

UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

A COMPARISON BETWEEN A MODIFIED AND A TRADITIONAL
EXPRESSIVE WRITING INTERVENTION AND THEIR EFFECT
ON ALEXITHYMIA AND EMOTIONAL EXPRESSIVITY

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

John Tzanos

College of Education and Behavioral Sciences
Department of School Psychology

December 2019

ProQuest Number:27663081

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent on the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 27663081

Published by ProQuest LLC (2020). Copyright of the Dissertation is held by the Author.

All Rights Reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

This Dissertation by: John Tzanos

Entitled: *A Comparison Between a Modified and a Traditional Expressive Writing Intervention and Their Effect on Alexithymia and Emotional Expressivity*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in the College of Education and Behavioral Sciences in the Department of School Psychology.

Accepted by the Doctoral Committee

Achilles N. Bardos, Ph.D., Research Advisor

David Hulac, Ph.D., Committee Member

Khalil Shafie, Ph.D., Committee Member

Joseph Ososkie, Ph.D., Faculty Representative

Date of Dissertation Defense _____

Accepted by the Graduate School

Cindy Wesley, Ph.D.
Interim Associate Provost and Dean
Graduate School and International Admissions

ABSTRACT

Tzanos, John. *A Comparison Between a Modified and a Traditional Expressive Writing Intervention and Their Effect on Alexithymia and Emotional Expressivity*.
Published Doctor of Philosophy dissertation, University of Northern Colorado,
2019.

The current study examined the effect of a modified expressive writing intervention compared to a traditional intervention and their effect on alexithymia and emotional expressivity while controlling for attachment style and social desirability among 150 undergraduate and graduate college students. The survey was administered online using a Qualtrics online survey tool. Participants were randomly divided into six groups: (a) low alexithymia/traditional intervention, (b) moderate alexithymia/traditional invention, (c) high alexithymia/traditional intervention, (d) low alexithymia/modified intervention, (e) moderate alexithymia/ modified intervention, and (f) high alexithymia/modified intervention. The three groupings of levels of alexithymia—low (<51), moderate (51-61), and high (> 61) alexithymia—were based on the Toronto Alexithymia Scale-20 (TAS-20, Bagby, Parker, & Taylor, 1994) pretest score. The intervention involved undergoing a writing task in two sessions: writing a short essay using the two-treatment assignment (modified versus traditional) in a span of a week. After the participants completed the two sessions of writing, they were administered follow-up surveys of the Berkeley Expressivity Questionnaire (BEQ, Gross & John, 1997) and TAS-20 to obtain posttest scores for emotional expressivity and levels of alexithymia. Two different survey questionnaires were used to control for social desirability and

attachment style: the Marlowe-Crowne Social Desirability Scale short form (Beretvas, Meyers, & Leite, 2002) and the Experiences in Close Relationships-Revised (Wei, Russell, Mallinckrodt, & Vogel, 2007). Statistical analysis for this study was a repeated measures multivariate analysis of covariance. The present study did not detect any effect of either expressive writing condition on alexithymia or emotional expressivity in college students with low, moderate, and high levels of alexithymia, whereas the two covariates, social desirability and emotional attachment style, did indeed affect participants' levels of alexithymia and emotional expressivity. The current research added to a growing body of literature on the efficacy of expressive writing prompts as treatments for alexithymia and provided a foundation for future research.

TABLE OF CONTENTS

CHAPTER I. INTRODUCTION.....	1
Significance of the Problem.....	1
Theoretical Framework.....	4
Introduction of Modified Intervention.....	7
Purpose of the Study.....	10
Nature of the Study.....	12
Research Question and Hypotheses.....	14
CHAPTER II. LITERATURE REVIEW.....	15
Expressive Writing Intervention.....	15
Mechanisms of Change.....	20
Alexithymia.....	25
Styles of Attachment.....	27
Social Desirability.....	30
Expressive Writing.....	32
Limitations/Delimitations.....	34
Discussion.....	35
CHAPTER III. METHODOLOGY.....	39
Research Design.....	39
Participants.....	45
Ethical Issues and Protection of Participants.....	49
Measures.....	51
Description of Treatment Groups.....	59
Data Analysis.....	63
Additional Data Analysis.....	67
CHAPTER IV. RESULTS.....	71
Participant Information.....	71
Psychometric Properties of Measures.....	73
Testing for Statistical Assumptions of Multiple Analysis of Covariance.....	78
Research Question and Hypotheses.....	82
Gain Scores Analysis.....	91

Testing for Statistical Assumptions of Multiple Analysis of Covariance and Analysis of Covariance	91
Multiple Analysis of Covariance and Analysis of Covariance	101
Summary	104
CHAPTER V. DISCUSSION	106
Limitations	112
Conclusion	114
REFERENCES	116
APPENDIX A. INSTITUTIONAL REVIEW BOARD APPROVAL	139
APPENDIX B. CONSENT FORM TO PARTICIPATE IN HUMAN RESEARCH.....	141
APPENDIX C. MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE	145
APPENDIX D. EXPERIENCES IN CLOSE RELATIONSHIPS-REVISED ADULT ATTACHMENT QUESTIONNAIRE SHORT VERSION.....	148
APPENDIX E. BERKELEY EXPRESSIVITY QUESTIONNAIRE	151
APPENDIX F. TORONTO ALEXITHYMIA SCALE.....	153
APPENDIX G. VISUAL DESCRIPTIVE STATISTICS	156
APPENDIX H. PILOT STUDY	162

LIST OF TABLES

1.	Summary of Research Design and Data Collection.....	44
2.	Participant Demographic Characteristics.....	72
3.	Descriptive Statistics of the Toronto Alexithymia Scale Pretest and Posttest Scores	74
4.	Descriptive Statistics of the Berkeley Expressivity Questionnaire Scale and Sub-Scales	76
5.	Descriptive Statistics of the Experiences in Close Relationships-Revised Scale and Sub-Scales	77
6.	Descriptive Statistics of the Marlowe-Crowne Social Desirability Scale Short Version	78
7.	Shapiro-Wilk Test of Normality for Predictors, Covariates, and Dependent Variables.....	81
8.	Means and Standard Deviations of Toronto Alexithymia Scale-20 Overall Scale Scores by Treatment Condition.....	83
9.	Means and Standard Deviations of Posttest Berkeley Expressivity Questionnaire Scale Scores by Treatment Condition	85
10.	Toronto Alexithymia Scale-20 Multivariate Analysis of Covariance Results for Tests of Covariates, Alexithymia Group, and Treatment Condition.....	88
11.	Berkeley Expressivity Questionnaire Multivariate Analysis of Covariance Results for Tests of Covariates, Alexithymia Group, and Treatment Condition	90
12.	Shapiro-Wilk Test of Normality for Predictors, Covariates, and Dependent Variables.....	92
13.	Levene's Test of Equality of Error Variances	93

14.	Test of Between Subjects Effects: Treatment Condition, Attachment, and Social Desirability	101
15.	Multivariate Tests	102
16.	Tests of Between-Subjects Effects.....	103

LIST OF FIGURES

1.	Flowchart of experimental process	40
2.	Results of G*power sample size computation	48
3.	Scatterplots of all independent, dependent, and covariate variables for the traditional treatment group.....	79
4.	Scatterplots of all independent, dependent, and covariate variables for the modified treatment group.....	80
5.	Berkeley Expressivity Questionnaire positive expressivity scores by pretest alexithymia condition.....	84
6.	Gains in Toronto Alexithymia Scale-20 facets	94
7.	Gains in Berkeley Expressivity Questionnaire facets	95
8.	Gains in Toronto Alexithymia Scale-20 overall score and Berkeley Expressivity overall score gain	95
9.	Difficulty describing feeling gain score.....	96
10.	Difficulty identifying feelings gain score	97
11.	Externally oriented thinking gain score	97
12.	Toronto Alexithymia Scale-20 overall gain score	98
13.	Negative expressivity gain score	98
14.	Positive expressivity gain score	99
15.	Impulse control gain score	99
16.	Berkeley Expressivity Questionnaire overall gain score	100
17.	Estimated pretest and posttest scores of alexithymia and expressivity by treatment group controlling for attachment style and social desirability.....	108

CHAPTER I

INTRODUCTION

Significance of the Problem

Alexithymia is a personality construct, which means to have no words for emotions (Ashley, O'Connor, & Jones, 2011). While this personality characteristic has passed into widespread understanding and use among those who study the disorders of the mind, it does not manifest by a discrete set of symptoms and does not have a formal DSM-V diagnosis. Instead, this personality construct is described by Muller (2000) as a psychological construct, which is useful in describing patients who either seem unable to appreciate emotions and other feelings or those who “seem to lack the words” to describe their feelings to other people (p. 1). Those who present with symptoms of this condition do not have fantasies that contain expressive feeling nor do they show an awareness of their surroundings, which is based on physical and sense detail alone (Kellner, 1990). Other expressions of this personality construct, as described by Lumley, Gustavson, Partridge, and Labouvie-Vief (2005), include having a limited fantasy life, a lack of effective imagination, and poor dreaming (Lumley et al., 2005).

Four basic characteristics define the concept of alexithymia: (a) a general difficulty or lack of ability to identify or describe feelings, (b) an inability or diminished ability to tell the difference between feeling states and physical sensation or awareness, (c) diminished or ineffective imaginative ability (Hendryx, Haviland, & Shaw, 1991); finally and most crucial to the proposed study, prior work (including Serani, 2014) shows

the limited capacity for emotional attachment or communication among those with alexithymia to reflect a mental tendency for (d) focused or ordered thought.

When individuals lack the capacity to process, express, or understand emotion in others, there is a wide range of negative effects, not the least of which are an impaired sense of their own inner experience and a sense of the inner and outer being made marginal (Muller, 2000, p. 1). While this could often lead to depression or other mental health problems, there are also immediate physical risks, e.g., when a person has an impaired sense of self, there is increased risk of neglect of the physical self and other activities of daily living over time. These problems are often paired with a “hypersensitivity to physical sensations” and a “detached and tentative connection to others” that serves to further impair preventive care (Serani, 2014, p. 1).

For many of those with alexithymia for whom there are no physical symptoms, there might be severe psychological consequences. Some of those with alexithymia might benefit from interventions specifically addressing anxiety as high anxiety has been shown to prevent individuals with alexithymia from gaining benefit from therapeutic interventions before stress is managed first (Hendryx et al., 1991).

Physical risk aside, alexithymia does its greatest damage to the mind. Those who present with this personality characteristic are at a far greater risk for autism (Hill, Berthoz, & Frith, 2004; Shah, Hall, Catmur, & Bird, 2016), anxiety (Jones, 1984), depression (Kim et al., 2008), and substance abuse (Lumley, Downey, Stettner, Wehmer, & Pomerleau, 1994), as well as physical pain and other somatoform disorders alike (Mattila et al., 2008). In turn, each of these disorders increases sufferers’ risks for hospitalization, self-harm, or the development of addiction (Serani, 2014). To this end, it

is incumbent upon psychological researchers to approach the idea of alexithymia from an intervention perspective and produce means by which specific tools could be developed to produce exercises to alleviate its symptoms.

Online expressive writing interventions are slowly becoming more popular. Computer-based therapy is advancing and with data supporting the effectiveness of online interventions, there might be some benefit to this type of intervention administration. According to Frattaroli's (2006) meta-analysis, online expressive writing interventions showed a slightly higher effect size compared to face-to-face expressive writing sessions, possibly due to the fact that participants felt more at ease writing about very personal information in the safety of their own home. Of note, a posttraumatic stress disorder study using expressive writing intervention by Lange, van de Ven, Schrieken, Bredeweg, and Emmelkamp (2000) showed online administration of the intervention produced not only a significant reduction in symptomatology (trauma symptoms and general psychopathology) but also two to three times the effect size compared to similar studies that conducted face-to-face writing trials.

The literature was not in agreement concerning the setting of the study and the number of sessions needed to facilitate positive change. For example, a study conducted by Walker, Nail, and Croyle (1999) found no significant difference between expressive writing groups instructed to disclose for one session compared to groups assigned to disclose for three sessions. Others (Hoyt, 2011) reported symptom reduction in just two 30-minute sessions of expressive writing. In terms of spacing out the sessions, evidence suggested spacing was not important (i.e., daily, weekly, etc.), thus supporting the hypothesis that the strength of the intervention did not depend on the elapsed time

between the expressive writing interventions (Chung & Pennebaker, 2008; Sheese, Brown, & Graziano, 2004). However, others found the opposite in terms of number of sessions, meaning the treatment dosage was important (Frattaroli, 2006).

Theoretical Framework

With an eye toward contributing to the alexithymia and emotional expressivity conversation, this work considered means by which modified tasks of expressive writing might be explored as means of such alleviation. As described by Pennebaker (2004), conversation and rhetoric comprise a broad field of study and serve to consider ways in which communication relates and has an impact upon writing. One key application of theory in this field was the consideration of expressive writing as a way in which individuals who presented with different communicative skills, deficits, and abilities, e.g., many of those who presented with alexithymia and low emotional expressivity, could improve upon their extant or impaired communication skills (Pennebaker, 2004). This concept also reflected a larger trend in early childhood education, owing largely to the work of Pennebaker (2004), which is now visible in the standardization of narrative essays in the public school classroom. This relatively new concept in elementary and secondary education was cited for improving students' capacity for personal disclosure as well as encouraging healthy and reasonable strategies for coping (Pennebaker, 2004).

In schools, access to brief and cost-effective intervention resources and tools are becoming more important with political and financial pressures around education. The National Association of School Psychologists (NASP, 2015a, 2015b) stated that because of the unique training of school psychologists in both education and mental health, school psychologists were uniquely qualified to help address the needs of students throughout

their academic careers. According to the NASP model for comprehensive and integrated school psychological services (cited in Office of Special Education Programs, 2016), the student to psychologist ratio should not exceed that of one psychologist for every 500-700 students; however, it was by some estimates closer to 1:1442. With intervention studies like this one, which was driven by an evidenced-based framework, brief term focus and easily used intervention tools could potentially provide school psychologists in all contexts with a method that could be used to alleviate symptoms related to emotional expressiveness challenges but also as an intervention tool to be used as homework after counseling sessions or even as a class wide prevention or treatment for challenges that ranged from anxiety and depression (Gortner, Rude, & Pennebaker, 2006) to test anxiety for students as well as social skill training and promotion of well-being as the research suggested (Shen, Yang, Zhang, & Zhang, 2018; Twenge & King, 2005).

While there was a great precedent for practical theory in use of this concept in elementary and secondary education as well as in the treatment of disorders such as depression, anxiety, or of alleviating the effects of trauma history (Smyth, Hockemeyer, & Tulloch, 2008) that might worsen these conditions, there was little apparent force behind the potential use of expressive writing as a means of alleviating symptoms of alexithymia. However, the literature found major similarities between more functional sorts of affective and attachment styles of relating. For this reason, there was reason to believe a tool (i.e., modified expressive writing) might be created that used expressive writing as a means by which persons with alexithymia might be aided in (a) either alleviating their symptoms or, perhaps, in (b) “training” themselves in the practical use of emotions to improve their own emotional lives.

Expressive writing as a means of self-expression has often been lauded for its cathartic effect on those whose emotional abilities and capacities were unimpaired (Range & Jenkins, 2010). While writing and journaling have a useful effect in this context, the sense of catharsis or the inhibition confrontation model, a state of purging of emotions that distances the participant from his/her emotions and thus his/her psychological distress, was not considered a very important operating factor in the use of rhetorical self-expression to alleviate affective disorders (Pennebaker, 1997). As described by Moran (2004) from work performed with trauma survivors, the key effect such exercises had on those with little sense or an impaired sense of emotion, such as those who are closed-off to trauma, was one of “habituation” or the idea that “naming an emotion or trauma legitimizes it” (p. 97). The same was true of the survivors of trauma, many of whom often presented with denial of their trauma, which was characteristic of an inability to confront and accept their pain or loss (Stroebe, Stroebe, Schut, Zech, & van den Bout, 2002). Indeed, those with affect or attachment disorders might share many characteristics with trauma survivors in the sense they presented an affect and attachment awareness cut-off from emotional awareness by an impaired emotional ability (Moran, 2004, p. 97). Under this consideration, it was not unreasonable to theorize that individuals with moderate and/or higher levels of alexithymia might show some measurable benefit from adopted and modified expressive writing exercises shown to be beneficial to those who presented with attachment-related issues.

In his review paper on alexithymia, Lumley (2004) identified four potential research directions for alexithymia intervention studies: (a) increasing the amount and time of the intervention, (b) study the effects of medication (i.e., selective serotonin

reuptake inhibitors) on alexithymia, (c) study the effects of non-emotional interventions (i.e., cognitive-behavioral), and, more importantly for the purpose of this study, (d) study the effects of more guided and structured expressive writing interventions. The author provided evidence to support the notion that a more guided and structured expressive writing intervention was not only lacking in research in previous studies but was very important to study since the symptoms of alexithymia had been a challenge to reduce within the paradigms of expressive writing interventions used so far.

Introduction of Modified Intervention

Traditional expressive writing exercises receive standard instructions by asking participants to write about the most traumatic event of their lives. The traditional expressive writing prompt (Pennebaker, 2004) invited participants to talk freely about what happened and asked the authors of the essay to let go and write what came to mind while asking them to make connections with events, people in their lives, or future self. In the modified expressive writing prompt, the difference lay in the stepwise break down of the instructions given in the following four steps. The first step asked participants to focus on a positive or negative event and facilitated framing the topic of the rest of the intervention, particularly as this event tied in with their current affect. The second step asked participants to make connections with people of their lives and focused on increasing insight. The third step was written in a way that promoted a self-reflecting mindset such that participants focused their creative energy into interpreting and giving advice to themselves as if they were their own therapist, thus reinforcing self-awareness and perspective taking. The last step focused on increasing participants' cognitive appraisal of all the information they provided throughout the writing exercise. These

steps are discussed in detail in the methodology section. Factors hypothesized to make this intervention at least equally beneficial to traditional expressive writing interventions for the treatment of alexithymia rested on the novel approach this work would provide with respect to participant self-expression in a guided manner as suggested by previous research. While in the past there has been some precedent regarding the use of exercises of expressive writing for persons who present with alexithymia (Lumley, 2004), noticeable differences to the modified approach formed the methodology of the present study.

Elements of this novel intervention, which set it apart from traditional use of expressive writing, were consistent with findings that structured interventions like this one were not only more fitting with the cognitive style of people with alexithymia but also were more attuned with the emotional processing challenges alexithymia brought (Lumley, 2004). While many of the past interventions on this topic focused on top-down assignments of writing activities designed to work out participants' capacity for reflection, they had done so in a relatively open-ended manner; i.e., without offering much guidance or structure that, given alexithymia is characterized by a subclinical inability to identify and describe feelings in the self, made these types of interventions difficult for participants high on alexithymia. By contrast, this intervention provided greater autonomy and agency to the participant while guiding his/her thinking process based on principles of psychotherapy. In summary, writing activities assigned to the groups of participants in the modified expressive writing condition would focus on (a) connecting experiences of their current life with those events that occurred in the past, (b)

self-directed interpretations of these participants' current behavior as well as (c) their affect and capacity to express emotion and interpret and reappraise their cognitions.

