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Expressive Drawing: Examining the Long-term Psychological and Psychophysiological Benefits

Working Paper

Jennifer E. Drake
Assistant Professor, Department of Psychology
Brooklyn College, City University of New York
E-mail: jdrake@brooklyn.cuny.edu

This project was supported by an award from the
Research: Art Works program at the National Endowment for the Arts:
Grant# 14-3800-7005.

Abstract

Brief episodes of drawing work to improve mood, and this effect is most pronounced when people draw to distract themselves from an aversive memory rather than express their negative feelings. Here we investigated the effects of drawing repeatedly over one month to test whether drawing to express might lead to greater benefits than drawing to distract after one month. We induced a sad mood in participants (n = 60) and then randomly assigned them to use drawing to express, to distract, or to a control condition where they did not draw at all. We assessed mood, overall life satisfaction, heart rate and Respiratory Sinus Arrhythmia (RSA) at the initial testing session and one-month later. Drawing to distract improved mood more than drawing to express after a single drawing session. Both conditions improved mood equally after one month and were similar to the control condition. Physiological measures improved after both a single session of drawing and after one month, and did so for both drawing conditions equally. The benefits of drawing are immediate and limited to single session of drawing and it seems the benefits of drawing are diluted over time.

Keywords: drawing, emotion regulation, distraction, emotional expression

Expressive Drawing: Examining the Long-term Psychological and Psychophysiological Benefits

Experiencing a traumatic event can have a detrimental effect on a person's psychological and psychophysiological well-being. Individuals who experience a traumatic event report higher levels of depression, anxiety, and PTSD symptomatology than those who did not experience a traumatic event (Vrana & Lauterbach, 2006). These individuals are also more likely to engage in risky behaviors (e.g., alcohol abuse, drug abuse, and promiscuous behaviors) as a way to cope with the traumatic event (Kianpoor & Bakhshani, 2012). And these behaviors have a negative influence on psychophysiological indices (Pennebaker & Chung, 2011).

Yet not all individuals who experience a traumatic event follow this pattern. How do individuals cope with traumatic experiences? One way that individuals can cope with traumatic experiences is by engaging in the arts. Art is made in prisons (Safe Street Arts, 2013), novels are written in police states (Frank, 1952), and drawings are made after natural disasters (Dewan, 2007). Individuals with no training in the arts turn to the arts in times of trouble: the arts help us express our feelings and provide us a means of distraction. The "expression" route allows us to express negative feelings while at the same time come to terms with these feelings (Morris, 1989), whereas the "distraction" route allows us to shift our attention away from our suffering (Morris, 1989). These two mechanisms, expression and distraction, are common forms of emotion regulation (Gross, 1998).

Benefits of Drawing to Distract

Testimonials to the therapeutic power of creative work are commonplace among visual artists. Artists have often talked about art as a form of therapy. Cezanne said about the act of painting: "There lies salvation." Artists may realize consciously or unconsciously that creating art has the power to improve mood. Reports from the field of art therapy are consistent with this

view. Many studies of patients receiving art therapy also report mood improvement (Briks, 2007; Pifalo, 2006). However, these studies cannot tell us if the art therapy was causally implicated in the improvement because art therapy is typically coupled with other kinds of therapy.

Research on the psychological benefits of art-making is still in its infancy, but has already revealed certain findings. For example, even one act of drawing has immediate mood benefits for adults. DePetrillo and Winner (2005) showed that drawing improves mood more strongly than does copying geometric shapes, arguably because copying is a task that is not as engaging as drawing. Other researchers have examined the relative benefits of using drawing as a means of expression versus using drawing as a means of distraction (Dalebroux, Goldstein, & Winner 2008). After a sad mood induction, participants were randomly assigned to one of three activities: drawing something happy (distraction), drawing something expressing their mood (expression), and, as a non-artistic distraction task, visually scanning a sheet of symbols searching for one particular symbol (non-drawing task). Immediately after drawing, the greatest mood improvement was found for those assigned to draw as a means of distraction rather than expression. And these mood benefits did not occur for those assigned to the symbol scanning condition. Thus, it was not distraction per se, but something about drawing to distract. In this study the distract condition asked people to draw something happy, and thus it is not surprising that this made mood more positive. But other research has shown that the benefits of using drawing as a form of distraction also occur when people are asked to draw emotionally neutral images (Drake & Winner, 2012).

The relative benefits of drawing to distract over drawing to express persist over four sessions of drawing, and are stronger after four days than after one session. After inducing a sad mood, Drake, Hastedt, and James (2016) asked participants to draw over four consecutive days.

Half were instructed to draw as a way to express their feelings (express condition) and half were instructed to draw as a way to focus and observe something in the world (distract condition). Drawing to distract improved mood more than drawing to express, both after a single drawing session and after four sessions. They also found that the mood benefits of drawing were stronger after four consecutive days of drawing than after a single session of drawing, specifically for the drawing to distract condition. The question still remains how long the benefits of drawing, specifically drawing to distract, persist over one month of drawing.

Benefits of Expressive Writing

Another way that individuals may cope with traumatic experiences is by translating their emotional experience into words. Research by Pennebaker and colleagues has demonstrated that expressive writing (writing about a personally upsetting experience) is associated with many positive outcomes. Writing about a stressful event improves immune function (Pennebaker, Kiecolt-Glaser, & Glaser, 1988), raises academic performance (Pennebaker & Francis, 1996), and decreases the number of medical appointments (Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990).

