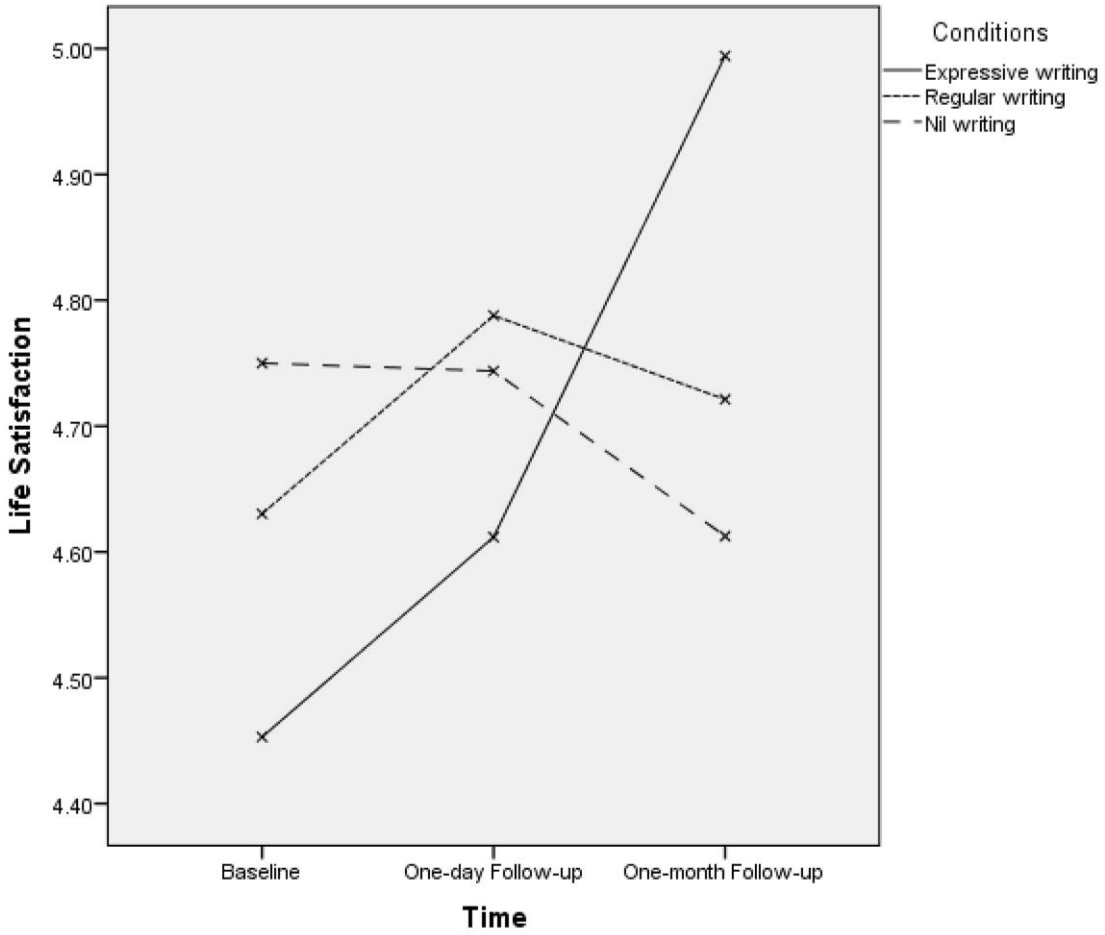

Figure 4. Life Satisfaction Across Conditions Over Time

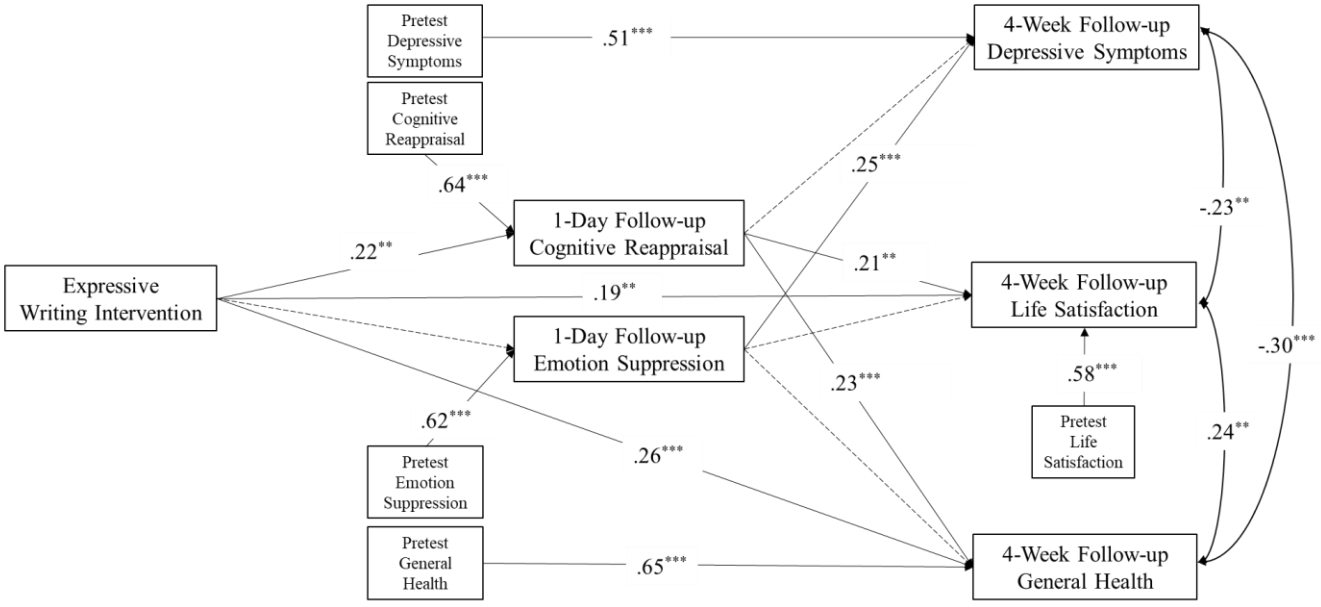

Figure 5. Mediating role of emotion regulation between expressive writing and health outcomes. Standardized parameter estimates are presented; *p =/< .05, **p =/< .01, *** p =/< .001; $\chi^2(21) = 25.70$, $p = .22$, CFI = .99, TLI = .97, RMSEA = .04, SRMR = .04. Direct effect of expressive writing intervention and adjustment outcomes are not depicted for clarity. Non-significant findings are shown in dashed arrows.