The goal of this work was to compare two expressive writing interventions and determine if a modified expressive writing intervention, with its greater focus on the expressiveness and guided focus of the task, had a greater impact (regarding scores on the Toronto Alexithymia Scale [TAS-20] and Berkeley Expressivity Questionnaire that would be utilized to measure various aspects of emotional expressiveness) on the participants than a traditional expressive writing task. The TAS, a 20-item self-report scale developed by Bagby, Parker, and Taylor (1994), is one of the most commonly used measures of alexithymia in the literature. The Berkeley Expressivity Questionnaire produces a general expressivity factor with three facets of emotional expressivity: negative expressivity, positive expressivity, and impulse strength. This tool was developed by Gross and John (1997) and was found to have sound psychometric quality. In addition, this work took attachment and different degrees of social desirability (to control for effects of social desirability, a factor that might influence subjects' ability to involve themselves in the interactive disclosure task) into consideration as a control variable, which was used to determine whether participants in this study exhibited greater benefit on the outcome variables (i.e., alexithymia and emotional expressivity). As found in a study by Stroebe, Schut, and Stroebe (2006), attachment style that was not secure predicted better results for individuals in expressive writing studies because securely attached individuals could utilize disclosure paradigms in their everyday lives, which in turn provided them with mental health benefits not seen in non-securely attached

individuals and individuals who utilized a defensive (socially desirable way of responding) style alike.

To control for attachment style and social desirability, this study utilized two tools. The first instrument was Experiences in Close Relationships-Revised Short version (ECR-RS) questionnaire (Wei, Russell, Mallinckrodt, & Vogel, 2007)—a measure of global attachment style in contrast with relationship-specific attachment (mother-father-significant other, etc.). The second instrument used was the Marlowe Crowne Social Desirability Scale (MC-SDS [short form]; Beretvas, Meyers, & Leite, 2002). This instrument was developed to assess whether or not participants were concerned with social approval. The scale was created by Douglas Crowne and David Marlowe in 1960 in an effort to measure social desirability bias (Beretvas et al., 2002). Social desirability is considered one of the most commonly identified biases affecting research studies, specifically survey studies. This instrument is one of the most readily recognized tools for controlling social desirability and has been listed in over 1,000 articles and dissertations at last estimate (Beretvas et al., 2002).

Purpose of the Study

In recent years, efforts to improve health care while lowering costs of treatments have been evident. Expressive writing interventions have been shown to produce health benefits; whereas these health enhancing effects are modest, they are of value and have minimal cost attached. The literature suggested finding ways to modify the standard expressive writing protocol to increase its effectiveness was paramount. Previous research has shown promising results for populations like college students (King & Miner, 2000; Mosher & Danoff-Burg, 2006), research upon which this study focused.

Examples of modified expressive writing interventions that have produced positive effects ranged from emphasizing positive disclosure (King & Miner, 2000) to writing in the form of dialogue to promote cognitive processing, affect regulation, and present-oriented mindset (Burke & Bradley, 2006).

As noted by Sloan, Marx, Epstein, and Lexington (2007), many studies have modified Pennebaker's (2004) expressive writing instructions with good results. For instance, Lichtenthal and Cruess (2010) modified the methodology of expressive writing to lower the effects of bereavement by providing a facilitating meaning making over the loss of a significant other. Others (Friedlander, Lumley, Farchione, & Doyal, 1997; Rosenblum et al., 2005) have modified expressive writing exercises in a way that was used as assertiveness training for alexithymics with promising results.

In the current study, a modified expressive writing intervention that was guided and structured was used as a way to counterbalance the effect alexithymia had on participants' emotional expressiveness mechanism, i.e., alexithymics felt emotions but might not be able to access their emotional vocabulary. By asking alexithymics to write in an open-ended manner might produce anxiety because emotional memories that surfaced could potentially overwhelm them as they would not have the necessary skills to gauge their feelings in the way non-alexithymics could. Therefore, the purpose of this study was to provide a context for the participants to practice skills in a guided and structured format in hopes a better instrument for self-help could be generated specifically for people with emotional expressiveness challenges.

Nature of the Study

The researcher employed a quantitative, true experimental research design with repeated measures design (pretest and posttest) in the current study. The focus of the study was to investigate the possible impact of using different expressive writing prompts of modified versus traditional on the levels of alexithymia and emotional expressivity of college participants. The researcher considered a quantitative method as opposed to a qualitative method because the constructs in the study were measured numerically using survey questionnaires (Szijarto, 2014). The researcher employed four different survey questionnaires to gather responses of the participants regarding their levels of alexithymia (TAS-20), emotional expressivity (BEQ), attachment style (ECR-RS), and social desirability (MC-SDS [Short Form]). The independent variable was treatment (modified versus traditional expressive writing prompt). Dependent variables were levels of alexithymia and emotional expressivity. The covariates were attachment style and social desirability. A true experimental design was possible because it would involve randomly assigning the samples into the two treatment interventions of modified versus traditional expressive writing prompts.

The sample in this current study was college participants who were 18-years-old or older, currently enrolled in an undergraduate or graduate program, and reported having experienced a significant emotional event that they believed had had a significant effect on their lives. This sample was randomly divided into the following six groups: (a) low alexithymia/traditional invention, (b) moderate alexithymia/traditional invention, (c) high alexithymia/traditional invention, (d) low alexithymia/modified invention, (e) moderate alexithymia/ modified invention, and (f) high alexithymia/ modified invention. The three

groupings of levels of alexithymia of low (<51), moderate (51-61), and high (> 61) alexithymia were based on the pretest score for TAS-20. Participants were recruited through the University of Northern Colorado (UNC) psychology research pool as well as any other means available to the researcher such as UNC's listserv and social media to follow the primary demographic requirements cited in the preceding review. The final number of samples of college participants would be at least 128, which was the minimum sample size needed according to a power analysis using a G*Power calculator that considered the following: (a) statistical test of analysis of covariance (ANCOVA): Fixed effects, main effects and interactions; (b) statistical power of 0.80, (c) medium effect size coefficient of 0.25 for an ANCOVA; (d) level of significance of 0.05; (e) one number of degrees of freedom; and (f) six groups and two covariates. For this sample design, the sampling frame was divided into sub-groups and individuals were randomly selected. Thus, in this study, stratification was based on the six groupings and then randomly selecting college age individuals for each of these group categories. According to Kennes, Hilgers, and Heussen (2012), random selection allowed a representative sample to be generalized to a population.

The intervention involved undergoing the writing task in two sessions: writing a short essay using the two-treatment assignment (modified versus traditional) in a span of three to four days in a week. After the participants completed the two sessions of writing, they were administered follow-up surveys of the BEQ and TAS 20 to obtain posttest scores for emotional expressivity and levels of alexithymia. The survey was administered online using a Qualtrics online survey tool. Statistical analysis for this study was a repeated measures multivariate analysis of covariance (MANCOVA) to

determine the impact of the treatment condition (modified versus traditional expressive writing) on the two dependent variables of levels of alexithymia and emotional expressivity of college participants while controlling for the impact of their attachment style and social desirability.

Research Question and Hypotheses

The following research question and hypotheses guided this current study:

- Q1 Does the treatment condition (modified/traditional expressive writing) significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability?
- H1 Treatment condition will significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability.
- H01 Treatment condition will not significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability.

CHAPTER II

LITERATURE REVIEW

This review considered a range of works that have contributed to the current state and discussion of the topics that informed this study. Scholastic works of theory and research that have been performed upon the construct alexithymia at the core of this work were reviewed as well as extant scholarship and literature that considered expressive writing therapy as a means by which alexithymia and emotional expressivity could significantly change. In addition, this section explored various works that sought to put the alexithymia construct into a context of attachment styles into adulthood. Particularly since this experiment took place with adult participants, it was necessary to consider the participants whom this work sought to explore, especially through the context of the constructs this study emphasized: the underlying therapeutic mechanisms of change, relevant dynamic theory upon which this work drew, attachment, social desirability (defensiveness), and emotional expressiveness.

Expressive Writing Intervention

Life events, especially unexpected life changes, can often be difficult to cope with, challenging, and frustrating. These changes can be the root cause of a multitude of emotional issues including alexithymia-related symptomatology, health problems, and, in general, what would be considered diverse personal dysfunctions (Pennebaker & Beall, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Currently, people who experience psychological and physical challenges can choose several ways to feel in control of the

situation and cope with their circumstances: meditation, psychotherapy, religious practices, etc. If issues persist, people often turn to other, more invasive interventions (i.e., medical interventions). In the realm of psychological intervention research, emotional expression and coping have been fundamental ways people who suffer from emotional challenges could feel better and cope with their reality, especially when these emotional challenges stemmed from experiential circumstances (Lepore, Fernandez-Berrocal, Ragan, & Ramos, 2012; Palmer & William, 2002; Stanton & Low, 2012).

According to DeSalvo (1999), people understand and are able to process their subjective experiences and form meaning of their inner psychological processes by telling their stories to others through written or oral means. However, recalling stressful events alone without recalling and examining one's emotional reactions to the event would not be as beneficial to the typical person. Hence, an examination of the event and the emotional response to the event was what made meaning-forming more likely and more fathomable to the participant (Baikie & Wilhelm, 2005; Suedfeld & Pennebaker, 1997). The key aspect of positive change could be attributed by many to the act of reappraising the events that caused the negative emotional experiences. Problem realization is just one step toward positive change followed by necessary perspective changes emotionally, cognitively, and behaviourally. How we tell our stories also plays an important role in this process of problem identification and the subsequent change in perspective that emerges in consciousness through self-regulation and self-adjustment; setting our stories in a coherent and structured manner raises our ability to change our subjective reality of events and their emotional impact on us (Lu & Stanton, 2010; Smyth, True, & Souto, 2001). This perspective, which was put to the test in a number of

studies, showed the more a person explained and talked about his/her experiences in a manner that created a meaning behind the events and the emotions this event elicited, the more the event lost its psychological impact on that person (Berkowitz & Troccoli, 1990; Schwarz, 1990; Wilson, 2002).

Expressive writing could be defined as a way for people to express their deeper thoughts and feelings about a situation or event without concern about grammar, syntax, punctuation, or any other writing convention (Baikie & Wilhelm, 2005; Gortner et al., 2006); it has been shown to be an effective and efficient way for someone to relieve his/her emotional upheavals. This method was primarily introduced by Pennebaker and Beall (1986) and was found to have various therapeutic effects on participants who used it for purposes ranging from emotional to physical and health ailments and challenges. The original version of this intervention urged participants to write for about 15 minutes each day for four days. Pennebaker and Beall focused more on the effects expressive writing had on health based on the works of Scheff (1979) who argued that talking about emotionally taxing events could provide relief and trigger positive change due to the cathartic effects of the act of talking about emotions itself and the somatic relief this act provided to participants in terms of their somatic experience (i.e., decreased somatic symptoms; Nichols, 1974).

This alternative to traditional psychotherapy dates back to Breuer and Freud (1895/1966) who suggested a fundamental link between cognition and emotion and subsequent responses to threatening experiences. During the last 30 years, several studies sought to examine this hypothesis with diverse people and conditions on both clinical and non-clinical populations. The literature suggested various benefits for issues in physical

and mental health (Frattaroli, 2006; Smyth, Nazarian, & Arigo, 2008). Specifically, a great number of subjects with diseases such as fibromyalgia, irritable bowel syndrome, myocardial infraction problems, somatic disorders, autoimmune functioning, high blood pressure, and asthma (Broderick, Junghaenel, & Schwartz, 2005; Halpert, Rybin, & Doros, 2010; McGuire, Greenberg, & Gevirtz, 2005; Pennebaker et al., 1988; Swanbon, Boyce, & Greenberg, 2008; Warner et al., 2005; Willmott, Harris, Gellaitry, Cooper, & Horne, 2011) were shown to have notable relief and a decrease in their symptomatology.

In non-clinical populations, mostly university and college students in the United States who did not suffer or were diagnosed with severe physical or mental health conditions, large numbers of studies have shown interventions based on expressive writing could help reduce depressive symptoms, increase certain cognitive skills and tasks (i.e., working memory), increase social adjustment (better reported relationship quality and increased feelings of isolation and loneliness), decrease anxiety and stress, improve general mood and well-being, and help people cope with grief after losing a loved one (Bhullar, Schutte, & Malouff, 2011; Danoff-Burg, Mosher, Seawell, & Agee, 2010; Deters & Mehl, 2012; Furnes & Dysvik, 2010; Lepore, Greenberg, Bruno, & Smyth, 2002; Lutgendorf & Antoni, 1999; Maestas & Rude, 2012; Rickwood & Bradford, 2012; Yogo & Fujihara, 2008). Expressive writing has also been shown to have positive effects on educational and work performance that might be due to an increase in social and intrapersonal intelligence (Frattaroli, Thomas, & Lyubomirsky, 2011; Lengelle, Meijers, Poell, & Post, 2013).

Another notable factor in expressive writing intervention studies was the intervention method employed a variety of diverse guidelines with participants.

Experimental groups were given a variety of writing prompts stemming from writing about the most traumatic event of their entire life (Pennebaker et al., 1988) to focusing and concentrating more on specific aspects of one's experience in the present, which was meant to emphasize more specific experiences such as bereavement or conflictual relationships (Frattaroli, 2006). Other studies focused on the psychological effects of writing about one's positive experiences (i.e., life satisfaction, relationship satisfaction, gratitude etc.) with positive results that showed an increase in subjective appreciation and enjoyment of everyday life and general well-being (Sheldon & Lyubomirsky, 2006).

Past and current research studies also explored the effect of the number of writing sessions (one session to five sessions), time allotted to each session (two minutes to 45 minutes each), and format of sessions (structured vs unstructured, same day or multiple days; Averill, Kasarskis, & Segerstrom, 2013; Baikie & Wilhelm, 2005; Burton & King, 2008; Gillis, Lumley, Mosley-Williams, Leisen, & Roehrs, 2006; Imrie & Troop, 2012; Pennebaker & Chung, 2011). Other differences between research articles dealt with the control group. Participants in the control group were instructed to write about a trivial topic (Klein & Boals, 2001) or complete questionnaires without writing at all (Toepfer & Walker, 2009); whereas in the present study, the control group was instructed to write in accordance to another expressive writing paradigm (active control). Finally, researchers explored the different effects location of the intervention had (i.e., on-campus lab vs home of participant) and found location did not predict success and was similarly effective (Frattaroli, 2006). However, some researchers claimed otherwise, which might have been due to type of diagnosis (i.e., posttraumatic stress disorder or anxiety disorders might benefit from safety of one's own home; Lange et al., 2000).

Given the fact that in expressive writing literature there are numerous different setups, locations, control group types, and outcome measures, the question remained unanswered concerning what exactly it was that created positive results in participants. Why did expressive writing work on so many people with diverse problems and backgrounds? Even though hundreds of studies showed positive results, there was no clear or unified theory of change and researchers did not know what it was that promoted the positive outcomes seen in research articles having to do with emotional or health benefits alike (Baikie & Wilhelm, 2005; Frattaroli, 2006; Nazarian & Smyth, 2013; Sloan & Marx, 2004).

A general and broad explanation according to Pennebaker and Beall (1986) was based on the Freudian theory of free association where previously forgotten memories of an event resurfaced, were reorganized and consciously processed through cognitive means, and thus were more meaningful and less traumatic or unpleasant for the subject in question. Other more modern theories that focused more on possible psychological mechanisms of change and emphasized mostly on different models of how the brain worked are presented below.

Mechanisms of Change

Among these models were a few that gained more attention in the literature: the inhibition model, the coherent story model, the habituation model, and the linguistic factor model (Baikie & Wilhelm, 2005; Frattaroli, 2006). According to the inhibition model, suppressed emotions could cause one's autonomic and central nervous system to be in a constant state of arousal. This state of perpetual arousal might result in a subject being in a chronic state of stress and all the unwanted effects this might bring: decreased

autoimmune function, increased blood pressure, and other physical symptoms. Emotional processing through disclosure as seen in expressive writing intervention studies, researchers observed positive changes in hypertension, immune function, and other physical health indicators as mentioned above, which were correlated with an increase in psychological well-being possibly due to a reduced inhibition workload (due to decreased mental effort) that promoted both physical and psychological health (Smyth, Nazarian et al., 2008).

Another approach endorsed by researchers as a potential underlying mechanism of positive change was that of a coherent story development framework. Based on this approach, individuals who expressed their stories in a meaningful and coherent way were promoting an internal psychological mechanism through cognitive processing of the events and the emotional impact those events had on their mind. They were starting to reflect on these experiences in a way that promoted a bigger picture type of thinking and might enhance their emotional perspective and cognitive understanding, thus promoting a different internal narrative (McFarlane, Weisaeth, & Bessel Van der Kolk, 1996; Pennebaker & Chung, 2011).

Another model was habituation--the repeated exposure of a subject to previously avoided emotions and cognitions about an event in a manner that made him/her feel safe and secure either with a therapist or, in this case, writing about one's experience in a safe place under non-threatening conditions—which might, according to behavioral principles, result in conciliation with the trauma or event and reduce avoidance behaviors that impacted mental and physical health in the long term, thus alleviating the emotional

impact of the past experiences (Konig, Eonta, Dyal, & Vrana, 2014; Sloan, Marx, & Epstein, 2005).

Finally, another theory of change was rooted in cognitive psychology—the linguistic factor. Based on this theory, cognitive processes employed in the mind by using language to explore and explain feelings and thoughts were proposed to have a significant effect on information processing that also resulted in more efficient emotional processing of an event. The intentionality and conscious effort put forth by the subject transformed previously difficult feelings into a narrative that made sense to him/her. This was a process that resulted, as some proposed, into translating inner psychological processes into actual words; considerable, positive physical and mental health outcomes were proposed to follow from that process (Campbell & Pennebaker, 2003; Chang, Huang, & Lin, 2012; Dunnack & Park, 2009; Jin, 2005; Seih, Lin, Huang, Peng, & Huang, 2008). For example, research showed that how a subject used language had a significant effect on physical and psychological outcomes. For example, Campbell and Pennebaker (2003) showed that even a change in how subjects were utilizing personal pronouns resulted in less doctor visits. Increased pronoun use by subjects promoted a change in perspective and facilitated better understanding of one's own situation in a subjective sense; several studies showed it was a significant marker of health outcomes (i.e., less doctor visits, increased well-being) and psychological adjustment (Dunnack & Park, 2009). The reason this happened was debated in the literature but the most prevalent theory had to do with the fact that perspective change and pronoun choice promoted a distinction between the individual and the event and decreased feelings of shame and guilt (Campbell & Pennebaker, 2003).