We can speculate that expressive writing improves health because it allows people to construct coherent narratives of their experiences, and this in turn helps people regulate and understand their emotions (Klein & Boals, 2001; Pennebaker, Mayne, & Francis, 1997). Consistent with this view is the finding that suppressing upsetting experiences (rather than talking about them) has a negative impact on health (Pennebaker & Susman, 1988). Expressive writing may have the same effect as talking about the experience: in both cases, individuals have the opportunity to express themselves in words rather than suppressing or containing the experience.

Whereas research has demonstrated psychophysiological and health benefits of expressive writing over time, the findings for the psychological benefits are less clear. While some studies have failed to find a benefit of expressive writing over time, other studies have shown that expressive writing does improve self-reported psychological outcomes (Pennebaker & Chung, 2011). One study found benefits for expressive writing over four days but this study focused on a specific topic – injustice – and not an upsetting event (Barclay & Skarlicki, 2009). Other work has shown that writing about a stressful event is painful at first (Pennebaker & Chung, 2011). Pizarro (2004) showed that for adults, drawing a still-life (after a negative mood induction) improved mood more than either drawing or writing about a past stressful event. Hemenover, Augustine, Shulman, and Tran (2008) found that autobiographical writing in adults improves short-term mood only when the content of the writing is positive – perhaps because when the content is positive, writing distracts the writer from negative thoughts.

Psychophysiological Benefits of the Arts

To date, no study has examined the psychophysiological benefits of drawing after a single or several sessions. We do know that the benefits of expressive writing extend to our biological responses: expressive writing (but not writing about everyday events) is associated with decreases in blood pressure, heart rate, and skin conductance (Pennebaker, Hughes, & O'Heeron, 1987). Individuals who write or talk about an upsetting event have psychophysiological responses similar to individuals in a relaxed state (Pennebaker & Chung, 2011). And for those with elevated blood pressure, the benefits of expressive writing last well after the writing intervention has ended. Those who wrote about an upsetting event had lower blood pressure levels one month after the study had ended compared to those that wrote about everyday events. Indeed, the blood pressure levels of the expressive writing condition were

lower at the end of the study than when they had begun the study.

Another important measure of the body's psychophysiological response is Respiratory Sinus Arrhythmia (RSA). RSA is considered an indicator of emotion regulation with higher RSAs associated with better emotion regulation abilities. A higher RSA indicates a more positive mood; a lower RSA indicates a more negative mood or a state of stress (Bazhenova et al., 2001). We are not aware of any study that has examined the benefits of the arts on RSA.

Overview of the Current Study

The current study examined the benefits of drawing over one-month. We asked participants to recall and relive the saddest event they had ever experienced. Participants were randomly assigned to an express or distract drawing condition or a control condition involving no drawing. Over one month, participants either drew their feelings about the saddest event they recalled (express) or drew neutral objects (distract). We measured participants' affect before and after the mood induction and after drawing on the first session and final session. We also asked participants to report on their overall life satisfaction prior to beginning the first testing session and after completion of the final testing session. We measured heart rate and RSA during the course of the study. The control condition was given no instructions other than to return to the lab one month later for the final testing session. Previous research on the benefits of writing has included a condition in which participants were instructed to write about everyday events as the "control condition." But here our control condition involved no specific assigned activity, allowing us to determine the extent to which gains are made simply by the passage of time.

Consistent with previous research on the benefits of drawing after a single session (Dalebroux et al., 2008; Drake et al., 2016; Drake & Winner, 2012), we hypothesized that using drawing to distract would lead to greater mood improvement than drawing to express (because

the distraction condition allows for the shifting of attention away from negative thoughts and feelings). With regards to heart rate and RSA, we hypothesized the drawing to distract would also have similar benefits over drawing to express. We tested two competing hypothesis for the benefits of drawing over one month. On the one hand, after one month, drawing to express may be more beneficial than drawing to distract because it should allow participants to come to terms with and understand an upsetting event – just as through writing individuals can frame and rework their experience into words (Pennebaker & Chung, 2011). Expressive drawing over time may allow individuals to work through their experience just as expressive writing does.

On the other hand, it may be difficult for individuals to capture, frame, and rework their experience through a visual medium without any language. Thus, drawing to distract may be more beneficial than drawing to express even when extended over one month. In this case, the benefits of drawing to distract may be due to the immediately engaging aesthetic properties of the medium.

Method

Participants

We recruited 66 (37 females and 29 males) undergraduates ranging in age from 18 to 36 (M = 22.4; SD = 3.8) through online postings to participate. The sample was 31.8% Asian, 30.3% Caucasian, 18.2% Black or African American, 13.6% Hispanic/Latino, 3.0% Biracial and 3.0% Other. We assumed a 10% attrition rate and therefore we recruited more participants for the initial testing session. Thus, 66 participants completed the first testing session and 61 completed all four weeks of the study (36 females and 25 males). Those that completed the study received $50 for participating.

Materials and Measures

Mood Induction. In order to induce a sad mood, we asked participants to "think about the saddest event you have ever experienced." Participants recorded the event on a sheet of paper and then were guided through a three-minute visual imagery task (developed by Rusting & Nolen-Hoeksema, 1998). The visual imagery task asked participants to recall vividly the sad event by having them focus on the sights, sounds, thoughts, and feelings they had experienced during the event.

Activity. Participants were randomly assigned to one of three conditions: express, distract, or a control condition, with no difference in gender distribution across conditions (X^2 = 0.032, p = 0.984). There were 21 participants (12 females) in the express condition, 23 participants (10 females) in the distract condition, and 22 participants (12 females) in the control condition.