In addition to the above mechanisms of change based on theory, several psychological mechanisms were identified as change promoting in psychotherapy. In this review, mechanisms relevant to the current research were identified and presented. One of the most important mechanisms of change was promoting and enhancing insight. Through this process, a therapist tried to illuminate, clarify, and interpret the client's affect and behaviors. By doing so, clients could observe these intra-personal patterns of relational operations or dynamics; as a result, awareness was enhanced and new learning could occur (Magnavita, 2010). Expressive writing bypassed the therapist and used this principle by prompting self-reflection as a means for the client to develop the skills to do that without external intervention or interpretation but rather by inviting the writer to do it independently.

Another mechanism of change was the therapeutic relationship itself and the rapport building process. The client experience with a therapist who did not repeat the patient's past maladaptive relationships and created a new and better environment for the patient was believed to provide a corrective emotional experience (Vaillant, 1997). Whereas in the case of expressive writing, no therapist is present to build a relationship; writing about one's emotions in a way that enhances self-reflection (actively reflecting on one's own written words and focusing on the meaning of their feelings) allows for a heightened degree of self-awareness that compares with the benefits of verbal guided exploration in psychodynamic psychotherapies (Murray, 2018). Within these two mechanisms of change, it was hypothesized that personality change occurred in three ways: defensive restructuring, affective restructuring, and cognitive restructuring (Vaillant, 1997). Defensive restructuring refers to the process of breaking through the

defense mechanisms of the client to expose underlying feelings and experiences. This process helps clients turn against their own defenses, thereby making them ego-dystonic. The concepts of ego-syntonic and ego-dystonic traits of personality are of primary importance as is their interplay with adaptive and maladaptive behaviors.

According to Reich (1972), character is made up of drive-defense constellations based on childhood experiences and conflicts. Reich suggested that whether one had insight into one's condition or not, it separated a bearer of certain character traits with the individual with neurotic symptoms. Ego-syntonic and ego-dystonic traits differentiate if someone has a particular "symptom" or he/she possesses a particular character trait. For example, symptoms that are troubling for the patient are considered ego-dystonic; whereas character, which is ego-syntonic, troubles others more than oneself (Magnavita, 2010). If we consider an individual with a character who is inclined to sabotaging oneself, then this person might consider his/her behavior to be ego-dystonic. In psychotherapy literature, one's coping style when defending against inner and outer conflict is considered to be a factor in personality development as well as one's identification and interpersonal relations with significant others, especially parents and other care givers who are major contributors to the development of personality (Magnavita, 2010). Also, the way an individual constructs his/her own reality and what that reality denotes for him/her as a person is also of importance because individuals strive to find meaning and by doing so alleviate some of the psychological discomfort that stems from life situations.

By challenging defenses, the therapist might elicit feelings of anger that when interpreted could reveal past patterns of behavior being transferred to the present situation

(Magnavita, 2010). When affective restructuring is used, the therapist arouses the patient directly, bypassing any defense mechanisms by using experiential techniques meant to improve anxiety tolerance for the client. That could be done by the therapist pointing to a client's nonverbal behavior or recounting an emotional event in detail (Magnavita, 2010). In support of the benefits of expressing one's affect, a meta-analysis by Diener, Hilsenroth, and Weinberger (2007) found positive change and overall patient improvement was directly associated with a patient's affective expression. To continue with the third mechanism of change, cognitive restructuring refers to efforts aimed at promoting change by helping the client problem solve, enhance coping skills, and differentiate feelings.

Alexithymia

Prominent sources in the medical, mental health, and psychiatric community define alexithymia as a deficiency in the capacity to regulate affect. This personality construct is described as originating in early childhood and manifests in the individual's lack of capacity to develop a structure for regulating emotional intelligence and expression (Bagby et al., 1994; Taylor, Bagby, & Parker, 1999). There is a clear physical deficiency at work in the manifestation of this subclinical construct with alexithymia often dovetailing with "maladaptive styles of emotion regulation, low emotional intelligence, a bidirectional interhemispheric transfer deficit, and reduced REM density" (Taylor, 2000, p. 134).

People who presented with this condition were described in early and pivotal experimentation as having a "marked difficulty describing participative feelings" and presenting with "preoccupation with minute details of external events" (Taylor et al.,

1999, p. 28). In addition, these participants were found to have few drive-related fantasies, i.e., observed to not only have a difficulty in expressing their emotional states, and presented with a “flattened” affect but when surveyed were also found to have a distinct lack (or no) emotional thought as well. This was a deficiency not of just expression of emotional state but also of capacity and the literature bore this out.

Significantly, research with respect to the alexithymia construct argued that many individuals with alexithymia might exhibit symptoms paradoxically reflective of the appearance of strong emotion. As described by Nemiah, Freyberger, and Sifneos (1976) and Robbins (1989), people with alexithymia might exhibit repeated incidents of dysphoria or strong outbursts of anger, rage, or weeping (Adams & Sutker, 2007; Nemiah et al., 1976). However, simply because these participants showed actions that indicated emotion did not necessarily mean they did not also have the emotional intelligence deficiency—alexithymia. Instead, these emotional states indicated only an understanding of their own distress and no broader shades of emotional literacy. Because participants with alexithymia lack the capacity to understand their own feelings or to link them with memories or fantasies or fantasy, they might act in ways that reflect strong emotion but these are only upsetting. Because this is a disorder of capacity and regulation of emotion (alexithymia generally manifests as a flat affect), no lack of disorder is evident by episodes of strong emotion with which participants have no understanding or connection (Adams & Sutker, 2007).

Even when participants expressed feeling pain or discomfort at having this personality construct, they were shown to lack the capacity to express these feelings as such. Instead, as described by Taylor et al. (1999), when alexithymic participants

expressed feelings of anxiety, it was not through feeling-state words but rather through descriptions of “agitation, nervousness, restlessness, irritability, and tension”; similarly, depression was described as “boredom, pain, and emptiness” (p. 29). Through this consideration, a clear need for relief was expressed, yet sensations of pain (though they were felt) were to these participants relatively (or completely) difficult to express.

With respect to the capacity of the individual with this personality construct to maintain social functioning as alexithymia’s impact falls along a spectrum, some sources described the actions of a ‘functional’ alexithymic. The alexithymic tends toward social conformity and the avoidance of conflict, possesses a poor recollection of dreams, and has a stiff posture and a lack of facial expressions (Nemiah et al., 1976). The wide range of symptoms and indicators and contra-indicators of alexithymia have led to a strong focus on diagnostic means by which the presence of it could be obtained reliably. Current means of achieving this goal have centered on self-reported measures of participants’ capacity to express emotional feeling states.

Tests have been established that are able to ascertain with a high degree of reliability whether a patient presents with alexithymia. One such tool was developed by Bagby et al. (1994)—the Twenty-Item Toronto Alexithymia Scale. Scores on this survey tool were found to have strong internal consistency (Cronbach’s alpha = .81) as well as robust test-retest reliability (.77, $p < .01$) when used in both clinical and non-clinical adult populations.

Styles of Attachment

One need look no further than the works of Bowlby (1973) and Sameroff and Emde (1989) who expressed the view that the etiology of many mental disorders was

directly correlated with the interpersonal difficulties the child faced during crucial periods of its development. According to this position, the development of psychopathology was the result of disruptive and problematic relations during this sensitive period. However, the etiology of mental disorders was difficult to trace as the impaired interrelations of the child and adolescent with his/her significant others could be both the cause and the consequence of inappropriate behavioral interrelations.

Determining the relationship between mental disorders and interrelations could not be adequately resolved and was still under close scrutiny and debate. Nevertheless, it was certain interpersonal experiences were of great importance when it came to the development of pathological behavior (Sroufe, Duggal, Weinfield, & Carlson, 2000). Symptoms and complaints were embedded in personality functioning and for any psychological treatment to be optimal, factors related to personality needed to be taken into consideration. For the identification and causes of psychopathology, most theories included the evaluation of impairments in personality functioning, i.e., how an individual typically experienced himself or herself as well as others. Adaptive failures were also included in the criterion of an impaired sense of self-identity or failure to develop effective interpersonal functioning. This conceptualization fit well within the focus on interpersonal factors in this study as well as self-concept factors (i.e., attachment style and social desirability).

As described by Sperling and Berman (1994), attachment theory defines an independent system of behavior that motivates action in an individual. In infancy and childhood, individuals are spurred by this system to engage in relationship-forming behaviors that ensure survival. In adulthood, individuals who are deficient of early-

childhood attachment experiences (i.e., social experiences that occur in a “consistent fashion and in which the set goal is being regularly achieved”) often have difficulty in forming social attachments (Sperling & Berman, 1994, p. 7).

These styles were often self-explanatory; when identified by a diagnostic tool (such as the Experiences in Close Relationships-Revised [ECR-RS] Adult Attachment Questionnaire; Feeney, Noller, & Hanrahan, 1994), they were often cited as ‘secure’ (such as an individual who sought out the comfort of the parent when left alone but did not become upset) or shades of ‘insecure’ attachment such as (a) avoidant (characterized by “distress during separation” and (b) anxious/ambivalent (characterized by distress, but also by “rejection” during the “reunion period”; Sperling & Berman, 1994, p. 7).

When considering individuals who presented with alexithymia, Montebanocci, Codispoti, Baldaro, and Rossi (2004) found their participants most often expressed “discomfort with closeness” and viewed “relationships were secondary” to other considerations (p. 499). In addition, in correlating results from attachment style with alexithymia, these researchers found participants with alexithymia showed a greater than average need for approval and a lower than average degree of confidence. Montebanocci et al. suggested a correlation between alexithymia and a deficiency in participants’ capacity to show confidence in adult intimacy. Thus, by framing emotional illiteracy through a consideration of emotional outlook, a greater degree of accuracy in expressive writing task intervention choice (and their relative effectiveness) could be obtained.

As described by Lepore and Greenberg (2010), attachment is based upon two important characteristics: avoidance and anxiety. Individuals who showed high avoidance (maladaptive coping to an uncomfortable situation) as well as high anxiety

(feelings of tension, worry, or intrusive thoughts and other concerns, especially in social situations) were fearful-avoidant, whereas those who not only confronted problems and were comfortable socially were defined as secure with respect to their attachment to others. This mechanism operated along a spectrum between secure and anxious-avoidant. Research showed the tendency toward the different type of attachment shown by the individual played a strong role in his/her capacity to react to different interventions in a reliable manner (Oskis et al., 2013).

According to Lepore and Greenberg (2010), participants who presented with a high degree of avoidance (after suffering an emotional loss) were shown to be more receptive to expressive writing interventions than participants who were tasked with completing neutral writing tasks (i.e., asking participants about what they had for dinner last night). In addition, as described by Mikulincer and Shaver (2010), participants who presented with alexithymia showed greater instances of the symptoms of that subclinical construct, an inability to process or recall emotion, and even the inability to remember dreams while also exhibiting avoidant attachment styles as opposed to secure.

Based on these considerations, it could be argued that attachment style represents another means by which participants could be identified who might be receptive to expressive writing tasks as a means of mitigating the symptoms of this construct's presentation.

Social Desirability

By contrast, defensiveness was defined by Weiner (2003) as a greater tendency to show a greater affective sensibility (or sensitivity) to criticism or perhaps deny criticism or other other-directed comments and statements that might come across as critical. In

addition, this concept, when it was exhibited by a given participant, might stand to thoroughly impede his/her capacity to be receptive and responsive to a given course of psychological treatment no matter how sorely it might be needed (Weiner, 2003). As defensiveness might present in the course of the evaluation that preceded psychological treatment, it was often necessary for mental health professionals to find a means by which this trait might be minimized to ensure participants were able to better understand the problems and lack of emotional capacity by which they were impeded from daily functioning (Baikie, 2008). Several studies considered the capability of expressive writing exercises to mitigate defensiveness in a given client. In a study of 88 university students, Baikie (2008) found expressive writing was of greater benefit to alexithymics, who often presented with a defensive posture or tendencies, than other participants.

Further, Esterling, L'Abate, Murray, and Pennebaker (1999) found considerable benefit associated with the conceptual use of any form of self-expression (not necessarily expressive writing but this was found to be of use) in the mitigation of the symptoms of mental disorder, which were often exacerbated by defensive affect. Taylor and Bagby (2004) also highlighted the increased usefulness of expressive exercises, particularly writing, with regard to the ways in which participants could be induced to become more aware of their emotional expressiveness deficits.

These studies showed a factor that often served to sorely impede the progress of alexithymic participants and in general those who lacked emotional literacy skills was a tendency among these patients to be unaware or unwilling to confront the reality of their situation or their emotional state. Often, it was only by creating exercises of experimental design and not traditional measurement-based validation methodologies that

these participants might be induced to become more aware of their emotional states including that of defensiveness.

Past research (Baikie, 2008; Esterling et al., 1999) showed significant promise for any expressive writing exercise that served to mitigate social desirability. Whereas this study did not focus on mitigating social desirability, the information (data) obtained by in terms of social desirability attempted to control for this factor. Thus, results could provide significant insights with regard to the workings of defensiveness on participants' capacity to benefit or not from the interventions in terms of decreasing alexithymia level and emotional expressivity. In addition, significant research has shown promise with respect to the capacity of expressive writing, particularly research focused on alexithymic emotional deficiencies, to mitigate symptomatology of this complex mental disorder structure.

Expressive Writing

A wide range of evidence indicated expressive writing could assist patients with disorders of affect and expression (Frattaroli, 2006). However, at present, the majority of the research indicated the use of expressive writing—writing about deepest thoughts and feelings or writing in a highly personal manner regarding some emotional event—was of best therapeutic use for patients with anxiety and depression or who had suffered trauma (Krpan et al., 2013, p. 1148). This intervention was often prized for its capacity for assisting patients in being able to make greater changes on their own and thereby could be cited as a more efficient means of inducing longer-lasting mental health benefits with fewer interventions.

There was some significant basis for confidence in the use of expressive writing therapy for instances of alexithymia. As described by Pennebaker (1997), patients who presented with symptoms of trauma found strong aid from an expressive writing exercise in order to label their emotions. Pennebaker argued trauma survivors were often ‘locked off’ from emotions necessary to achieve closure and acceptance, a state of affairs that appeared to mirror the outright emotional illiteracy expressed by patients with alexithymia. To this end, through exercises during which participants were required to “identify, label, and understand” their experiences, participants of trauma were able to frame their experiences in a manner that allowed them to come closer to acceptance (Pennebaker, 1997, p. 1).

Other benefits of expressive writing for trauma that could be extrapolated to show promise for the treatment of alexithymics were described by Baikie and Wilhelm (2005). The paradigm of expressive writing is often the key to its benefit as it challenges participants to write about “traumatic, stressful, or emotional events,” often for 15 to 20 minutes per session, and on three to five occasions before the conclusion of the therapy (Baikie & Wilhelm, 2005, p. 338). These authors reported significantly improved physical and psychological outcomes for participants who wrote on such topics as opposed to those tasked with writing on neutral topics. The beneficial nature of expressive writing for all mental disorders was cited by these authors and others so it might be argued that alexithymia was no exception (Baikie & Wilhelm, 2005; Krpan et al., 2013; Lepore & Smyth, 2002).

In particular and as described by Lepore and Smyth (2002), expressive writing of this standard variety showed considerable promise in assisting patients in improving their

social role functioning, which was often a key deficiency expressed in those with alexithymia. However, the key difference in major trauma survivors' inhibitions with respect to emotional expression and alexithymic patients' inability to do so indicated this might not have the exact same benefits for alexithymic patients. Other means by which expressive writing exercises were shown to be of benefit to those with affective expression and regulation challenges centered around participants' capacity for imagination and compartmentalization. Through expressive writing exercises, an individual was forced to name an object or idea; doing so would "legitimize" that idea in a conscious and focused manner (Moran, 2004, p. 97). In so doing, a process of objectification took place through which the individual effectively built a contextual tool to aid in the processing of a concept otherwise foreign or inaccessible. The uniquely human capacity for narrative-building was thus invoked as a means of finding a sense of coherence and meaning in an emotional concept not otherwise possible.

Limitations/Delimitations

A key delimitation for this study was the concept of the difference between early-childhood manifestation of affective disorders and the short-term (and treatable) symptoms of affect disorder linked to trauma and other situational factors. Because existing studies on trauma in particular focused on 'triage' mental health principles, there was a key difference between treatment plans for and methodologies focused on the elimination of symptoms of affective disorders that manifested as a result of trauma and those, such as alexithymia, that were largely present throughout the subjects' entire lives. However, previous research suggested alexithymia has distinct types and etiologies. Alexithymia is considered a disorder with a set of symptoms that have surfaced because

of early development and genetic predisposition and another type of alexithymia expressed due to traumatic events (Lumley, 2004); these subtypes were hypothesized as being distinct from one another.

To this end, it was crucial to consider the connections present between alexithymia and disorders that were long-term if not lifelong diagnoses. For example, the work of Light, Roberts, Dimarco, and Greiner (1998) showed “augmentative and alternative communication,” e.g., expressive writing, showed promise as a means of “enhancing comprehension and expression of people with autism” (p. 153). Other works (Campbell, 2003) since then have showed neurocognitive disorders such as autism could be effectively treated by using other means of expression as an effective tool for expression but also in ‘training’ the more effective use of emotions.

This study had several delimitations. The existence of potential concurrent disorders could potentially have had an uncontrolled effect on the results of this study and also to those who presented with alexithymia the distinction between subtypes (developmental and genetics versus trauma) and their potential effect on the outcome could potentially have been an uncontrolled factor. Also, due to the online nature of the study, the authenticity of participant responses could not be verified.

Discussion

There has been no consensus among researchers about whether emotional disclosure interventions such as expressive writing are beneficial to one’s psychological functioning. Some studies have shown that whether someone benefits from such interventions has to do with individual differences and socio-cultural differences with regard to emotional openness. However, in studies conducted by Lu and Stanton (2010)

and Stanton et al. (2002), people who exhibited alexithymic traits (such as ambivalence or avoidance to express their emotions) benefited most from the intervention, a finding that supported the idea behind the present study. Others (Engebretson, Matthews, & Scheier, 1989; Stanton, Kirk, Cameron, & Danoff-Burg, 2000) found the opposite trend, namely that people who were naturally emotionally expressive benefited more from expressive writing interventions. This study aimed at contributing to the literature of expressive writing, alexithymia, and emotional expressivity; how relatively fixed traits such as attachment style and defensiveness contributed to the effectiveness of emotional expression interventions; and what future researchers could do to improve its effectiveness.

This work anticipated significant results in terms of the impact of the modified expressive writing exercise on the ability of those with alexithymia to express emotions compared to the traditional paradigm. The key goal for the direction of this study was to focus on building skills by learning a step-wise method of analyzing events and emotions, like the one provided to the modified expressive writing group of expressing and investigating one's affective state for long-term use. There were clear social, health, and economic benefits for the ability to process emotions and to operate at a normative level in social interaction. Due to the nature of alexithymia, subjects' inability to obtain significant gains from traditional psychotherapy (Sifneos, 1973) and the long-term lack of effective treatment, those with alexithymia suffer economically, socially, and physically by their day-to-day reality under this little-known condition. In the view of this work, there was promise in any tool that served to assist in the forming of skills and could aid in the construction of an inner emotional narrative; this research endeavor hoped to develop

such a tool or begin a conversation that would lead to better and more efficient ways to moderate alexithymia.