Instructions in the express condition were as follows: "I want you to draw about the event you recalled. I want you to draw as a way to focus on, feel, and make sense of the experience you recalled. Use the drawing activity as a way to express your feelings." Instructions in the drawing to distract condition were as follows: "I want you to look down at your shoes and draw them as you see them. I want you to draw as a way to focus, observe, and make sense of what you see. Use the drawing activity as a way to help you look closely." Participants in both drawing conditions were given a set of colored pencils and 9" x 11" sheet of white paper and were asked to draw for 10 minutes. Those in the control condition did not engage in any activity.

Participants in the express and distract conditions were given several sheets of paper, a set of colored pencils, and drawing instructions to take home with them. On Weeks 2 and 3, participants in the express condition were given the same instructions to use drawing "as a way to express their feelings." On Weeks 2 and 3, participants in the distract condition were given the

same instructions to using drawing "as a way to help you look closely" but they were asked to draw their hand in week 2; and an object in their room in week 3. Participants were sent e-mails to remind them what to draw and were instructed to e-mail the research staff a photo of their drawings once complete.

All participants were instructed to return to the lab during Week 4. Those in the express condition were instructed again to use drawing "as a way to express their feelings" and those in the distract condition were instructed to again to use drawing "as a way to help you look closely" and were instructed to draw an object in the testing room. The control condition was given no instructions beyond the need to return to the final testing session. Figure 1 presents drawings from the express and distract conditions at the initial testing session and the final testing session.

In previous research examining the emotion regulation benefits of drawing, the time allotted for the drawing activity has been 10 minutes (e.g., Drake & Winner, 2012). In previous studies on the benefits of writing, the time allotted for the writing paradigm has varied from 10-30 minutes (Pennebaker & Chung, 2011). Burton and King (2008) found effects when participants wrote for just 2 minutes a day. We were interested in whether the simple act of drawing could improve mood and therefore asked participants to draw for 10 minutes.

Positive Affect and Negative Affect Schedule (PANAS). To assess affect, we administered the Positive and Negative Affect Schedule (PANAS) developed by Watson, Clark, and Tellegen (1988). The PANAS contains 20 words that describe different feelings and emotions (e.g., interested, jittery, upset, excited). Participants were asked to indicate, for each word, the extent to which they were feeling that emotion on a five-point scale ranging from *very slightly or not at all* to *extremely*. A global score was computed separately for positive affect and negative affect. The PANAS scale measures positive affect and negative affect as two

independent variables (Watson et al., 1988). Participants completed the PANAS before (Time 1) and after the mood induction (Time 2), after drawing at the initial testing session (Time 3), and after drawing at the final testing session (Time 4). Cronbach's alpha for this measure was as follows: positive affect Time 1 $\propto$ = .85, positive affect Time 2 $\propto$ = .89, positive affect Time 3 $\propto$ = .89, positive affect Time 4 $\propto$ = .90, negative affect Time 1 $\propto$ = .79, negative affect Time 2 $\propto$ = .83, negative affect Time 3 $\propto$ = .88, negative affect Time 4 $\propto$ = .77.

Satisfaction with Life Scale. The Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) assessed participants' overall life satisfaction. Participants were presented with five statements (e.g., In most ways my life is close to my ideal) and were asked how much they agreed with each statement on a 7-point scale from *strongly disagree* to *strongly agree*. A total life satisfaction score was computed by summing the responses for each item.

Psychophysiological Indices. Heart Rate and RSA were collected during the testing session using BIOPAC hardware (BIOPAC INC., CA) and analyzed using the AcqKnowledge 4.2 software. We collected the psychophysiological indices at the following time points during the first session: 1) at the beginning of the study (2 minutes); 2) during the mood induction (3 minutes); and 3) after drawing (2 minutes). Data was only collected for the express and distract conditions after drawing. During the final testing session, psychophysiological indices were collected at the end of the session for all participants (2 minutes).

Heart Rate. Cardiovascular activity was continuously recorded from a three-lead electrocardiogram (ECG). We attached two pre-jelled disposable electrodes to the participant's skin – one below the right collarbone and the other above the left hip. After inspecting the ECG signal for artifacts, we converted the signal to R-R intervals using the AcqKnowledge automated modified Pan-Tompkins QRS detector. Heart rate was measured in beats per minute based on the

average of inter-beat intervals.

Respiratory Sinus Arrhythmia (RSA). Respiratory sinus arrhythmia (RSA) measures variation in heart rate during the breathing cycle. To assess RSA, we placed a respiration belt around the participant's abdomen. RSA was derived using the peak-valley method (Grossman, van Beek, & Wientjes, 1990) and measured in milliseconds as the difference between the minimum and the maximum R-R intervals during respiration. The RSA variables were found to positively skewed with significant skewness and kurtosis ($p < 0.001$). In order to reduce skewness and prevent potential outliers, a log transformation was performed on all RSA variables.

Procedure

Participants in the express and distract conditions completed four drawing sessions over the course of one month. During the first testing session, all participants (including those in the control condition) were instructed to sit quietly for 2 minutes while the psychophysiological indices were collected (Time 1). Next, they completed the PANAS (Time 1) and Satisfaction with Life Scale (Initial) and then they were asked to recall the saddest event they had ever experienced. Psychophysiological indices were measured during the mood induction. After recalling the sad event, they completed the PANAS (Time 2) and were randomly assigned one of three conditions: express, distract, or control. Those in the express and distract conditions were instructed to draw for 10 minutes. Those in the control condition were instructed to return to the lab one month later. Finally, the express and distract conditions completed the PANAS (Time 3) and were instructed to sit quietly for 2 minutes while the psychophysiological indices were again collected.