In addition, defensiveness was considered, especially as it was often a causal or highly-related factor in the consideration of alexithymia symptomology. As described by Myers (1995), those who scored low on an alexithymia inventory, thereby showing high degrees of alexithymia symptoms, were expressing “defensiveness and anxiety,” traits far more causally indicative of their alexithymia than mere “trait anxiety” such as worry, tension, or stress (p. 489). The idea of defensiveness was also studied by Langens (2005) who found participants who scored high in fear of social rejection benefited most from the expressive writing intervention by writing about upsetting events. This could be explained by the notion that individuals low in emotional expressiveness had a greater need for a platform to practice their emotional literacy and to express themselves. Considering this idea, it was beneficial to test for defensiveness and emotional expressiveness in addition to attachment style prior to the expressive writing exercises.

To this end, four inventories were used at the start of this study. The first was the TAS-20 to test for alexithymia (Bagby et al., 1994). Following its administration, the Marlowe-Crowne social-desirability questionnaire (Beretvas et al., 2002) was used to measure subjects’ defensiveness as well as a standard scale of emotional expressiveness (see the Berkeley Expressivity Questionnaire; Gross & John, 1997) and attachment style (see The Experiences in Close Relationships-Revised short form [ECR-RS] Adult Attachment Questionnaire; Wei et al., 2007).

This work was considered in the context of a college-aged population as a means of ‘grounding’ the findings and conclusions to follow. As revealed by the latest

Association for University and College Counseling Center Director's survey (cited in Earle, 2018) of counseling center directors, the clear majority of college counseling directors (95%) reported mental health as a growing problem for university communities and the number of students with severe psychological issues has risen dramatically since last year (reported by 70% of directors). The survey also found students suffered from anxiety (41.6%), depression (36.4%), and relationship problems (35.8%). One quarter of students were on some kind of psychotropic medication and, overall, students with mild, moderate, and severe mental health diagnosis constituted the majority (61%) of the population. College-aged adults showed a far higher rate of mental illness than members of the general population with one student in three reporting prolonged periods of depression and having issues with school-work due to issues of mental health (Earle, 2018). For this reason, this study collected data from those in the college-aged population who presented with such emotional issues. As this population is at so much greater a risk for the psychological and physical ramifications of mental health, the need to create a tool for the specific population was of great importance.

CHAPTER III

METHODOLOGY

In this chapter, the processes that informed the execution of the data collection are considered, which then informed the results. The first section elaborates on the research design, the characteristics as well as the number and method of recruiting participants, and the testing platform used for this study. The second section provides information concerning the instrumentation used in the study, validity and reliability data gleaned from the literature, and a preliminary pilot study conducted. The third section describes the setting of the study as well as a description of the treatment groups and intervention procedures. Ethical issues protection of participants and data analysis procedures conclude this chapter.

Research Design

The research design for this study was a true experimental research design (see Figure 1). True experimental research focuses on examining possible cause-and-effect relationships by exposing the experimental group to treatment conditions and comparing the results to the control group that did not receive the treatment (Leedy & Ormrod, 2013). Random assignment to groups was imperative to establish equivalence of groups.

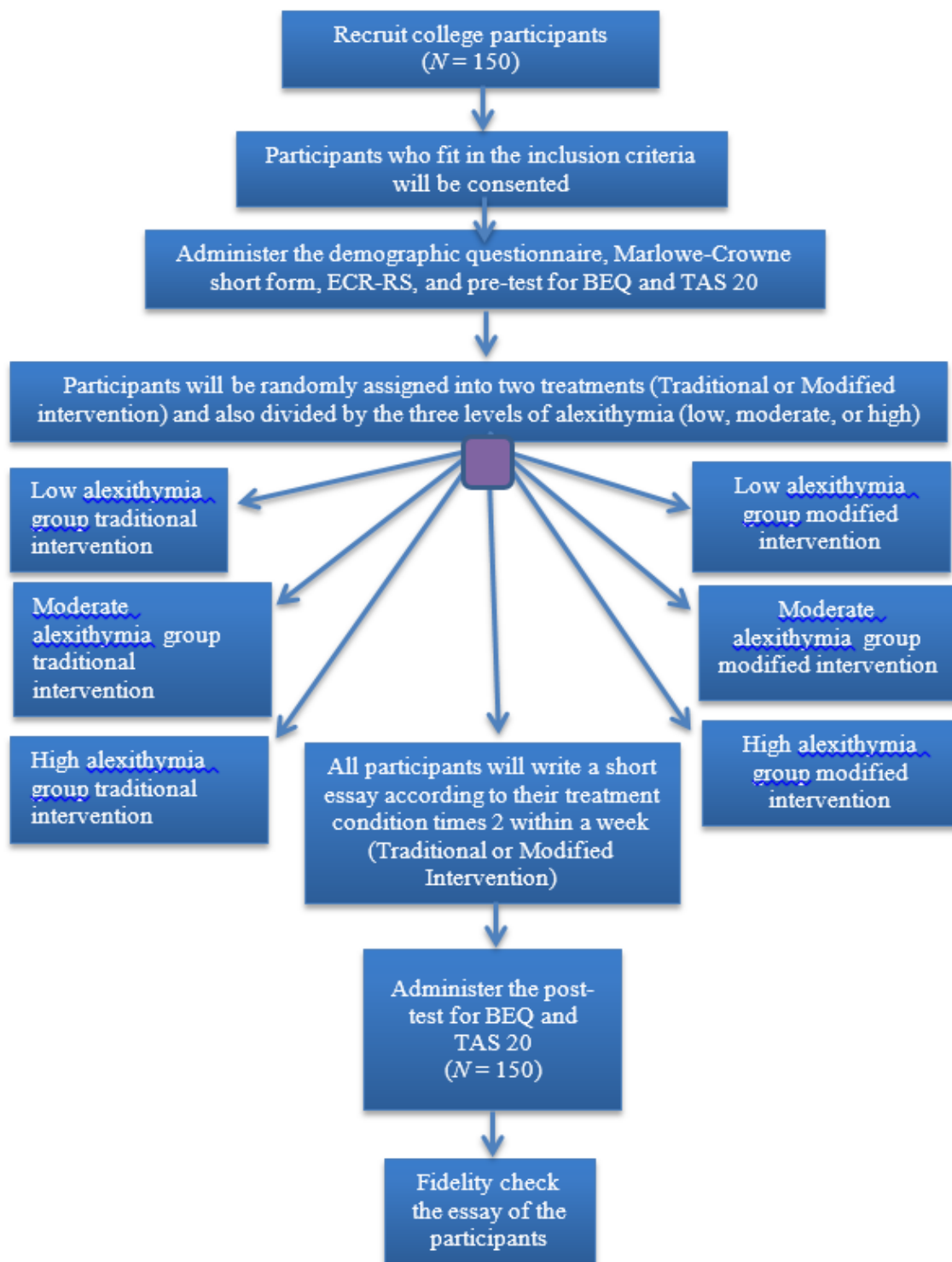


Figure 1. Flowchart of experimental process.

Also, this experimental research involved the use of a repeated measures design to obtain both pretest and posttest measures of levels of alexithymia and emotional expressivity of college participants. This was essential to determine the possible impact of the treatment to compare the before and after scores of the participants pretest and posttest undergoing the two different expressive writing prompts. Thus, the two groups (modified and traditional intervention) were asked to undergo the same surveys on two separate occasions. Repeated measures designs are popular because they allow a subject to serve as their own control (Klugh, 2013). For this study, two repeated measures were utilized during the pretest and posttest periods. Other advantages of a repeated measures design are it creates more statistical power, it controls for factors that cause variability between subjects (Faul, Erdfelder, Buchner, & Lang, 2009), and it requires fewer subjects to reach the necessary statistical power to detect a desired effect size (Remler & Van Ryzin, 2014). In this study, sample size reductions were possible because each participant was assigned into two different treatments.

This study used a quantitative methodology to investigate the possible impact of using different expressive writing prompts on the levels of alexithymia and emotional expressivity of college participants. The research design for this study had two purposes: (a) to guide the collection, interpretation, and analysis of the data and to provide an outline for reaching the desired objectives of the research (Zikmund, Babin, Carr, & Griffin, 2010); and (b) to explore the relationship between variables using statistical analyses (Szijarto, 2014). Surveys provided the numerical data using an outline process.

In the course of this study, two groups of college-aged participants were provided with different expressive writing prompts. In particular, the first group (the active control

group) received the traditional Pennebaker and Beall (1986) expressive writing prompt and the second group (the experimental group) received a modified expressive writing prompt produced for this work. Because participants received an online means of carrying out the data-provision process, participants were free to commit to the completion of the study and the data collection at their leisure. The study was conducted over the Internet using a Qualtrics online survey to complete the four different survey questionnaires and expressive writing task. Participants were solicited through the Qualtrics research panel where participants are paid to partake in research studies, social media, and the University of Northern Colorado (UNC) research pool. A link to the Qualtrics website was provided where they gained access to the online platform.

Before data collection, Institutional Review Board (IRB) approval was obtained in order to gain permission from the university to conduct the study. Once IRB was received (see Appendix A), a link was sent to potentially interested participants with a brief description of the study asking people to participate by giving their consent (see Appendix B). All the participants were asked to complete the informed consent form, which was conducted electronically through Qualtrics wherein the participant would click the yes option after they read the consent form provided in the online survey link. Then, the survey process commenced. As stated, the participants could access the different survey questionnaire online using the Qualtrics online survey. The survey link of the Qualtrics was provided in the invitation email; the link directed the participants to the Qualtrics platform where they were asked to fill out demographic information.

Four different survey questionnaires were used to measure the study variables: the Marlowe-Crowne Social Desirability Scale (short form; see Appendix C) and the

Experiences in Close Relationships-Revised short form (ECR-RS) Adult Attachment Questionnaire (see Appendix D) to measure the covariates of social desirability and attachment style, respectively; the Berkeley Expressivity Questionnaire (BEQ; see Appendix E); and the Toronto Alexithymia Scale (TAS 20; see Appendix F) to measure the two dependent variables of emotional expressivity and levels of alexithymia, respectively, before the writing tasks were given. This obtained pretest scores for emotional expressivity and levels of alexithymia. These two dependent variables were the only ones expected to change based on theory. Social desirability and attachment style are covariates or fixed factors that were not expected to change but might have acted as moderators for the other factors, namely alexithymia and emotional expressiveness. In the case of the pilot study, participants took approximately one hour to complete all the survey questionnaires and wrote their essay.

The participants underwent the writing task by writing a short essay according to the treatment condition to which they were assigned. The participants were randomly sampled and then assigned to the groupings of the two treatments of traditional and modified expressive writing. First, the levels of alexithymia were determined based on the pretest scores of the TAS 20. The college participants were divided into six groups: (a) low alexithymia/traditional invention, (b) moderate alexithymia/traditional invention, (c) high alexithymia/traditional invention, (d) low alexithymia/modified invention, (e) moderate alexithymia/ modified invention, and (f) high alexithymia/ modified invention. Those in the experimental group underwent the modified expressive writing prompt and those in the active control group underwent the traditional) expressive writing prompt by Pennebaker and Beall (1986). The details of the two treatments are further discussed in

the next paragraph. It should be noted that each of the participants underwent two sessions of their respective assigned treatment (modified and traditional intervention) in a span of a week. Table 1 presents a summary of the research design and data collection.

Table 1

Summary of Research Design and Data Collection

Step	Task
Step 1	Make Qualtrics link available to potential participants via Qualtrics research panel, social media (i.e., Facebook), and the University of Northern Colorado (UNC) school of psychological research pool.
Step 2	Undergo the process of informed consent. Administer the surveys and demographic information (i.e., TAS-20 screener, demographic questionnaire, Marlowe-Crowne Social Desirability Scale (short form), ECR-RS, and BEQ).
Step 3	Categorize the participants by the three levels of alexithymia (low, moderate, high) based on the pretest score for TAS 20 as described below.
Step 4	Randomly assign the participants into the two treatment groupings of treatments of traditional and modified expressive writing and divide to six participant groups: (a) low alexithymia/traditional invention, (b) moderate alexithymia/traditional invention, (c) high alexithymia/traditional invention, (d) low alexithymia/modified invention, (e) moderate alexithymia/ modified invention, and (f) high alexithymia/modified invention.
Step 5	Contact potential participants via e-mail and include appropriate online link to Qualtrics, based on treatment condition and TAS-20 screener.
Step 6	Email participants a reminder to undergo the first writing task using the treatment assignment (modified versus traditional).
Step 7	Email participants a reminder to undergo the second writing task session
Step 8	Administer the posttest for BEQ and TAS 20 after the end of the week and following the expressive writing sessions. Export survey responses from Qualtrics.
Step 9	Conduct fidelity check for essays and exclude essays and participants that are below second grade level writing.

Participants

Initially, during this study, two groups of college participants (in the treatment of traditional and modified intervention) were solicited and inclusion/exclusion criteria were applied. Additionally, the college participants were divided into three groupings based on TAS-20 pretest scores: low (< 51), moderate (51-61), and high (> 61) alexithymia. In total, there were six groups of college participants by randomly assigning those various degrees of alexithymia into the two groups of the treatment of traditional and modified intervention. The process for participant selection was considered as well as other procedures that informed the execution of the experimental condition. The participants were randomly divided into the following six groups: (a) low alexithymia/traditional invention, (b) moderate alexithymia/traditional invention, (c) high alexithymia/traditional invention, (d) low alexithymia/modified invention, (e) moderate alexithymia/ modified invention, and (f) high alexithymia/ modified invention. All of the college-aged participants were informed of the data collection provisions prior to their participation in order to maintain an ethically-sound means of collecting data.

Participants were recruited through UNC's psychology research pool, social media, as well as the Qualtrics research panel. An invitation was sent to potential participants in the form of a brief description of the project and a link that directed them to the Qualtrics website. Participants were 18 years of age or older, English speaking, residents of the United States, and currently enrolled in an undergraduate or graduate program. In addition, another inclusion criterion was the participant must have reported having experienced a significant emotional event in their life he/she believed had a significant effect on their lives and were willing to write about it. Participants who

reported having learning disorders in reading and writing were excluded from consideration and participation. Another exclusion criterion involved the process of correct language sequencer for fidelity check; participants' essays with below second grade level in the Flesch-Kincaid were excluded from the study. Participants' essays were copied and pasted in a Word document and assessed based on their grade level of written text. This was done before the data analysis stage to decide if participants' survey results would be included in the dataset or would be excluded from the study. Those with below the cut-off point of second grade level might not take the writing process seriously and posed a threat to internal validity. The Flesch-Kincaid grade level was computed based on the Microsoft Word feature of readability statistics. The formula was $(0.39 \times \text{ASL}) + (11.8 \times \text{ASW}) - 15.59$, where ASL was the average sentence length computed by the number of words divided by the number of sentences and ASW equaled the average number of syllables per word computed by the number of syllables divided by the number of words. The Flesch-Kincaid accessed the participants' essays and evaluated whether or not they actually wrote text that made sense. The cut off was an essay that was at least second grade level.

The required number of participants (i.e., the sample size) for this study was determined through a power analysis using G*Power software (Faul et al., 2009). The sample size computation was based on the following factors: Cohen's effect size, the level of significance, and the statistical power or the probability of rejecting a false null hypothesis. It should be noted that self-reported changes in alexithymia were estimated to be medium in the pilot study conducted for this research (see Summary of Pilot study). Previous research studies have also estimated medium effect size for expressive writing

interventions; however, effect size significantly varied among research studies for expressive writing interventions (Frattaroli, 2006; Smyth, 1998).

The statistical test used for this study was a MANCOVA. However, there was no option for MANCOVA for statistical test in G*Power for the computation of sample size (see Figure 2). Instead, the option of an ANCOVA, which was the closest test to MANCOVA, was used in the sample size computation. Thus, an *a priori* power analysis was conducted with the following factors: (a) statistical test of ANCOVA: fixed effects, main effects and interactions; (b) statistical power of 0.80, which is normally used in quantitative studies (Faul et al., 2009); (c) medium effect size coefficient of 0.25 for an ANCOVA; (d) level of significance of 0.051 (e) one number of degrees of freedom ($df =$ number of levels of independent variables of 2 - 1); and (f) number of groups (six—low, moderate, and high alexithymia and then randomly assigned them into two groups for each category of independent variable of treatment of traditional and modified intervention) and two covariates (attachment style and social desirability). This *a priori* power analysis yielded a recommended minimum sample size of 128 participants. This meant the study sample should be comprised of at least 128 individuals who were currently enrolled in an undergraduate or graduate program that fit in the inclusion criteria of the study as the minimum to achieve the required statistical power for a quantitative study of 80% using a MANCOVA.

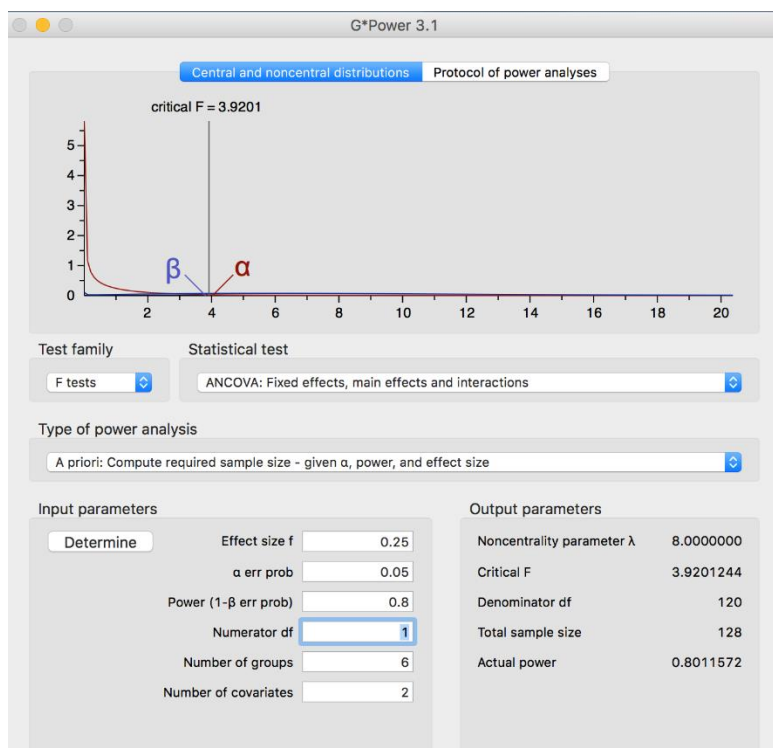


Figure 2. Results of G*power sample size computation.

This study managed to recruit 150 participants; there were 25 participants in each of six groupings (mild, moderate and high alexithymia times two (traditional vs modified), which made it 75 participants in each of the two conditions. Pretest data were collected based on TAS-20 scores as described above and random assignment to the two treatment conditions followed. Random sampling was used in this research study. Random sampling for this study was appropriate because participants had an equal probability of being selected to participate in the study (Pierzchlewski & Arildsen, 2016). The use of a random sampling approach ensured the sample yielded data that were representative of the population of interest and an adequate amount of data was collected to ensure the statistical analysis methods would be valid (Lusinchi, 2017). There was an equal chance of recruiting college participants who had different levels of alexithymia

and could be equally distributed in the two different treatments of traditional versus modified intervention. To create a random sample, the following steps were followed. The first step was defining the population, which were college participants who must have reported having experienced a significant emotional event in their life that they believed had had a significant effect on their lives. The second step was to screen participants for alexithymia level and have Quattrics software randomly assign participants to treatment conditions. The random assignment followed the order of the six groupings: (a) low alexithymia/traditional intervention, (b) moderate alexithymia/traditional intervention, (c) high alexithymia/traditional intervention, (d) low alexithymia/modified intervention, (e) moderate alexithymia/modified intervention, and (f) high alexithymia/modified intervention. The screening process stopped when each of the groupings had at least 25 assigned college participants.

Ethical Issues and Protection of Participants

The effect of expressive writing has been studied in a substantial body of research. Some studies reported the participants might feel upset for one or two hours after completion of an expressive writing task. Other studies, specifically with regard to alexithymia, reported participants might experience some form of discomfort due to rumination of the negative experience they wrote about during the expressive writing task. It was anticipated a few of the participants recruited for this study would be aware of the emotional impact that might result from their participation. Thus, this potential emotional “fallout” was considered to be a factor of the researcher’s responsibility to help mitigate. As a result, each participant was provided with information regarding student mental health services available to each student. Since this study was conducted over the

Internet, the participants were provided with various mental health resources at both state and national levels.

Participants provided consent (see Appendix B) for their research participation through the online platform (Qualtrics) where the study took place by pressing yes or no after they read the consent form information provided to them. Also, after completion of the experiment, they were informed they should only press the Submit button if they felt comfortable sharing their data in the study. Participation was expected to take approximately one hour including completing the instruments and the intervention itself. Obviously, participants could withdraw at any time from the study by just closing their web browser. Participants were also offered a \$12 gift card if they chose to participate in this study and completed it in its entirety.

Participant confidentiality could not be guaranteed due to the online nature of the data collection but all necessary measures were applied as discussed in the following paragraph. Other benefits drawn from the expressive writing literature included both physical (less frequent visits to health centers) and psychological (i.e., meaning-making of traumatic experiences, lower levels of depression, and less anxiety at follow up to name a few).

To maximize confidentiality, participants' collected data were stored in a password protected computer and will be disposed of three years after the end of this research study. To further maximize confidentiality, all data were presented in aggregate form. There were short and potentially long-term increases in participant well-being in both groups as seen in other expressive writing research studies.

Measures

Variables identified in this study included alexithymia, emotional expressivity, attachment style, and social desirability, all of which were measured to identify potential effects each construct had on the other. These qualities were determined by different questionnaires that were strong in precedent and rigor, particularly the TAS-20 (for alexithymia; Bagby et al., 1994), Berkeley Expressivity Questionnaire (for measures of emotional expressivity; Gross & John, 1998), the Experiences in Close Relationships-Revised short form (ECR-RS; for attachment style), and the Marlowe-Crowne Social Desirability Scale (for defensiveness; Beretvas et al., 2002). The measures are described following a summary of this dissertation's pilot study.

Summary of Pilot Study Results

A total of 18 participants took part in a pilot study but only eight finished both the pre- and post-sessions. In terms of feedback questions relating to the quality of the modified expressive writing prompt, participants found the prompt was clear, it addressed most of the important emotional aspects of the experience they wrote about, and they found this way of exploring their emotional experience was helpful in sorting out their feelings (see Appendix H for more information).

In this study's pilot study, preliminary evidence to support the theory of providing a more structured and guided format of written expression to individuals was observed. Other important considerations gauged from the pilot included the good reliability coefficients for the two control variables (attachment and social desirability) for which the short forms were used, thus saving time for participants. The reliability statistics are reported below.

Internal reliability of the pretest and posttest administrations of the TAS-20 were assessed using Cronbach's alpha (TAS-20 pretest $\alpha = .895$, TAS-20 posttest $\alpha = .915$). The alexithymia scale consisted of three factors: difficulty identifying feelings (pretest score $\alpha = .909$, posttest score $\alpha = .967$), difficulty describing feelings (pretest score $\alpha = .673$, posttest score $\alpha = .861$), and externally-oriented thinking (pretest score $\alpha = .701$, posttest score $\alpha = .286$). For emotional expressivity, internal reliability was assessed as follows: BEQ overall pretest score $\alpha = .869$, posttest score $\alpha = .798$). The three facets or dimensions of expressivity and the corresponding internal reliability statistics were as follows: negative expressivity (pretest score $\alpha = .656$, posttest score $\alpha = .210$), positive expressivity (pretest score $\alpha = .852$, posttest score $\alpha = .833$), and impulse strength (pretest score $\alpha = .776$, posttest score $\alpha = .765$). There was no noticeable increase in reliability in the negative expressivity facet posttest Cronbach's alpha even when items were deleted. This might be the result of different factors including sample idiosyncrasies. Internal reliability of the two control variables was also assessed using Cronbach's alpha. The construct of attachment in the pilot study conducted for this research was administered once and was used as a control variable. This measure was found to have a Cronbach's alpha of .855. The Marlowe-Crowne Social Desirability Scale (short form) was utilized to control for defensive responding and the reliability analysis showed a Cronbach's alpha of .815.

To address the pilot study's research question regarding the amount of variability explained in the dependent variables (i.e., alexithymia and emotional expressivity) by treatment condition (i.e., traditional vs modified) while controlling for attachment style and social desirability, a three-stage hierarchical multiple regression was conducted—

first for alexithymia and then for emotional expressivity (DV). In the first model, social desirability was entered at stage one of the regression to control for socially desirable responding. At stage two, the attachment variable was entered to control for attachment style (anxious/avoidant) and the dummy coded treatment variable was entered at stage three (modified/traditional expressive writing group). However, this model did not yield significant results. Social desirability did not contribute significantly to the regression model, $F = 0.99$, $p = .763$, and accounted for 1.6% of the variation in alexithymia. For this reason, a two-step model was tested instead. In this model, the attachment variable was entered first to control for attachment style and then the binary treatment variable was entered in the second step. The hierarchical regression revealed that at stage one, attachment did not yield statistically significant results, $F = 5.622$, $p = .055$, and accounted for 48.4% of the variation in alexithymia, which given its size was not statistically significant due to sample size. Introducing the treatment variable explained an additional 29.8% of variation in alexithymia above and beyond attachment; the R^2 change was statistically significant at an alpha level of .05, $F = 6.807$, $p = .048$. Together, attachment and treatment condition explained 78.1% of the variation in alexithymia.

Then a three-stage hierarchical multiple regression was conducted for emotional expressivity. Social desirability was entered at stage one of the regression to control for socially desirable responses. Then at stage two, the attachment variable was entered to control for attachment style (anxious/avoidant) and the dummy coded treatment variable was entered at stage three (modified/traditional expressive writing group). However, this model did not yield significant results. Social desirability did not contribute significantly

to the regression model, $F(0.20)$, $p = .892$), and accounted for 0.3% of the variation in emotional expressivity. For this reason, a two-step model was tested instead.

In this model, the attachment variable was entered first to control for attachment style and then the binary condition variable was entered in the second step. The hierarchical regression revealed that at stage one, attachment did not yield statistically significant results, $F(0.271)$, $p = .621$, and accounted for just 4.3% of the variation in emotional expressivity. Introducing the treatment variable explained an additional 22.2%, which was a large effect size of variation above and beyond attachment in emotional expressivity. The R^2 change was not statistically significant at an alpha level of .05, $F(1.514)$, $p = .273$. Because of the non-significant results for the global emotional expressivity score, the three facets of emotional expressivity were tested instead (negative expressivity, positive expressivity, and impulse strength). Significance was found only for the negative emotional expressivity facet (BEQ-nex) as a dependent variable, yielding significant results for the model (attachment and treatment condition). Only the second step (treatment condition) yielded significant results, $F(7.112)$, $p = 0.045$ and accounted for 58.6% of the variation in BEQ-nex; whereas attachment accounted for just 0.2% of the variation in negative emotional expressivity, $F(0.14)$, $p = .909$.

Toronto Alexithymia Scale-20

The TAS-20 is a 20-item scale that measures the dependent variable of levels of alexithymia (Bagby et al., 1994). In each of the question items for the TAS-20 (Bagby et al., 1994), participants were asked to read each of the statements provided and indicate how much they agreed or disagreed on a Likert-type scale where 1 was *strongly disagree* and 5 was *strongly agree*. Questions 4, 5, 10, 18, and 19 were reverse coded (see

Appendix F). Although alexithymia is a dimensional construct, TAS-20 scores were best analyzed as a continuous variable. No more than two or three answers should be missing as Qualtrics will automatically exclude participants who do not answer three or more survey questions; the scale provided three subscale scores for the three dimensions of the alexithymia construct: difficulty identifying feelings (seven items), difficulty describing feelings (five items), and externally-oriented thinking (eight items). Also, an overall score was obtained by adding the participants' responses (after reversing the scores as indicated above) to the items treated as a continuous variable and used in this study to indicate whether the treatment had any effect on the general construct of alexithymia. The following empirically derived cutoff scores in the total score were used for identifying individuals with low, moderate, and high alexithymia: (a) scored less than (<) 51 = low alexithymia, (b) score range of 52-60 = moderate alexithymia, and (c) scored greater than (>) 61 = high alexithymia. Subsequent analyses based on the three factors or dimensions of alexithymia were not be explored in this study if an overall effect was observed.

Previous research supported the validity and reliability of this instrument. Bagby et al. (1994) found the TAS-20 demonstrated good internal consistency ($\alpha = .81$) and test-retest reliability ($.77, p < .01$). The validity of this instrument was also shown to have acceptable levels of convergent (with N [Neuroticism] E [Extroversion] and O [openness to experience] personality inventory) and concurrent validity (by positive correlations with observer-ratings of alexithymia) in a college population (Bagby et al., 1994). In addition, the TAS-20 (a three-factor structure) was evaluated to be in agreement with the

theoretical construct of alexithymia and was found to be stable and replicable in both clinical and nonclinical populations (Bagby et al., 1994)

Berkeley Expressivity Questionnaire

The Berkeley Expressivity Questionnaire (BEQ) is a 16-question scale that measured the dependent variable of emotional expressivity (Gross & John, 1995). Each participant was provided with BEQ item questions and asked to answer on a 7-point Likert scale where 1 = *strongly disagree* to 7 = *strongly agree*. Items 3, 8, and 9 were reverse scored. Items 3, 5, 8, 9, 13, and 16 comprised the negative expressivity facet. Items 1, 4, 6, and 10 made up the positive expressivity facet and Items 2, 7, 11, 12, 14, and 15 made up the impulse strength facet. Scoring was kept continuous. Researchers could either keep the three facets as separate scores or could combine them together to form an overall emotional expressivity scale. In this study, both the overall and the facet scores were considered.

Several studies replicated the three facets of emotional expressivity (Gross & John, 1997, 1998). Evidence of construct validity was supported in the literature with the finding that women scored higher in emotional expressivity. The instrument's convergent validity was tested by Gross and John (1995) who observed a clear negative relation between the instrument's subscales of emotional expression with a measure of emotional control. This was because participants high in expressivity scores were more prone to inhibit their emotions. What they also found was the instrument was sensitive to change as it reflected different times and circumstances when used as a self-report measure. When participants' expressive behaviors (facial and body language movement during emotional movies like comedy and drama) were measured against their BEQ

profiles, the researchers found the negative expressivity subscale predicted for the drama film while the positive expressivity scale predicted for the comedy film. This added to the evidence for the instrument's discriminant validity (Gross & John, 1997; Gross, John, & Richards, 2000).

In addition, the instrument has shown differential relations with the Positive and Negative Affect Schedule (PANAS) scale, which measures positive and negative affect (Watson, Clark, & Tellegen, 1988). In summary, the BEQ instrument has shown strong theoretical connections between emotional expressivity and the Five Factor Personality Questionnaire (positive relationship between positive expressivity and extraversion and agreeableness and strong positive correlation between negative expressivity, and impulse control with neuroticism; Gross & John, 1995).

Experiences in Close Relationships- Revised Short Form

The ECR-RS (Wei et al., 2007) was also administered to participants to control for participant attachment style (anxious\avoidant continuum). This form has nine questions on a 7-point Likert scale. Results consisted of two scores for the two separate factors: attachment anxiety and attachment avoidance. The minimum score for each scale was 7 and a maximum score was 42. Insecure adult attachment was assumed when people scored high on either or both scales and secure adult attachment was assumed when people scored low on attachment anxiety and avoidance (Wei et al., 2007). In addition, higher scores were significantly and positively related to depression, anxiety, interpersonal distress, or loneliness.

In studies examining the psychometric properties of the Experiences in Close Relationships short form (ECR-RS; Sibley, Fischer, & Liu, 2005), longitudinal analyses

suggested very stable indicators of latent attachment by the ECR-RS during a three-week period (85% shared variance). Furthermore, hierarchical linear modeling validated the instrument, which was shown to explain almost 40% of the between person variation in attachment-related emotions with a romantic partner (Sibley et al., 2005).

Marlowe-Crowne Social Desirability Scale (Short Form)

Lastly, the participants were administered the Marlowe-Crowne Social Desirability Scale (Marlowe-Crowne short form; (Beretvas et al., 2002), which is a 13-item measure of the social desirability construct; the participants were asked to say if the 13 questions posed in this questionnaire were true or false.

First developed based on 608 undergraduate students' responses, the 33-item Marlowe-Crowne Social Desirability Scale (short form) has been a very popular instrument among research that wants to measure defensiveness responding. To decrease participant effort and invested time, researchers developed three different short forms for this instrument (one with 11 items, one with 12 items, and one with 13 items) and compared them with three other short forms developed by Strahan and Gerbasi (1972). Reynolds (1982) investigated the psychometric properties, specifically internal consistency reliability, item factor loadings, correlation between the short and long versions of the Marlowe-Crowne and correlation between the short form, and another instrument that measures the same construct (i.e., the Edwards Social Desirability Scale; Edwards, 1957). Results showed the Marlowe-Crowne Social Desirability Scale (short form; 13 item version) was a viable and valid option to substitute for the regular 33-item scale. The reliability of the Marlowe-Crowne Social Desirability Scale (short form) was also tested internationally. For example, confirmatory factor analysis of the original

version along with a 21-item version and the 13 item version in a sample of 215 Romanians aged between 20-35 years old showed both short versions achieved better fit than the original scale with the 13-item version being the most adequate (Sârbescu, Costea, & Rusu, 2012).

Description of Treatment Groups

For the treatment, the experimental group was asked to write about an “emotional event” that had taken place in their lives. The definition of emotional event was left to the discretion of the participants but the instructions emphasized the importance of their considering events as of the utmost importance, had carried a strong emotional weight, or had had a significant emotional impact. More specifically, one group (traditional expressive writing intervention: Experimental Group 1) was given the Pennebaker and Beall (1986) writing prompt with the following instructions:

In your writing, I would like you to really let go and explore your very deepest emotions and thoughts about the most traumatic experience in your entire life. You might tie this trauma to other parts of your life: your childhood, your relationships with others including parents, lovers, friends, relatives or other people important to you. You might link your writing to your future and who you would like to become your future, or to who you have been, who you would like to be, or who you are now. Not everyone has had a single trauma but all of us have had major conflicts or stressors and you can write about these as well. All your writing is confidential. There will be no sharing of content. Do not worry about form or style, spelling, punctuation, sentence structure, or grammar. Please write for 20 minutes.

The purpose of the group receiving the Pennebaker prompt was so Experimental Group 1 could be compared to the modified expressive writing group.

The second group (modified expressive writing intervention: Experimental Group 2) received the following prompt:

I would like you to write about one of the most emotionally significant events you have experienced in your life. Be as descriptive as possible and reflect on thoughts, feelings and behaviors as you remember them. Begin your reflection by describing 1. Where you were, 2. Who was present, 3. What was the event, 4. How you felt, and finally anything else that comes to mind. Please write for at least five to seven minutes.

The purpose of this prompt was twofold: the first part of the prompt focused on the effect considered the primary research element of this work, namely, focusing on the affective ability of the participant to frame the topic of the rest of the intervention, particularly as it tied with affect as well as emotional expression. This prompt helped participants focus on one important emotional experience so relevant control and emphasis were set for the writing prompts to follow. In addition, because this element had a strong focus on the ability (or inability) of participants to understand their own emotional state as well as the impact of others on the participant's emotional well-being, this step was important in order to help participants focus or remember what it was they wanted to talk about in subsequent sections. In addition, the emphasis on describing the event and everything that surrounded the event provided a primer of sorts for the participant to delve into the memory even more.

The second prompt, which was provided after completion of the first prompt, read as follows:

Now I would like you to write freely and tie this event with your 1. family history, 2. Personal events in your past, 3. Friends and significant others 4. Physical symptoms that you experienced after the event and 5. Focus on the feelings you can identify (e.g. sadness, anger, anxiety, guilt (e.g., do you have a hard time trusting people? Do you experience feelings of inadequacy and self-criticism? Did you experience or are experiencing difficulty sleeping? Increased headaches/feeling tired etc.)). Please write for at least five to seven minutes.

In addition to providing participants with a strong means of using the first prompt as a “jumping off” point to more closely explore their ideas and feelings regarding their self-perceptions, it was anticipated this second prompt would have significant effects and provide the writer with an exercise in self-reflection and self-awareness with regard to developmental considerations as well as different aspects of participants’ well-being and emotional capacity for insight.

The next step involved a prompt that asked participants to “flip” their self-perception and attempt to take on the perspective of a mental health provider who would be considering their emotional wellbeing. The third prompt read as follows:

Now I would like you to think about yourself from a distance and think about what you would tell/advise yourself if you were your own therapist, mentor, friend, or some other source of emotional support of your choosing. Please write freely for at least five minutes.

The chief benefit to be gained from this prompt was through the exercise of interpretation/advice/increasing self-awareness and through the idea that participants would be more capable of understanding their own complete (or hampered) emotional literacy if they were tasked with using a hypothetical “third party” to consider their own ability or inability to express themselves in an emotional manner. The final question posed to participants was as follows:

Based on your previous writings, what have you learned about yourself, the way you cope and perceive life events? What would you change in the way you cope and deal with emotions if you could do so? Write at least one thing you would change or improve upon (e.g., Be kinder with yourself, turn to family and friends for support, accept that you cannot control everything and focus on what you can control etc.). Please write for at least five minutes.