During Weeks 2 and 3, participants in the express and distract conditions were sent e-mail reminders and were asked to make a drawing (with instructions appropriate to their respective conditions and to email us photos of their drawings). During Week 4, all participants returned to the lab for the final testing session. After first making a drawing (according to their condition), they then completed the PANAS (Time 4) and the Satisfaction with Life Scale (Final). Those in the control condition were simply asked to complete the PANAS and Satisfaction with Life Scale. All participants sat quietly for two minutes while the psychophysiological indices were collected a final time.

Results

Preliminary Analysis

Table 1 presents means and standard deviations for positive affect and negative affect for Time 1 (before the mood induction), Time 2 (after the mood induction), Time 3 (after the first testing session), and Time 4 (after one month) by condition. There was no difference across conditions before the mood induction (Time 1) for positive affect, F (2, 63) = 1.002, p = 0.373, n_p^2 = 0.031 and negative affect, F (2, 63) = 0.005, p = 0.995, n_p^2 = 0.0. A paired sample t test revealed that positive affect decreased (t[65] = -8.504, $p < 0.001$, d = -1.04), and negative affect increased (t[65] = 9.090, $p < 0.001$, d = 1.11), from before to after the mood induction. There was also no difference across the conditions after the mood induction (Time 2) for positive affect, F (2, 63) = 1.832, p = 0.168, n_p^2 = 0.055 and negative affect, F (2, 63) = 0.075, p = 0.928, n_p^2 = 0.002.

Table 2 presents means and standard deviations for heart rate and RSA at baseline, the mood induction, after drawing in the first session, and at the end of the final testing session by condition. There was no difference between conditions before the mood induction for heart rate,

F (2, 62) = 0.765, p = 0.470, n_p^2 = 0.024, and RSA, F (2, 62) = 1.407, p = 0.252, n_p^2 = 0.043. A paired sample t test revealed that heart rate increased (t[64] = 2.566, p = 0.013, d = 0.32) from before to during the mood induction. RSA remained the same from before to during the mood induction (t[64] = 0.0582, p =0.562, d = 0.07), There was also no difference across the conditions during the mood induction for heart rate, F (2, 62) = 1.027, p = 0.364, n_p^2 = 0.032, and RSA, F (2, 62) = 0.372, p = 0.691, n_p^2 = 0.012.

Benefits of Drawing After a Single Session. For this analysis, we examined differences in mood improvement, heart rate, and RSA after a single session of drawing. The control condition did not engage in an activity after the mood induction and therefore was not included in this analysis. For mood improvement, we examined affect at two time points: before drawing (and after the mood induction) and after drawing. For heart rate and RSA, we examined these indices during the mood induction and after drawing. Because positive affect and negative affect are orthogonal constructs, we conducted separate analysis. We did the same for heart rate and RSA.

Positive Affect. A repeated measures ANOVA with condition (2) as the between subjects factor and time (2) as the repeated measure was performed on positive affect. There was an effect of time, F (1, 42) = 12.113, MSE = 26.878, p < 0.001, n_p^2 = 0.224: positive affect increased from after the mood induction to after one session of drawing. There was no effect of condition, F (1, 42) = 0.882, p = 0.353, n_p^2 = 0.021. More importantly, there was an interaction of time with condition, F (1, 42) = 4.244, p = 0.046, n_p^2 = 0.092, as shown in Figure 2. To understand the interaction, we computed a change score for mood improvement by subtracting positive affect before from positive affect after drawing. As discussed by Zumbo (1999), the use of a difference score is an adequate measure to reflect change. Next, we conducted a univariate

ANOVA by condition with the positive affect change score as the dependent variable. Those in the distract condition (M = 6.1) experienced a greater increase in positive affect after drawing than did those in the express condition (M = 1.6), F (1, 42) = 4.244, p = 0.046, n_p^2 = 0.092.

Negative Affect. A repeated measures ANOVA with condition (2) as the between subjects factor and time (2) as the repeated measure was performed on negative affect. There was an effect of time, F (1, 42) = 32.270, MSE = 24.267, p < 0.001, n_p^2 = 0.442: negative affect decreased from after the mood induction to after one session of drawing. There was no effect of condition, F (1, 42) = 1.992, p = 0.165, n_p^2 = 0.045. More importantly, there was an interaction of time with condition, F (1, 42) = 6.059, p = 0.018, n_p^2 = 0.126, as shown in Figure 3. To understand the interaction, we computed a change score for mood improvement by subtracting negative affect before from negative affect after drawing. Next, we conducted a univariate ANOVA by condition with the negative affect change score as the dependent variable. Those in the distract condition (M = 8.7) experienced a greater decrease in negative affect after drawing than did those in the express condition (M = 3.5), F (1, 42) = 6.059, p = 0.018, n_p^2 = 0.126.

Heart Rate. A repeated measures ANOVA with condition (2) as the between subjects factor and time (2) as the repeated measure was performed on heart rate. There was an effect of time, F (1, 40) = 17.354, MSE = 20.333, p < 0.001, n_p^2 = 0.303: heart rate decreased from during the mood induction to after one session of drawing. There was no effect of condition, F (1, 40) = 1.146, p = 0.291, n_p^2 = 0.028, and no interaction of time with condition, F (1, 40) = 0.001, p = 0.970, n_p^2 = 0.0.

RSA. A repeated measures ANOVA with condition (2) as the between subjects factor and time (2) as the repeated measure was performed on RSA. There was an effect of time, F (1, 40) = 15.294, MSE =0.024, p < 0.001, n_p^2 = 0.277: RSA increased from during the mood induction to

after one session of drawing. There was no effect of condition, F (1, 40) = 0.801, p = 0.376, n_p^2 = 0.020, and no interaction of time with condition, F (1, 40) = 0.323, p = 0.573, n_p^2 = 0.08.

Summary. Consistent with previous research, drawing to distract improved both positive and negative affect more than drawing to express after a single session of drawing. However, we did not find a difference by condition for the psychophysiological indices.

Benefits of Drawing After One Month. We examined affect at two time points: after the mood induction (or during the mood induction for heart rate and RSA) and after one month. This allowed us to assess: 1) whether there were benefits of drawing over one month; 2) whether the benefits differed by drawing condition; and 3) whether the benefits of drawing differed from the passage of time (the control condition).

Positive Affect. A repeated measures ANOVA with condition (3) as the between subjects factor and time (2) as the repeated measure was performed on positive affect. There was an effect of time, F (1, 58) = 31.442, MSE = 38.122, $p < 0.001$, n_p^2 = 0.352: positive affect increased from after the mood induction to after one month. There was no effect of condition, F (2, 58) = 2.586, p = 0.084, n_p^2 = 0.082, and no interaction of time with condition, F (2, 58) = 1.145, p = 0.325, n_p^2 = 0.038.

Negative Affect. A repeated measures ANOVA with condition (3) as the between subjects factor and time (2) as the repeated measure was performed on negative affect. There was an effect of time, F (1, 58) = 62.913, MSE = 29.642, $p < 0.001$, n_p^2 = 0.520: negative affect decreased from after the mood induction to after one month. There was no effect of condition, F (2, 58) = 0.334, p = 0.717, n_p^2 = 0.011, and no interaction of time with condition, F (2, 58) = 0.674, p = 0.514, n_p^2 = 0.023.

Life Satisfaction. Table 3 presents mean life satisfaction at the initial and final testing session by condition. A repeated measures ANOVA with condition (3) as the between subjects factor and time (2) as the repeated measure was performed on overall life satisfaction. There was a marginal effect of time, F (2, 58) = 3.313, MSE = 6.573, p = 0.074, n_p^2 = 0.054: life satisfaction increased after one month. There was no effect of condition, F (2, 58) = 0.412, p = 0.664, n_p^2 = 0.014, and no interaction of time with condition, F (2, 58) = 0.275, p = 0.760, n_p^2 = 0.009.

Heart Rate. A repeated measures ANOVA with condition (3) as the between subjects factor and time (2) as the repeated measure was performed on heart rate. There was a marginal effect of time, F (1, 57) = 3.374, MSE = 57.593, p = 0.071, n_p^2 = 0.056: heart rate decreased from during the mood induction to after one month. There was no effect of condition, F (2, 57) = 0.920, p = 0.404, n_p^2 = 0.031, and no interaction of time with condition, F (2, 57) = 1.031, p = 0.363, n_p^2 = 0.035.

RSA. A repeated measures ANOVA with condition (3) as the between subjects factor and time (2) as the repeated measure was performed on RSA. There was a marginal effect of time, F (1, 57) = 3.632, MSE = 0.021, p = 0.062, n_p^2 = 0.060: RSA increased from during the mood induction to after one month. There was no effect of condition, F (2, 57) = 0.194, p = 0.824, n_p^2 = 0.007, and no interaction of time with condition, F (2, 57) = 0.422, p = 0.657, n_p^2 = 0.015.

Summary. Whereas both drawing conditions improved affect, heart rate and RSA after a month of drawing, we did not find any differences between the drawing conditions. Furthermore, there were no differences between the drawing conditions and the control condition after one month.

Discussion

This study examined the psychological and psychophysiological benefits of drawing over one month in a non-clinical sample of adults. Participants were asked to recall a personally upsetting event and were randomly assigned to one of three conditions: express (draw their feelings), distract (draw an object from observation) or control group (no activity). Participants in the two drawing conditions were instructed to draw once a week for one month. Psychological and psychophysiological measures were collected during the duration of the testing sessions. We hypothesized that using drawing to distract would improve mood and psychophysiological indices after a single session of drawing. We tested two competing hypotheses for the benefits of drawing over one month: 1) over one month drawing to express may be more beneficial than drawing to distract because it should allow participants to come to terms with and understand an upsetting event; and 2) drawing to distract may be more beneficial than drawing to express even when extended over one month because of the engaging aesthetic properties of the medium. Our hypotheses were partially supported.

Consistent with our hypothesis and previous research, we found that drawing to distract improved positive and negative affect more after a single session of drawing. As discussed by Watson et al. (1988), positive affect and negative affect represent two orthogonal constructs. Positive affect measures a person's enthusiasm and alertness with high scores in positive affect reflecting high energy and low scores reflecting lethargy (p. 1063). In contrast, negative affect measures a person's distress with high scores reflecting intense negative emotions (e.g., anger, fear) and low scores reflecting tranquility (p. 1063). Thus, scores on positive affect and negative affect are not necessary correlated. A person could experience high positive affect (feeling energized and an engaged in an activity) with or without experiencing low negative affect

(feeling calm and serene). Those in the distract condition not only were able to shift their attention away from the negative content of the memory they recalled (as evidenced by higher positive affect scores) but were also experiencing a greater sense of calm (as evidenced by lower negative affect scores) than those in the express condition.

This is the first study to investigate the psychophysiological benefits when drawing. The research examines both overt psychological and underlying psychophysiological outcomes. No research has yet investigated these two levels of responses to the act of drawing. We hypothesized that similar to the mood improvement, drawing to distract would result in reduced heart rate and an increase in RSA compared to drawing to express. Our hypothesis was not supported. Although, the drawing activities both reduced heart rate and increased RSA from during to after the mood induction, there was no difference between conditions after a single session of drawing. As suggested by Pennebaker and Chung (2011), some benefits of expressive writing may be immediate whereas others may take several weeks or months to emerge. The same may be true for drawing: the benefits of drawing to distract may persist several weeks or month after drawing. The benefits of drawing to distract seem limited to a single drawing or drawings made in a short time span (four consecutive days) as in Drake et al. (2016). It may be that over time, both drawing to distract and drawing to express have positive effects. Thus, there are multiple routes to improving mood from drawing.