This question emphasized the way participants were able to appreciate the concepts of closest interest to this study. Through its emphasis upon cognitive and affective processes and participants’ capacity to appraise emotional information in an emotional manner (both of which are distinct skill-sets), this question allowed participants to develop distinct skills with respect to their emotional literacy as well as their capacity for evaluating those skills. Both are essential aspects of any therapeutic intervention process.

Through greater participant control of the means at their disposal by which they were able to complete the study, factors present in a public or group setting and factors that might lead to participants’ feelings of distress at completing the process or even their inability to complete the experiment at all were moderately mitigated by the online

setting of this study. However, due to the online nature of the experiment, a greater risk of threats to treatment fidelity in implementing the experimental conditions and thus a risk to internal validity was a possibility. Treatment or intervention fidelity could produce either statistically significant or non-significant results—not because of the study’s design but due to non-adherence to the study protocol itself. Thus, a fidelity check measure was included for validity purposes such as evaluating the grade level writing of the participants’ writings as described above (see Participant section).

If no significant results were found for the significance of the impact of the treatments on the total scores of overall levels of alexithymia and emotional expressivity, a contingency plan or Plan B was in place. Instead of using the total score of the TAS 20 to measure level of alexithymia and the total score of BEQ to measure emotional expressivity, the three dimensions of the alexithymia construct in the TAS 20 (difficulty identifying feelings, difficulty describing feelings, and externally-oriented thinking) and three facets of the BEQ (negative expressivity, positive expressivity, and impulse strength) were used to measure level of alexithymia and emotional expressivity, respectively. This contingency was in place to see which facet of those variables was potentially impacted by the interventions introduced in the study.

Data Analysis

This study analyzed the following research question and hypotheses:

- Q1 Does the treatment condition (modified/traditional expressive writing) significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability?
- H1 Treatment condition will significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability.

H01 Treatment condition will not significantly impact the levels of alexithymia and emotional expressivity in a college sample while controlling for attachment style and social desirability.

For the research question and hypotheses, participants' attachment style and social desirability were accounted for as covariates.

Before any analyses were conducted, data were screened, coded, and input into the Statistical Package for the Social Sciences (SPSS) version 24 software. After the data were coded, each scale and sub-scale scores were calculated including the two dependent variables, TAS-20 (measure of alexithymia), BEQ (emotional expressiveness), as well as the measures controlling for attachment style (ECR-RS) and social desirability (MC-SDS short version). Before completing further analysis, the researcher screened the data for detection and correction of erroneous data (Warner, 2013). Incomplete datasets, defined as datasets with more than 50% missing responses in the survey questionnaires, were discarded.

The internal reliability for each scale and sub-scale was assessed using Cronbach's alpha. A value of .70 or greater was considered acceptable for internal reliability (Nunnally & Bernstein, 1994). Descriptive statistics for scales and sub-scales were then calculated and reported including measures of central tendency (mean, median, and mode) and measures of variability (standard deviation and range). Additionally, descriptive statistics were conducted to summarize the data of the demographic information.

Frequencies and percentage summaries were used to summarize data of categorical measured study variables. Central tendency measures of means and standard

deviations were used to summarize the data of for continuous measured study variables (levels of alexithymia, emotional expressivity, attachment style, and social desirability).

After reporting the descriptive statistics and demographic characteristics of the sample, the research questions were addressed systematically. A MANCOVA examined the impact of one or more independent variables on multiple dependent variables while removing the effect of one or more covariate factors. For the repeated measures MANCOVA, the independent variables included a within-subjects factor (pretest and posttest), and between-subjects factor (treatment condition: traditional or modified). The dependent variables were alexithymia and emotional expressivity. Alpha was set to .05 to determine statistical significance.

Statistical assumptions of a repeated measure MANCOVA were evaluated. A MANCOVA used the *F*-test, a ratio of the different independent variance estimates of the same population variance (Pagano, 2010). The *F*-test allows for an overall comparison on whether group means differed. An *F*-test was used to address both research questions. If the obtained *F* statistic was larger than the critical *F* statistics, the null hypothesis was rejected, which meant the independent variable had a significant impact on the dependent variable controlling for the impact of the covariates. Before conducting the analysis, statistical assumptions for the parametric MANCOVA analysis had to be assessed to ensure the statistical validity of the analysis.

The first statistical assumption was a linear relationship existed between the independent and dependent variable(s) as well as between the covariates and the dependent variable(s). Scatterplots (and simple bivariate correlations) between the independent (and covariates) variable and the dependent variables were assessed. The

assumption was met if the mean of the dependent variable for each increment on the independent variable approximated a straight line (Christiansen, 2014).

The second statistical assumption of the MANCOVA is that of homogeneity of covariance and variances. Homogeneity of covariances and variances was assessed using Box's M Test of Equality of Covariance Matrices and Levene's test. A p -value greater than .05 for the Box's M Test and Levene's test indicated homogeneity of covariance and variances, respectively.

The third assumption was there were no significant univariate outliers in the dataset. An outlier investigation was conducted by converting raw scores to z -scores. Cases with values that fell above 3.29 or below -3.29 were removed from the final dataset (Tabachnick & Fidell, 2012).

The fourth required assumption was there are no significant multivariate outliers in the groups of the independent variable in terms of each dependent variable. This was tested by investigating the Mahalanobis distance. Mahalanobis distance is a measure of multivariate outliers that calculates the degree to which a case or participant (with scores on two or more variables) varies from a distribution. Mahalanobis distance provides a measure of how far a case is from the mean vector (Yuan, Fung, & Reise, 2004).

The fifth and final assumption tested was that of normal distribution—the data of the dependent variable should approximate a normal distribution. To assess normality, the Shapiro-Wilk test of normality was conducted on each variable. A significant p value ($< .05$) would indicate the shape of the distribution was significantly different than the normal distribution and, therefore, the data were not approximately normally distributed. A p -value of the Shapiro-Wilk test greater than .05 demonstrated the data did not

significantly differ from a normal distribution, i.e., the data were approximately normally distributed. An examination of histograms for the dependent variables of alexithymia and emotional expressiveness to check if the values were normally distributed was conducted. Each of these required assumptions had to be met or the data were transformed before conducting the repeated measures MANCOVA.

After examining the assumptions of MANCOVA, an analysis was conducted to address the research questions. Participants' pretest alexithymia scores (i.e., TAS-20) were categorized as falling into the following ranges: low alexithymia (≤ 51), moderate alexithymia (52-60), and high alexithymia (≥ 61). Additionally, half of the participants were given the traditional expressive writing treatment and half received the modified expressive writing treatment. As such, a 3 (pretest alexithymia: low, moderate, high) x 2 (treatment condition: traditional vs modified) between-subjects MANCOVA was conducted on posttest alexithymia scores (research question 1) and emotional expressivity (research question 2) for participants who received either a traditional or modified intervention. Additionally, attachment style and social desirability were included as covariates.

Additional Data Analysis

Furthermore, because a potential effect could be identified when the analyses were performed out of gain score differences (pretest to posttest difference), an additional analysis was conducted. While in the first analysis comparisons of the effects of alexithymia and emotional expressivity were performed out of posttest levels, in this analysis, the MANCOVA and ANCOVA were conducted out of pre-post test score differences (gain score). A MANCOVA was conducted that examined the impact of

treatment condition on alexithymia and emotional expressivity gain scores while removing the effect of one or more covariates (social desirability and attachment style). Then individual ANCOVA analyses of the gain scores for each facet were examined.

For the MANCOVA analysis, the independent variables included a between-subjects factor (treatment condition: traditional or modified) and the dependent variables were the gain scores of the TAS-20 and BEQ. Several ANCOVAs were also conducted for individual facets scores. Alpha was set to .05 to determine the statistical significance.

For the ANCOVA analysis, the independent variables included a between-subjects factor (treatment condition: traditional or modified). The dependent variables were the gain scores of the TAS-20 and BEQ facets. Alpha was set to .05 to determine the statistical significance.

The *F*-test of significance was used as in the first analysis. With this method, each main and interaction effect was assessed for between-groups variance divided by the within-groups variance. Three non-statistical assumptions and eight statistical assumptions of the MANCOVA and ANCOVA analyses were evaluated before analyzing the data to ensure the statistical validity of the analysis.

The first non-statistical assumption was the requirement for a continuously measurable dependent and covariates variables. The next assumption was the independent variable should consist of two or more categorical, independent groups. Independence of observations was also required (i.e., there was no relationship between the observations in each group or between the groups themselves).

The first statistical assumption for ANCOVA was there were no significant univariate outliers in the dataset. An outlier investigation was conducted by converting

raw scores to z-scores. Cases with values that fell above or below 3.29 standard deviations from the mean were removed from the dataset.

The second statistical assumption tested was that of normal distribution—residuals should be approximately normally distributed for each category of the independent variable. To understand whether the standardized residuals were normally distributed, the Shapiro-Wilk test was conducted. If data were normally distributed, the significance level should be more than .05 (i.e., $p > .05$). If data were not normally distributed (i.e., the assumption of normality was violated), the significance level would be less than .05 (i.e., $p < .05$).

The third statistical assumption was that of homogeneity of covariance and variances and was assessed using Box's M. The fourth assumption required homogeneity of variances. This assumption was tested using Levene's test. Violation of this assumption could have increased the probability of Type I error. The fifth assumption was that a linear relationship existed between the covariates and the dependent variable(s).

The sixth assumption tested for significant multivariate outliers in the groups of the independent variable in terms of each dependent variable. This was tested by investigating the Mahalanobis distance and comparing it with a chi-square distribution with two degrees of freedom.

The seventh assumption was that of homoscedasticity. This assumption was tested by plotting a scatterplot of the standardized residuals against the predicted values. By looking at the scatterplots, the homoscedasticity could be determined by examining the standardized residuals and whether they were equal across the predicted values. The

points of each of the scatterplots would exhibit no pattern and would be approximately randomly spread across the predicted values; the spread of points should be similar in the y-axis for all categories of the independent variable (i.e., treatment condition) and the spread of points should be similar in the y-axis for each of the scatterplots.

Finally, the eighth statistical assumption was that of homogeneity of regression slopes, which meant there was no interaction between the covariate and the independent variable. In other words, the regression lines going through the scatterplots plotted needed to be parallel.

CHAPTER IV

RESULTS

This chapter systematically discusses the results of the primary research question examined in the present study. First, participants' demographic information is described, followed by a description of the psychometric properties of each of the measures used. Then the statistical assumptions of the MANCOVA analyses are presented. Finally, the results and major key findings are summarized.

Participant Information

A sample of 150 participants living in the United States (and who speak English) participated in the present study. Most participants were female ($n = 118$; 78.7%). In terms of ethnicity, most participants were White ($n = 96$; 64%), followed by Asian ($n = 19$; 12.7%), Latino ($n = 17$; 11.3%), Black ($n = 11$; 7.3%), multiracial ($n = 6$; 4%), and other ($n = 1$; 0.7%). Regarding marital status, most participants were single (never married, $n = 108$). Fewer participants ($n = 19$; 12.7%) were living with their romantic partner, even fewer were married ($n = 3$; 2%) or widowed ($n = 3$; 2%), and some participants ($n = 17$; 11.3%) did not respond.

Participants also reported their ages, ranging from 17-years-old to 61-years-old ($M = 24.59$, $SD = 7.36$). The median age was 22-years-old. Additionally, participants reported their level of education, operationalized as the number of years (i.e., current year) in college. Responses ranged from one to six: 16% ($n = 24$) were in their first year, 25.3% ($n = 38$) were in their second year, 18% ($n = 27$) were in their third year, 13.3% (n

= 20) were in their fourth year, 6.0% ($n = 9$) were in their fifth year, 20.7% ($n = 31$) were in their sixth year, and less than 1% ($n = 1$) did not respond. Furthermore, none of the participants had been diagnosed with a learning disability. A full description of participants' demographic characteristics by treatment group and overall is provided in Table 2.

Table 2

Participant Demographic Characteristics

	Treatment Group					
	Traditional		Modified		Total	
	n	%	n	%	n	%
Sex						
Male	17	22.7	15	20.0	32	21.3
Female	58	77.3	60	80.0	118	78.7
Ethnic/Racial Background						
Asian	9	12.0	10	13.3	19	12.7
Black	9	12.0	2	2.7	11	7.3
Latino	8	10.7	9	12.0	17	11.3
Multiracial	2	2.7	4	5.3	6	4.0
White	46	61.3	50	66.7	96	64.0
Other	1	1.3	--	--	1	0.7
Marital Status						
Single (Never Married)	55	73.3	53	70.7	108	72.0
Living with romantic partner	8	10.7	11	14.7	19	12.7
Married	--	--	3	4.0	3	2.0
Widowed	1	1.3	2	2.7	3	2.0
Prefer not to say	11	14.7	6	8.0	17	11.3
Year in College						
First	15	20.0	9	12.0	24	16.0
Second	17	22.7	21	28.0	38	25.3
Third	15	20.0	12	16.0	27	18.0
Fourth	9	12.0	11	14.7	20	13.3
Fifth	4	5.3	5	6.7	9	6.0
Sixth	14	18.7	17	22.7	31	20.7
Missing	1	1.3	--	--	1	0.7
In Psychotherapy?						
Yes	17	22.7	11	14.7	28	18.7
No	58	77.3	64	85.3	122	81.3

The TAS-20 Berkeley Expressivity questionnaire was administered to 150 participants in two separate sessions—a pretest and posttest. Additionally, measures of attachment avoidance and social desirability were administered during the pretest along with demographic information. Half of participants were randomly assigned to the traditional intervention ($n = 75$), and half were randomly assigned to the modified intervention ($n = 75$).

Psychometric Properties of Measures

Toronto Alexithymia Scale

Participants completed the 20 item Toronto Alexithymia Scale (TAS-20) as a measure of alexithymia. Scale scores were computed as the sum of responses to all items (after reverse coding six items: 4, 5, 10, 18, and 19). The TAS-20 was administered to participants twice—before treatment (pretest) and after treatment (posttest). The TAS-20 contains three sub-scales: (a) difficulty describing feelings, (b) difficulty identifying feelings, and (c) externally-oriented thinking. Sub-scale scores were calculated in the same way as the overall TAS-20 but only included the designated items for each sub-scale.

Internal reliability of the pretest and posttest administrations of the TAS-20 were assessed using Cronbach's alpha. The TAS-20 pretest had acceptable internal reliability ($\alpha = .819$) as did the posttest ($\alpha = .828$). The internal reliability of the difficulty describing emotion sub-scale was high at pretest ($\alpha = .742$) and posttest ($\alpha = .745$) as was the internal reliability for the difficulty identifying feelings sub-scale (pretest: $\alpha = .801$; posttest: $\alpha = .844$).

At the pretest, 50 participants had scores of 51 or less on the TAS-20 (categorized as low alexithymia), 50 participants scored between 52 and 60 (moderate alexithymia), and 50 participants had scores of 61 and greater (high alexithymia). At posttest, 58 participants had scores in the low alexithymia range, 43 were in the moderate alexithymia range, and 49 scored in the high alexithymia range. Table 3 presents descriptive and reliability statistics for the TAS-20 scale.

Table 3

Descriptive Statistics of the Toronto Alexithymia Scale Pretest and Posttest Scores

Scale	Number of Items	<i>M</i> (<i>SD</i>)	Median	Range	Reliability (Cronbach's Alpha)
TAS-20 scale score					
Pretest	20	55.61 (11.23)	56.50	24 – 88	.819
Posttest	20	54.75 (11.55)	55.50	26 – 82	.828
Difficulty Describing Emotion sub-scale					
Pretest	5	15.86 (4.31)	16.50	5 – 25	.742
Posttest	5	15.46 (4.39)	15.00	6 – 25	.745
Difficulty Identifying Feelings sub-scale					
Pretest	7	20.74 (5.80)	20.50	7 – 35	.801
Posttest	7	19.72 (6.23)	19.00	7 – 34	.844
Externally-Oriented Thinking sub-scale					
Pretest	8	19.01 (4.59)	19.00	8 – 29	.605
Posttest	8	19.57 (4.60)	20.00	8 – 36	.606
		Low Alexithymia (<i>n</i>)	Moderate Alexithymia (<i>n</i>)	High Alexithymia (<i>n</i>)	
Pretest		50	50	50	
Posttest		58	43	49	

Berkeley Expressivity Questionnaire

Participants completed the Berkeley Expressivity Questionnaire (BEQ) as a measure of emotional expressivity. The BEQ was administered twice—once before treatment (pretest) and once after treatment (posttest). Scale scores were computed as the sum of responses to all items (after reverse coding three items: 3, 8, and 9). Three sub-scales were embedded within the BEQ: (a) the negative expressivity facet, (b) positivity expressivity facet, and (c) impulse strength facet. Sub-scale scores were calculated in the same way as the overall BEQ scale score.

Internal reliability of the pretest and posttest administrations of the BEQ were assessed using Cronbach's alpha. The BEQ overall scale had acceptable internal reliability when administered at pretest ($\alpha = .847$) and at posttest ($\alpha = .865$). The negative expressivity sub-scale had slightly less than adequate internal reliability based on the .70 standard in the literature (Nunnally & Bernstein, 1994; $\alpha = .685$). However, the posttest negative expressivity sub-scale did have acceptable internal reliability ($\alpha = .746$). The positive expressivity sub-scale had acceptable internal reliability at pretest ($\alpha = .776$) and posttest ($\alpha = .781$) as did the impulse strength subscale (pretest: $\alpha = .802$, posttest: $\alpha = .819$). Table 4 presents descriptive and reliability statistics for the BEQ scale and sub-scales.

Table 4

Descriptive Statistics of the Berkeley Expressivity Questionnaire Scale and Sub-Scales

Scale	Number of Items	<i>M</i> (<i>SD</i>)	Median	Range	Reliability (Cronbach's Alpha)
BEQ Scale Score					
Pretest	16	76.75 (14.17)	77.00	32 – 109	.847
Posttest	16	76.67 (14.39)	76.50	30 – 109	.865
Negative expressivity					
Pretest	6	23.25 (6.28)	23.00	6 – 41	.685
Posttest	6	23.32 (6.68)	24.00	6 – 41	.746
Positive expressivity					
Pretest	4	26.36 (5.55)	27.50	10 – 35	.776
Posttest	4	26.69 (5.31)	27.00	13 – 35	.781
Impulse strength					
Pretest	6	32.50 (6.74)	33.00	11 – 42	.802
Posttest	6	32.07 (6.84)	34.00	8 – 42	.819

Experiences in Close Relationships-Revised

Participants completed the Experiences in Close Relationships-Revised short form (ECR-RS; Wei et al., 2007) as a measure of attachment style. The ECR-RS was administered to participants once—prior to treatment. Scale scores were computed as the sum of responses to all items (after reverse coding four items: 1, 2, 3, and 4). The ECR-RS measures two aspects of attachment: attachment anxiety and attachment avoidance. These sub-scale scores were calculated in the same way. Participants who scored high on either or both scales were thought to have insecure adult attachment style. Higher scores were positively related to depression, anxiety, interpersonal distress, and/or loneliness. Secure adult attachment was assumed when people scored low on both scales.