Does the dosage of drawing affect the mood benefits? And, does the dosage affect the relative advantage of distract over express? Contrary to our hypothesis, we did not find any difference between drawing to distract and drawing to express over one-month. This is in contrast to the work of Drake et al. (2016) who showed that drawing to distract improved mood after four days. It is possible that the differences may be due to the duration of the study (four

days versus one month) or that the drawings in Drake et al. study were made over four consecutive days. Perhaps different results would have been obtained if participants had been asked to draw every day over a one-month period. Drawing every day would have allowed participants to become more familiar and comfortable with drawing. Also, contrary to our hypothesis, we did not find that the benefits of drawing differed from the control condition. In all three conditions – express, distract, and the control – positive and negative affect improved after one month. We found that the passage of time leads to similar mood benefits as drawing.

Why might the same results be found for the control condition as the drawing conditions? The expressive writing literature has included writing about everyday events as their "control" condition. They have found that expressive writing improves health outcomes after writing for several weeks to several months (e.g., Pennebaker & Chung, 2011). However, they have not found benefits for self-report measures of mood or psychological well-being. And, these studies have not included a control condition that does not engage in an activity but allows for the control of the passage of time. It is unclear if a true "control" condition in the expressive writing literature would reap the same benefits as writing over time. What is clear is that drawing and writing seem to afford different benefits. Expressive writing seems beneficial for health outcomes not immediately but after extended period of times. Drawing seems to work via distraction for mood improvement immediately. It is unclear whether the benefits of drawing persist over extended periods of time. The benefits of drawing have been found over four days (Drake et al., 2016) but not (as demonstrated by this study) over a one-month period.

Future research should continue to explore the benefits of drawing by directly comparing drawing and writing as a form of distraction versus expression. The mediums may afford different kinds of emotion regulation strategies. Language is primarily propositional, referential,

and discursive (Goodman, 1976; Langer, 1957), and thus easily invites us to express our thoughts and feelings in words. Conveying feelings through images may be more challenging. Drawing is not a primarily referential symbol system; it is presentational rather than discursive (Goodman, 1976; Langer, 1957). The act of drawing pulls our attention towards the surface properties of color, line, texture, etc. In short, we suggest that writing affords expression due to the referential nature of the symbol system of language, while drawing affords distraction due to the immediately engaging aesthetic properties of the medium.

Future research should also examine the benefits of a longer drawing intervention (over several months) and assess the benefits of drawing several months after the drawing intervention has ended. It has been shown that the benefits of expressive writing persist beyond the end of the expression writing intervention (Pennebaker & Chung, 2011). It is important that future research continue to examine the benefits of drawing over time across a variety of psychological and health outcomes. It has been suggested that non-artists may have difficulty expressing aspects of themselves through drawing due to a “poor command of the medium" (Betts & Groth-Marnat, 2014, p. 279). Participants may be less familiar with expressing themselves through drawing. They also may be less comfortable with drawing from observation as they may feel they are being evaluated for their drawing ability. One possible way to address this would be to increase the number of drawing sessions from once a week to several times a week. This would allow participants to gain experience with drawing both in the distraction and expression conditions.

This research informs our understanding of the value and impact of the arts and how the everyday activity of art-making may be associated with recovery (and reframing) from trauma. This research also expands our understanding of emotion regulation. While emotion regulation researchers have reported that expressive writing is more effective than distracting, no one has

examined this question with respect to the activity of art-making. Our findings show that drawing to distract improves psychological outcomes after a single session. Whereas the benefits of drawing to distract have been found after several days (Drake et al., 2016), our study found no difference between drawing to express and drawing to distract and the control condition over time. In fact, both conditions resulted in psychological and psychophysiological benefits over one month similar to the control condition. The benefits of drawing are immediate and limited to single session of drawing and it seems the benefits of drawing are diluted over time. Given the contrast between our results and those reported for writing, we suggest that drawing and writing may improve mood through different mechanisms.

Acknowledgments

This research was supported by a grant from National Endowment of the Arts. We thank Lauren Fink, Michael Ianello, and Isabella Poloes for their assistance with data collection and data processing. We thank Wei Zhang and Yu Gao for the expertise and advice on the psychophysiological measures. We would also like to thank Yu Gao for the use of her psychophysiological equipment.

References

Bazhenova, O. V., Plonskaia, O., & Porges, S. W. (2001). Vagal reactivity and affective adjustment in infants during interaction challenges. *Child Development, 72*(5), 1314–1326.

Barclay, L. J. & Skarlicki, D. P. (2009). Healing the wounds of organizational injustice: Examining the benefits of expressive writing. *Journal of Applied Psychology, 94,* 511–523. doi: 10.1037/a0013451

Betts, D. J. & Groth-Marnat, G. (2014). The intersection of art therapy and psychological assessment: Unified approaches to the use of drawings and artistic processes. In L. Handler & A. Thomas (Eds.), *Figure drawings in assessment and psychotherapy: Research and application* (pp. 268-285). New York, NY: Routledge.

Briks, A. (2007). Art therapy with adolescents: Vehicle to engagement and transformation. *Canadian Art Therapy Association Journal, 20,* 2-15.

Burton, C. M., & King, L. A. (2008). Effects of (very) brief writing on health: The twominute miracle. *British Journal of Health Psychology, 13,* 9–14.

Dalebroux, A., Goldstein, T. R., & Winner, E. (2008). Short-term mood repair through art-making: Attention redeployment is more effective than venting. *Motivation and Emotion, 32*, 288–295.

DePetrillo, L., & Winner, E. (2005). Does art improve mood? A test of a key assumption underlying art therapy. *Art Therapy: Journal of the American Art Therapy Association, 22*(4)*,* 205–212.

Dewan, S. (2007, September 17). Use of crayons to exorcise Katrina. *New York Times. Retrieved from http://www.nytimes.com/2007/09/17/arts/design/17ther.html?_r=0*

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*, 71–75. doi: 10.1207/s15327752jpa4901_13

Drake, J. E., & Winner, E. (2012). Confronting sadness through art-making: Distraction is more beneficial than venting. *Psychology of Aesthetics, Creativity, and the Arts, 6*, 251-266.

Drake, J. E., Hastedt, I., & James, C. (2016). Drawing to distract: Examining the psychological benefits of drawing over time. *Psychology of Aesthetics, Creativity, and the Arts. 10,* 325-331.

Frank, D. (1952). *The diary of Anne Frank.* Garden City, NY: Doubleday

Goodman, N., (1976). *Languages of art.* Indianapolis, IN: Hackett Publishing Company

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

Grossman, P., van Beek, J., &Wientjes, C. (1990). A comparison of three quantification methods for estimation of respiratory sinus arrhythmia. *Psychophysiology, 27*(6), 702–714.

Hemenover, S. H., Augustine, A. A., Shulman, T. E., Tran, T. Q., & Barlett, C. (2008). Individual differences in the ability to repair negative affect. *Emotion, 8,* 468–478.

Kianpoor, M., & Bakhshani, N-M. (2012). Trauma, dissociation, and high-risk behaviors. *International Journal of High Risk Behaviors & Addiction, 1,* 9-13.

Klein, K., & Boals, A. (2001). Expressive writing can increase working memory capacity. *Journal of Experimental Psychology: General, 130*, 520-533.

Langer, S. K. K. (1957). *Philosophy in a new key*: *A study in the symbolism of reason, rite, and art.* Cambridge, MA: Harvard University Press.

Morris, W. N. (1989). *Mood: The frame of mind.* New York: Springer Verlag.

Pennebaker, J. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*, 162-166.

Pennebaker, J., & Beall, S. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*, 274-281.

Pennebaker, J. W., Colder, M., & Sharp, L. K. (1990). Accelerating the coping process. *Journal of Personality & Social Psychology, 58*, 528–537.

Pennebaker, J. W., & Chung, C. K. (2011). Expressive writing and its links to mental and physical health. In H. S. Friedman (Ed.), *Oxford handbook of health psychology* (pp. 417-430). New York, NY: Oxford University Press.

Pennebaker, J. W., & Francis, M. E. (1996). Cognitive, emotional, and language processes in disclosure. *Cognition & Emotion, 10*, 601–626.

Pennebaker, J. W., Hughes, C. F., & O'Heeron, R. C. (1987). The psychophysiology of confession: Linking inhibitory and psychosomatic processes. *Journal of Personality & Social Psychology, 52*, 781-793.

Pennebaker, J. W., Kiecolt-Glaser, J. K., & Glaser, R. (1988). Disclosure of traumas and immune function: Health implications for psychotherapy. *Journal of Consulting & Clinical Psychology, 56*, 239–245.

Pennebaker, J. W., & Susman, J. R. (1988). Disclosure of traumas and psychosomatic processes. *Social Science & Medicine, 26,* 327-332.

Pifalo, T. (2006). Art therapy with sexually abused children and adolescents: Extended research study. *Art Therapy, 23,* 181-185.

Pizarro, J. (2004). The efficacy of art and writing therapy: Increasing positive mental health outcomes and participant retention after exposure to traumatic experience. *Art Therapy: Journal of the American Art Therapy Association, 21*(1), 5-12.

Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74,* 790-803.

Safe Street Arts (2013). Retrieved from http://www.safestreetsarts.org.

Vrana, S., & Lauterbach, D. (2006). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress, 7,* 282-302.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS Scales. *Journal of Personality and Social Psychology, 54,* 1063–1070.

Zumbo, B. D. (1999). The simple difference score as an inherently poor measure of change: Some reality, much mythology. In B. Thompson (Ed.), *Advances in social science methodology,* Vol. 5 (pp. 269–304). Greenwich, CT: JAI Press.

Table 1

Positive Affect and Negative Affect by Condition at Time 1, Time 2, Time 3, and Time 4

	Time 1		Time 2		Time 3		Time 4	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Positive Affect								
Express	29.9	6.3	22.3	8.8	23.3	9.0	26.2	8.3
Distract	28.7	8.7	22.0	8.6	27.7	7.1	29.8	8.3
Control	25.5	6.1	17.7	6.7	--	--	24.9	6.5
Negative Affect								
Express	14.6	4.7	21.0	5.7	17.6	5.8	14.8	4.8
Distract	15.0	5.2	21.4	7.6	13.2	4.9	12.7	3.5
Control	14.5	4.9	22.5	8.2	--	--	13.9	4.2