The ECR-RS overall scale had acceptable internal reliability ($\alpha = .741$). The attachment anxiety sub-scale also had acceptable internal reliability ($\alpha = .798$) as did the

attachment avoidance sub-scale ($\alpha = .853$). Table 5 presents descriptive and reliability statistics for the ECR-RS scale and sub-scales.

Table 5

Descriptive Statistics of the Experiences in Close Relationships-Revised Scale and Sub-Scales

Scale	Number of Items	<i>M</i> (<i>SD</i>)	Median	Range	Reliability (Cronbach's Alpha)
ECR-RS overall Score	9	39.49 (8.68)	39	14 – 60	.741
Attachment anxiety	6	22.94 (7.08)	23	6 – 39	.798
Attachment avoidance	3	16.55 (4.44)	18	3 – 21	.853

Marlowe-Crowne Social Desirability Scale (Short Form)

Participants' level of social desirability was measured via the Marlowe-Crowne Social Desirability Scale (MC-SDS) short form. The MC-SDS was administered to participants once—prior to treatment. The MC-SDS consisted of 13 true or false items. The MC-SDS (short form) scale scores were computed as the sum of responses to all items (after reverse coding 8 items: 1, 2, 3, 4, 6, 8, 11, and 12). The MC-SDS (short form) had acceptable internal reliability ($\alpha = .718$). Table 6 presents descriptive and reliability statistics for the MC-SDS (short form).

Table 6

Descriptive Statistics of the Marlowe-Crowne Social Desirability Scale (Short Form)

Scale	Number of Items	<i>M</i> (<i>SD</i>)	Median	Range	Reliability (Cronbach's Alpha)
MC-SDS (Short Form)	13	5.51 (2.88)	5.00	0 – 12	.718

Testing for Statistical Assumptions of Multiple Analysis of Covariance

Before conducting the analyses, five statistical assumptions of the multiple Analysis of Covariance (MANCOVA) were assessed. First, TAS-20 and BEQ overall scores were examined for outliers using a cut-off of +/- 3.29 standard deviations from the mean. No outliers were found on either measure. Nor were there any outliers in either the difficulty describing feelings or difficulty identifying feelings sub-scales. However, one outlier was identified and removed from the externally-oriented thinking sub-scale. For the BEQ sub-scales, no outliers were found in either the negative expressivity or the positive expressivity sub-scales. However, one outlier was identified on the impulse sub-scale. Finally, no outliers were found in either the ECR-RS (attachment style) or the MC-SDS Short Form (social desirability) measures.

In addition to univariate outliers, the data were assessed for multivariate outliers across the two dependent variables (TAS-20 and BEQ scores). The Mahalanobis distance was calculated for each data-point and compared to a chi-square distribution with two degrees of freedom. The degrees of freedom for the Mahalanobis distance was equal to the number of variables under investigation. Because the relationship between

two variables (TAS-20 and BEQ scores) was tested, degrees of freedom for the Mahalanobis distance was set to two. Multivariate outliers were tested against a significance level of $p < .001$. Thus, if any of the Mahalanobis distance values were significant at the .001 alpha level, that data-point would be considered an outlier. Two outliers (for a single participant) were identified and removed from subsequent analyses.

Scatterplots were then examined to determine whether a linear relationship existed between the independent and dependent variables for each of the treatment groups (see Figures 3 and 4). The relationship between each pair of dependent variables should be approximately linear for each related group of the independent variable. By examining the scatterplot matrices, it was determined this statistical assumption was satisfied.

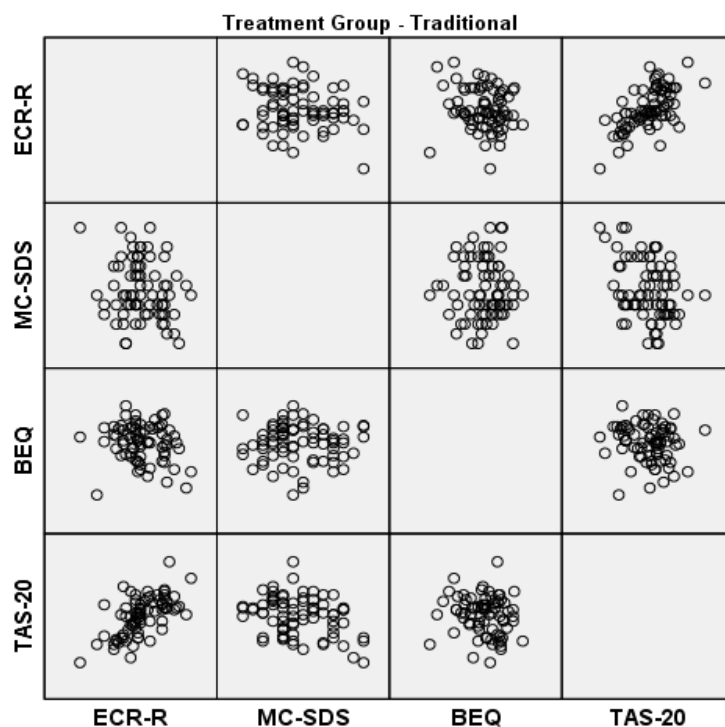


Figure 3. Scatterplots of all independent, dependent, and covariate variables for the traditional treatment group.

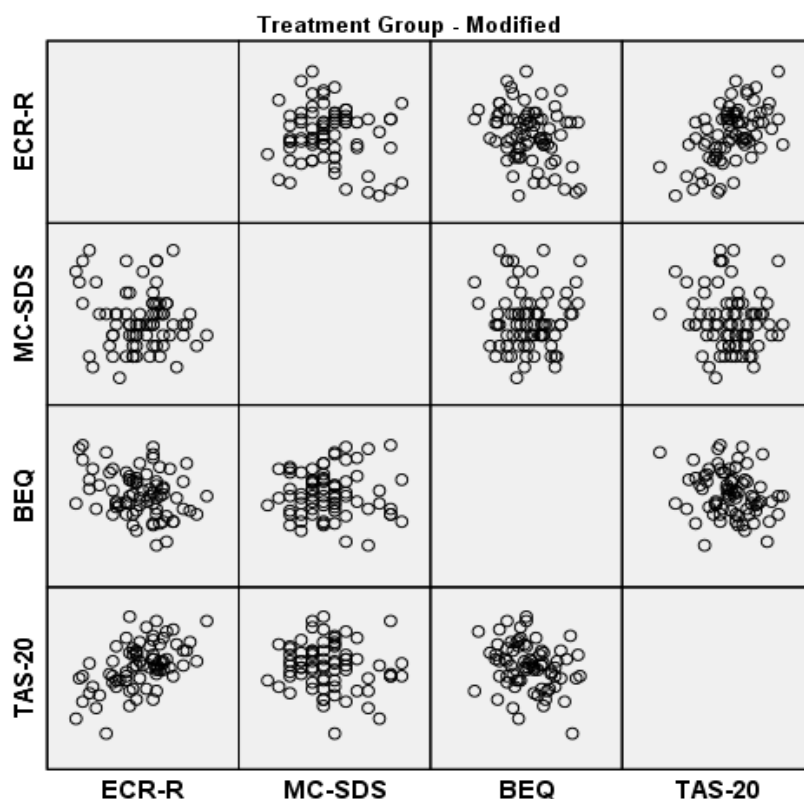


Figure 4. Scatterplots of all independent, dependent, and covariate variables for the modified treatment group.

Then the assumption of homogeneity of variances and covariances was assessed. A Box's M test demonstrated that the observed covariance matrices of the dependent variables were equal across groups, Box's $M = 12.901$, $p = .175$. For completeness, Levene's test was also conducted to test the assumption that the population variances were equal across groups. Prior to receiving the treatment (pretest scores), the treatment groups had similar population variances, $F(1, 148) = 3.336$, $p = .070$. After receiving treatment, the treatment groups had different population variances, $F(1, 148) = 5.835$, $p = .017$. However, this assumption can be ignored for analyses of variance when the sample sizes for each group are equal (Zimmerman, 2004).

Finally, the assumption of normality was assessed using the Shapiro-Wilk test of normality. A significant p value (i.e., $< .05$) would indicate the shape of the distribution was significantly different than the normal distribution. The distributions of the two dependent variables, TAS-20 and BEQ scores, were approximately normally distributed. The distribution of scores on the ECR-RS covariate (attachment style) was also approximately normally distributed. The distribution of scores on the MC-SDS (social desirability) was significantly different from that of a normal distribution, $p < .001$. Table 7 presents a complete list of normality statistics and significance values for each of the continuous variables included in the present study.

Table 7

Shapiro-Wilk Test of Normality for Predictors, Covariates, and Dependent Variables

Tasks	Shapiro-Wilk Test of Normality		
	Statistic	df	p
TAS-20	.992	150	.578
BEQ	.990	150	.342
ECR-RS	.992	150	.560
MC-SDS (short form)	.964	150	$< .001$

Research Question and Hypotheses

- Q1 Does the treatment condition (modified/traditional expressive writing) significantly impact the levels of alexithymia and emotional expressivity in a college population while controlling for attachment style and social desirability
- H1 Treatment condition will significantly impact the levels of alexithymia and emotional expressivity in a college population while controlling for attachment style and social desirability.
- H01 Treatment condition will not significantly impact the levels of alexithymia and emotional expressivity in a college population while controlling for attachment style and social desirability.

The null hypothesis associated with the research question posited the treatment condition did not impact levels of alexithymia or emotional expressivity. In other words, there was no difference in levels of alexithymia or emotional expressivity between students who received traditional and modified treatments. The alternative hypothesis posited students' alexithymia or emotional expressivity would vary as a function of the type of treatment they received.

To assess the impact of treatment condition (traditional vs. modified), participants' pretest alexithymia scores were categorized into three groups (low alexithymia, moderate alexithymia, and high alexithymia) and treated as a categorical independent variable. A 3 (pretest alexithymia level: low, moderate, high) x 2 (treatment condition: traditional versus modified) MANCOVA (with social desirability and attachment style treated as covariates) was conducted on participants' posttest alexithymia scores (TAS-20; see Table 8).

Table 8

Means and Standard Deviations of Toronto Alexithymia Scale-20 Overall Scale Scores by Treatment Condition

Pretest Alexithymia Groups	Expressive Writing Prompt Treatment Condition		<i>p</i> -value
	Traditional <i>M</i> (<i>SD</i>)	Modified <i>M</i> (<i>SD</i>)	
Low alexithymia	44.24 (6.60)	44.12 (8.36)	> .05
Moderate alexithymia	56.80 (9.70)	53.76 (5.62)	> .05
High alexithymia	64.36 (9.13)	65.24 (7.49)	> .05

Note. The *p*-value represents the pairwise comparison between traditional and modified treatment condition for each alexithymia group.

For posttest TAS-20 scores (alexithymia measure), the main effect of pretest alexithymia condition (low, moderate, or high) was significant, $F(2, 142) = 44.651, p < .001$. Posttest alexithymia scores ($M = 63.56$) were significantly higher for participants in the high alexithymia pretest category than those with moderate alexithymia ($M = 54.65, p < .001$), and those with low alexithymia ($M = 46.06, p < .001$). The effect size for the difference between the high and moderate alexithymia groups on the TAS-20 was large (Cohen's $d = 1.18$) as was the magnitude of the difference between high and low alexithymia groups (Cohen's $d = 2.34$). Participants in the moderate alexithymia group also had significantly higher posttest alexithymia scores than participants in the low alexithymia condition, $p < .001$. The magnitude of this effect was large (Cohen's $d = 1.07$).

For posttest BEQ scores (emotional expressivity), the main effect of pretest alexithymia condition (low, moderate, or high) was not significant, $F(2, 142) = 0.185, p =$

.831. There was no effect of pretest alexithymia condition on the posttest BEQ negative expressivity sub-test, $F(2, 142) = 0.392, p = .676$ or the posttest BEQ impulse strength facet, $F(2, 142) = 0.140, p = .869$. However, there was a significant effect of pretest alexithymia condition on the posttest BEQ positive expressivity sub-test, $F(2, 142) = 3.514, p = .032$. Posttest BEQ positive expressivity sub-scale scores were smaller for those participants with high alexithymia ($M = 24.44, SD = 5.31$) than participants with moderate alexithymia ($M = 27.40, SD = 4.60$). The magnitude of this effect was moderate (Cohen's $d = 0.595$). Posttest BEQ positive scores were also smaller for the high alexithymia group than the low alexithymia group ($M = 28.24, SD = 4.70$; see Figure 5 and Table 9). The magnitude for this effect was also moderate (Cohen's $d = 0.76$).

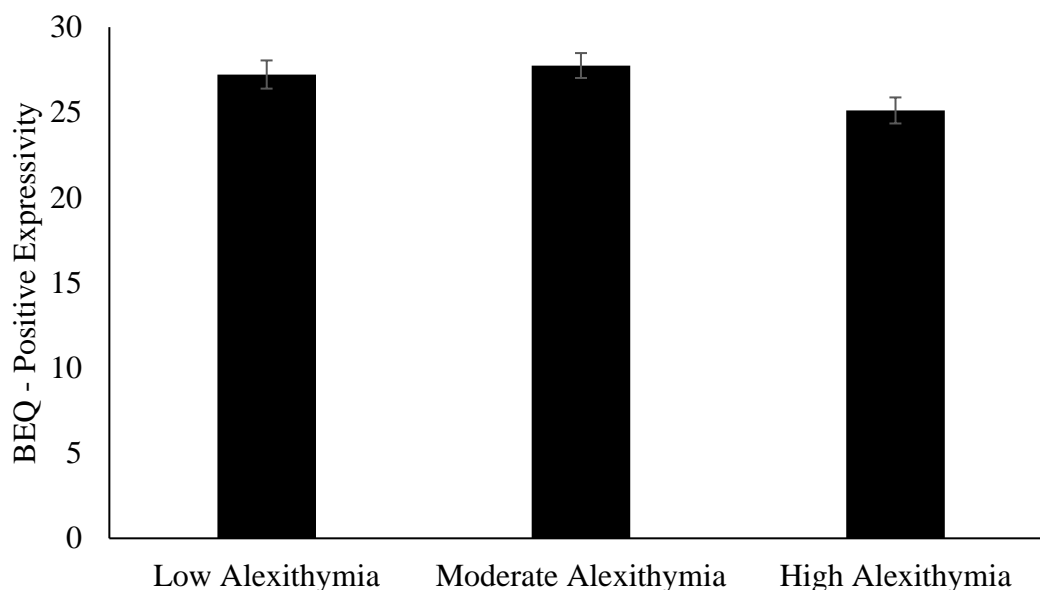


Figure 5. Berkeley Expressivity Questionnaire positive expressivity scores by pretest alexithymia condition.

Table 9

Means and Standard Deviations of Posttest Berkeley Expressivity Questionnaire Scale Scores by Treatment Condition

Pretest Alexithymia Groups	Expressive Writing Prompt Treatment Condition		<i>p</i> -value
	Traditional <i>M</i> (<i>SD</i>)	Modified <i>M</i> (<i>SD</i>)	
Low alexithymia	79.08 (16.72)	79.20 (13.51)	> .05
Moderate alexithymia	76.76 (15.69)	76.32 (9.01)	> .05
High alexithymia	75.32 (17.09)	73.32 (13.31)	> .05

Note. The *p*-value represents the pairwise comparison between traditional and modified treatment condition for each alexithymia group

Additionally, the main effect of the pre-alexithymia condition was not significant for any of the three sub-tests of the TAS-20 (difficulty describing feelings: $F(2, 141) = 16.019, p = .001$; difficulty identifying feelings: $F(2, 141) = 19.556, p = .001$; and externally-oriented thoughts: $F(2, 141) = 16.996, p = .001$). The pattern of the main effect for each of the sub-scales was the same as the TAS-20 overall score. Posttest TAS-20 scores were highest for those with high alexithymia (difficulty describing feelings: $M = 18.41, SD = 3.49$; difficulty identifying feelings: $M = 23.82, SD = 5.23$; external oriented thinking: $M = 22.55, SD = 3.89$) at pre-test, followed by moderate alexithymia (difficulty describing feelings: $M = 16.00, SD = 3.79$; difficulty identifying feelings: $M = 20.16, SD = 5.49$; external oriented thinking: $M = 19.12, SD = 4.42$), and low alexithymia (difficulty describing feelings: $M = 11.94, SD = 3.23$; difficulty

identifying feelings: $M = 15.16$, $SD = 4.71$; external oriented thinking: $M = 17.08$, $SD = 3.82$).

The main effect of treatment condition (traditional or modified) was not significant for posttest alexithymia scores, $F(1, 142) = 0.236$, $p = .628$. Furthermore, the interaction between treatment condition (traditional or modified) and pretest alexithymia was not significant for posttest alexithymia scores, $F(1, 142) = 1.013$, $p = .366$. There was also no effect of treatment condition (modified or traditional) on any of the three TAS-20 sub-scales (difficulty describing feelings: $F(1, 141) = 0.709$, $p = .401$; difficulty identifying feelings: $F(1, 141) = 2.743$, $p = .100$; externally-oriented thoughts: $F(1, 141) = 3.261$, $p = .073$). Nor was the interaction between treatment condition and pre-alexithymia condition significant (difficulty describing feelings: $F(2, 141) = 0.093$, $p = .911$; difficulty identifying feelings: $F(2, 141) = 0.420$, $p = .658$; externally-oriented thoughts: $F(2, 141) = 1.585$, $p = .208$).

The main effect of treatment condition (traditional or modified) was not significant for posttest BEQ overall (emotional expressivity) scores, $F(1, 142) = 0.244$, $p = .622$, nor any of the BEQ sub-scales: BEQ negative expressivity, $F(1, 142) = 0.086$, $p = .769$; BEQ positive expressivity, $F(1, 142) = 0.134$, $p = .715$; and BEQ impulse strength facet, $F(1, 142) = 0.330$, $p = .567$. Furthermore, the interaction between treatment condition (traditional or modified) and pretest alexithymia was not significant for overall posttest BEQ (emotional expressivity) scores, $F(2, 142) = 0.095$, $p = .909$, nor for any of the BEQ sub-scales: BEQ negative expressivity, $F(2, 142) = 0.253$, $p = .777$; BEQ positive expressivity, $F(2, 142) = 0.276$, $p = .759$; and BEQ impulse strength, $F(1, 142) = 0.481$, $p = .619$.