Table 2

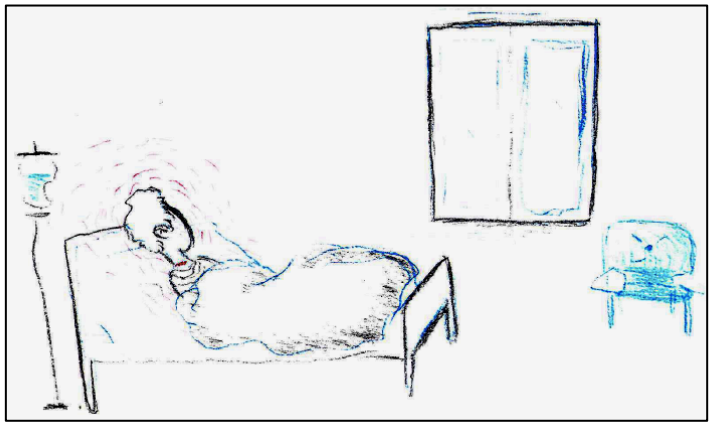
Heart Rate and RSA by Condition at Time 1, Time 2, Time 3, and Time 4

	Time 1		Time 2		Time 3		Time 4	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Heart Rate								
Express	74.9	14.6	76.0	15.5	71.9	11.9	72.3	12.2
Distract	78.9	13.0	80.4	11.5	75.8	10.7	75.6	10.6
Control	74.3	13.6	75.6	11.1	--	--	74.9	9.2
RSA								
Express	84.7	39.8	83.4	30.7	96.5	36.1	91.1	32.1
Distract	68.7	36.0	77.5	42.7	88.8	47.6	100.2	50.0
Control	94.8	58.9	86.4	56.4	--	--	95.6	74.7

Table 3

Life Satisfaction for Each Condition at the Initial and Final Testing Sessions

	Initial Session		Final Session	
	M	*SD*	*M*	*SD*
Express	21.4	8.4	21.9	8.0
Distract	20.6	6.5	21.9	6.1
Control	19.4	7.5	20.2	6.3



a

b

c d

Figure 1. Examples from the express condition (a) and distract (b) conditions at the initial testing session and the express (c) and distract (d) conditions at the final testing session.

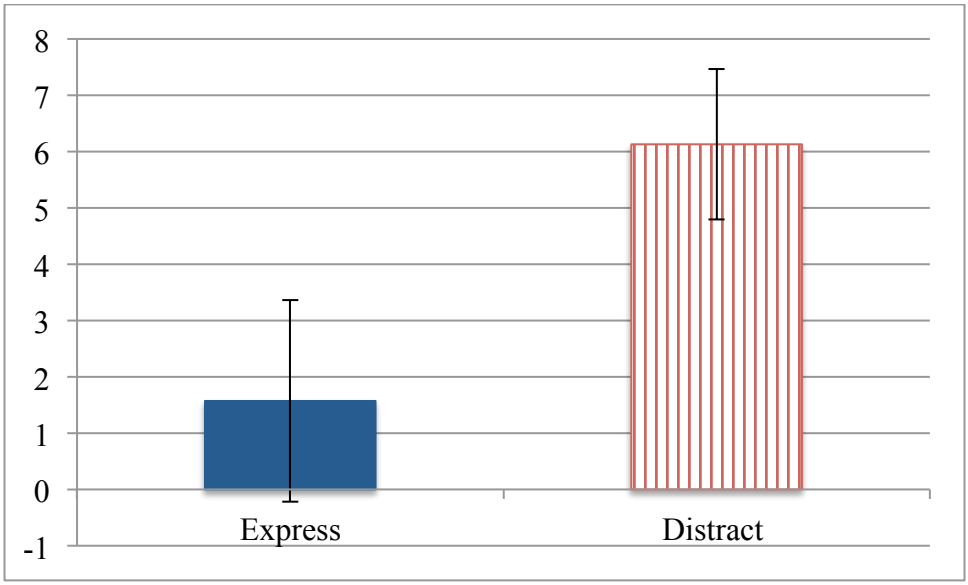


Figure 2. Positive Affect Change Score by Condition After the First Testing Session

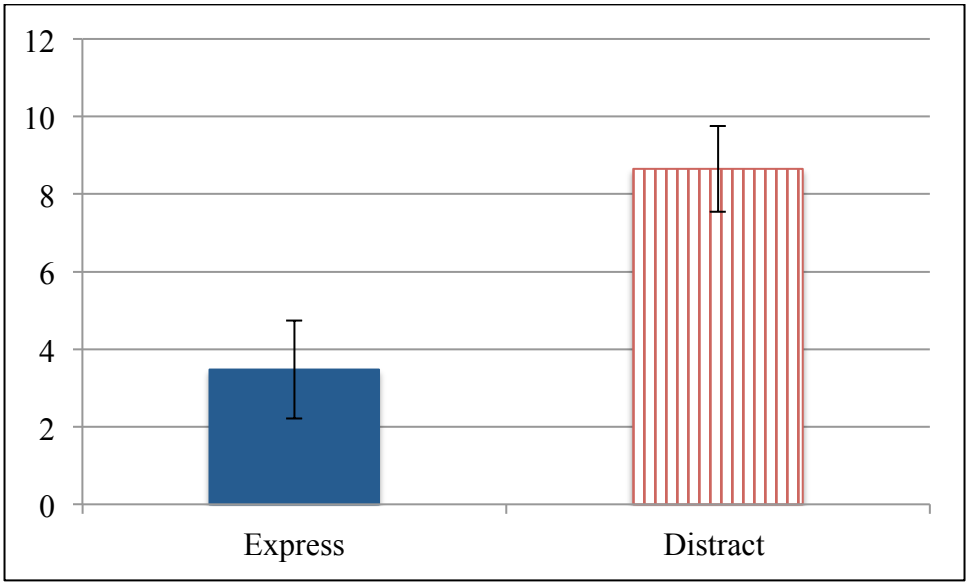


Figure 3. Negative Affect Change Score by Condition After the First Testing Session