However, there was evidence the covariates impacted participants' posttest alexithymia scores. There was a significant effect of attachment style (ECR-RS) on posttest alexithymia, $F(1, 142) = 6.538, p = .012$. The nature of the relationship between attachment style and alexithymia (TAS-20) was positive. As participants' ECR-RS scores increased, their TAS-20 scores (alexithymia) increased. There was also a significant effect of attachment style on the difficulty describing feelings sub-scale, $F(1,142) = 16.357, p < .001$. As participants' ECR-RS scores increased, their difficulty in describing feelings increased. The relationship between attachment style and difficulty identifying feelings was not significant, $F(1,142) = 0.497, p = .497$, nor was the relationship between attachment style and externally oriented thoughts significant, $F(1,142) = 0.558, p = .456$.

The effect of social desirability was not significant in this analysis of posttest alexithymia scores, $F(1, 142) = 2.281, p = .133$. There was a relationship between social desirability and the difficulty identifying feelings sub-test, $F(1,142) = 8.15, p = .005$. As participants' social desirability scores increased, their scores on the identifying feelings sub-scale decreased. However, the relationship among social desirability and difficulty describing feelings, $F(1,142) = 0.843, p = .360$, and externally oriented thoughts, $F(1,142) = 1.832, p = .178$ was not significant. Table 10 presents the TAS-20 MANCOVA results.

Table 10

Toronto Alexithymia Scale-20 Multivariate Analysis of Covariance Results for Tests of Covariates, Alexithymia Group, and Treatment Condition

Independent Variable	Dependent Variable	Univariate F	df	Alpha	Partial ETA-Squared
Alexithymia condition	TAS-20 Overall	43.415	2,142	< .001	.381
	Difficulty Describing Feelings	16.019	2,142	< .001	.185
	Difficulty Identifying Feelings	19.556	2,142	< .001	.217
	Externally-oriented Thoughts	16.996	2,142	< .001	.194
Treatment group	TAS-20 Overall	0.236	1,142	.628	.002
	Difficulty Describing Feelings	.709	1,142	.401	.005
	Difficulty Identifying Feelings	2.743	1,142	.100	.019
	Externally-oriented Thoughts	3.261	1,142	.073	.023
Covariates Attachment Style (ECR-RS)	TAS-20 Overall	6.538	1,142	.012*	.044
	Difficulty Describing Feelings	16.357	1,142	< .001***	.104
	Difficulty Identifying Feelings	0.465	1,142	.497	.003
	Externally-oriented Thoughts	0.558	1,142	.456	.004
Social Desirability (MC-SDS Short Form)	TAS-20 Overall	2.281	1,142	.133	.016
	Difficulty Describing Feelings	0.843	1,142	.360	.006
	Difficulty Identifying Feelings	8.150	1,142	.005**	.055
	Externally-oriented Thoughts	1.832	1,142	.178	.013

Moreover, evidence showed the covariates impacted participants' posttest emotional expressivity (BEQ). There was a significant effect of attachment style (ECR-RS) on overall posttest BEQ scores, $F(1, 142) = 5.878, p = .017$. For overall BEQ posttest scores, as ECR-RS scores increased, participants' BEQ scores decreased. There was also a significant effect of attachment style on posttest BEQ negative expressivity scores, $F(1, 142) = 13.333, p < .001$, and posttest BEQ positive expressivity scores, $F(1, 142) = 4.624, p = .033$, but not on posttest BEQ impulse strength, $F(1, 142) = .002, p = .966$.

The effect of social desirability was not significant for overall posttest BEQ scores, $F(1, 142) = 0.750, p = .388$. There was a significant effect of social desirability on BEQ negative expressivity sub-scale scores, $F(1, 142) = 4.654, p = .033$. However, there was no significant effect on either the posttest BEQ positive expressivity, $F(1, 142) = 1.290, p = .258$, nor the BEQ impulse strength sub-scales, $F(1, 142) = 0.259, p = .612$. Table 11 provides the Berkeley Expressivity Questionnaire multivariate analysis of covariance results for tests of covariates, alexithymia group, and treatment condition.

Table 11

Berkeley Expressivity Questionnaire Multivariate Analysis of Covariance Results for Tests of Covariates, Alexithymia Group, and Treatment Condition

Independent Variable	Dependent Variable	Univariate F	df	Alpha	Partial ETA-Squared
Alexithymia condition	BEQ Overall	0.185	2,142	.831	.003
	Positive expressivity	3.514	2,142	.032*	.047
	Negative expressivity	0.392	2,142	.676	.006
	Impulse Strength	0.140	2,142	.869	.002
Treatment group	BEQ Overall	0.244	2,142	.622	.002
	Positive expressivity	0.134	2,142	.715	.001
	Negative expressivity	0.086	2,142	.769	.001
	Impulse Strength	0.330	2,142	.567	.002
Covariates Attachment style (ECR-RS)	BEQ Overall	5.878	1,142	.017*	.040
	Positive expressivity	4.624	1,142	.033*	.032
	Negative expressivity	13.333	1,142	< .001***	.086
	Impulse Strength	0.002	1,142	.966	.000
Social Desirability (MC-SDS Short Form)	BEQ Overall	0.750	1,142	.388	.005
	Positive expressivity	1.290	1,142	.258	.009
	Negative expressivity	4.654	1,142	.033	.032
	Impulse Strength	0.259	1,142	.612	.002

Gain Scores Analysis

In the previous analyses, comparisons of the effects of alexithymia and emotional expressivity were performed out of posttest levels. However, in order to examine the effects of treatment condition (modified vs traditional) on alexithymia and emotional expressivity, an additional analysis was performed on pre-post gain scores for both alexithymia and emotional expressivity while controlling for attachment style and social desirability.

Testing for Statistical Assumptions of Multiple Analysis of Covariance and Analysis of Covariance

Before conducting the analyses, eight assumptions of the MANCOVA and ANCOVA were assessed to make sure the analysis would yield valid results. Each of the TAS-20 and BEQ gain scores and their facets were examined for outliers using a cut-off ± 3 standard deviations. No outliers were found on the difficulty describing feelings (DDF) or difficulty identifying feelings (DIF) sub-scales. There was an outlier in the externally oriented thinking (EOT) gain score facet, one outlier was also found in the difficulty identifying feelings (DIF), and for the BEQ scale, one outlier was identified in the impulse facet. All univariate outliers were removed.

The data were also assessed for multivariate outliers across the two dependent variables (TAS-20 and BEQ gain scores). The Mahalanobis distance was calculated with two degrees of freedom and was compared to a chi-square distribution. If any of the values was significant at the .001 alpha level, that data point was considered an outlier. Two outliers were discovered and were removed from the analysis.

The third assumption of the statistical analysis asked for approximately normal distribution of the residuals. This assumption was assessed using the Shapiro-Wilk test of normality. A significant *p-value* (i.e., $p < .05$) would indicate the shape of the distribution was significantly different from the normal distribution. The distributions of the gain scores for both TAS-20 and BEQ scales and subscales were approximately normally distributed. The distribution of scores on the ECR-RS covariate (attachment style) was also approximately normally distributed. The distribution of scores on the MC-SDS Short Form (social desirability) was significantly different from that of a normal distribution, $p < .001$. Table 12 presents a complete list of normality statistics and significance values for each of the continuous variables included in the present study.

Table 12

Shapiro-Wilk Test of Normality for Predictors, Covariates, and Dependent Variables

Tasks	Shapiro-Wilk Test of Normality		
	Statistic	<i>df</i>	<i>p</i>
TAS-20 Overall Gain Score	.912	149	.618
Difficulty describing feelings gain score	.086	150	.221
Difficulty identifying feelings gain score	.096	149	.105
Externally oriented thinking gain score	.102	149	.099
BEQ Overall Gain Score	.872	149	.412
Negative expressivity gain score	.090	150	.094
Positive expressivity gain score	.082	150	.301
Impulse strength expressivity gain score	.105	149	.097
ECR-RS	.992	150	.560
MC-SDS (short form)	.964	150	<.001

To continue with the assumption of homogeneity of variances and covariances, a Box's M test was conducted and showed the covariance matrices of the dependent variables in the model were equal across conditions, Box's M =16.208, $p = .011$. Box's M test is sensitive to data not normally distributed; therefore, the level of statistical significance for this test is often set at $p < .001$. The assumption of equality of covariance was satisfied. Similarly, the assumption of homogeneity of variances was tested using Levene's test of equality of variances. If Levene's test was statistically significant (i.e., $p < .05$) and there were no equal variances, there was a violation of the assumption of homogeneity of variances. Table 13 gives the values of the Levene's test of equality of the variances for each gain score facet.

Table 13

Levene's Test of Equality of Error Variances

Tasks	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>p</i>
TAS-20 Overall Gain Score	.316	1	148	.712
Difficulty describing feelings gain score	1.521	1	148	.219
Difficulty identifying feelings gain score	.000	1	147	.987
Externally oriented thinking gain score	.512	1	147	.475
BEQ Overall Gain Score	.428	1	148	.514
Negative expressivity gain score	1.487	1	148	.225
Positive expressivity gain score	1.563	1	148	.213
Impulse strength expressivity gain score	.583	1	147	.446

The sixth assumption required a linear relationship between the dependent variable and covariate at each level of the dependent variable (i.e., traditional and modified treatment). The relationship between each pair of dependent variables should be approximately linear for each related group of the independent variable. By examining the scatterplot matrices, there should be a linear relationship between each pair of dependent variables within each group of the independent variable and a linear relationship between the covariate and each dependent variable within each group of the independent variable. It was determined that this statistical assumption was satisfied. The scatter plots were split for simplicity (see Figures 6-8).

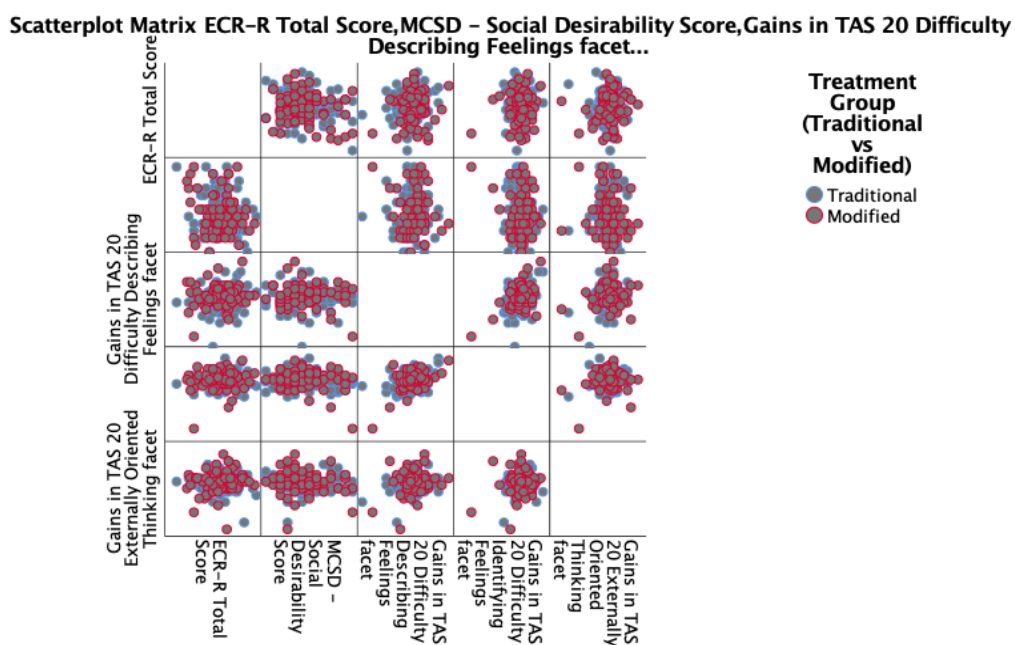


Figure 6. Gains in Toronto Alexithymia Scale-20 facets.

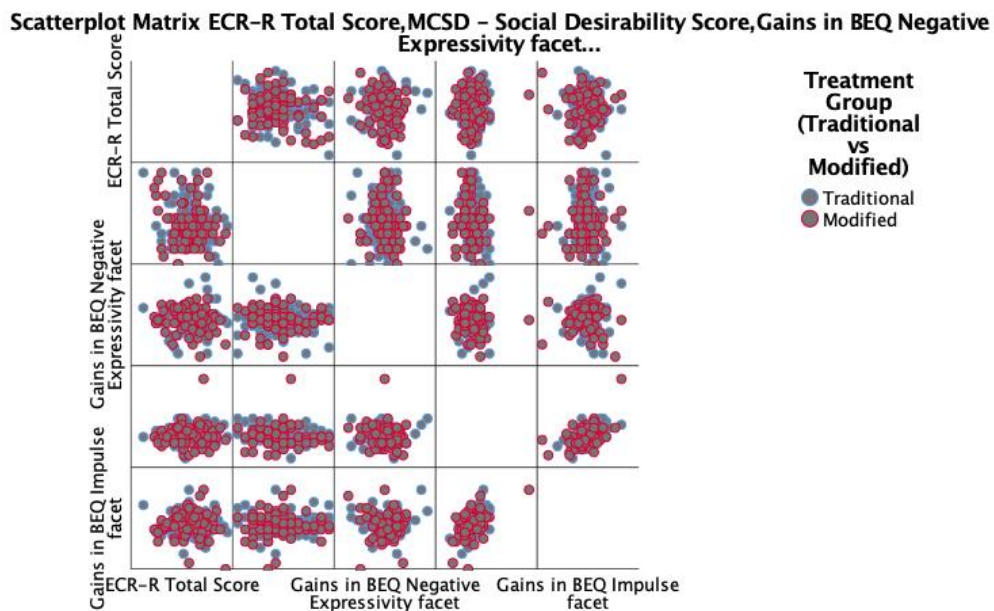


Figure 7. Gains in Berkeley Expressivity Questionnaire facet.

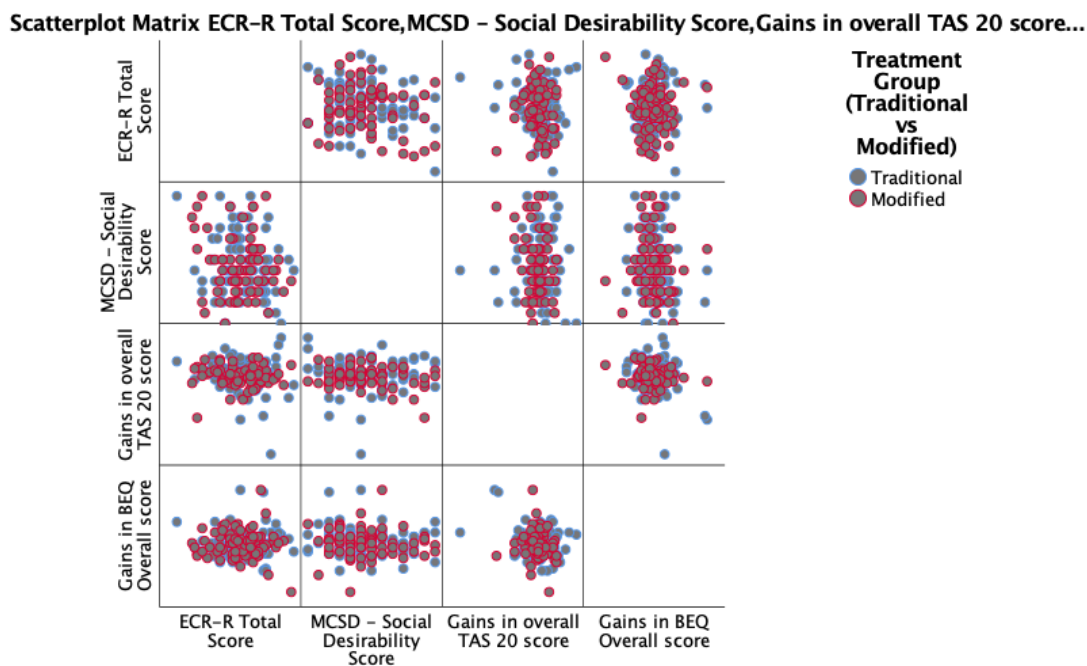


Figure 8. Gains in Toronto Alexithymia Scale-20 overall score and Berkeley Expressivity overall score gain.

The seventh assumption assessed was that of homoscedasticity. This assumption was tested by plotting a scatterplot of the standardized residuals against the predicted values. Figures 9-16 present the scatter plots of the standardized residuals against the predicted values for each of the gain score facet of the TAS-20 and BEQ. If there was homoscedasticity, the standardized residuals would be equal across the predicted values, i.e., the points of each of the scatterplots would exhibit no pattern and would be approximately constantly spread across the predicted values and the spread of points would be similar in the y-axis for all categories of the independent variable—treatment condition. The spread of points should be similar in the y-axis for each of the scatterplots. The standardized residuals in the aforementioned scatterplots appeared randomly scattered and with approximately constant spread. On this basis, it would appear the assumption of homoscedasticity was met.

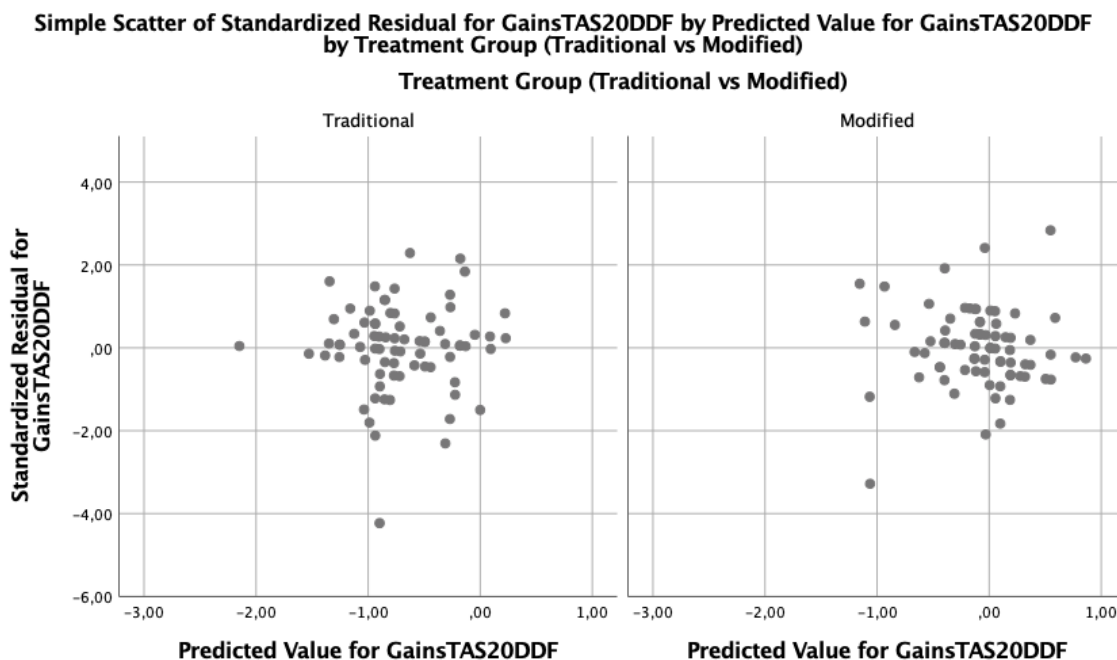


Figure 9. Difficulty describing feeling gain score.

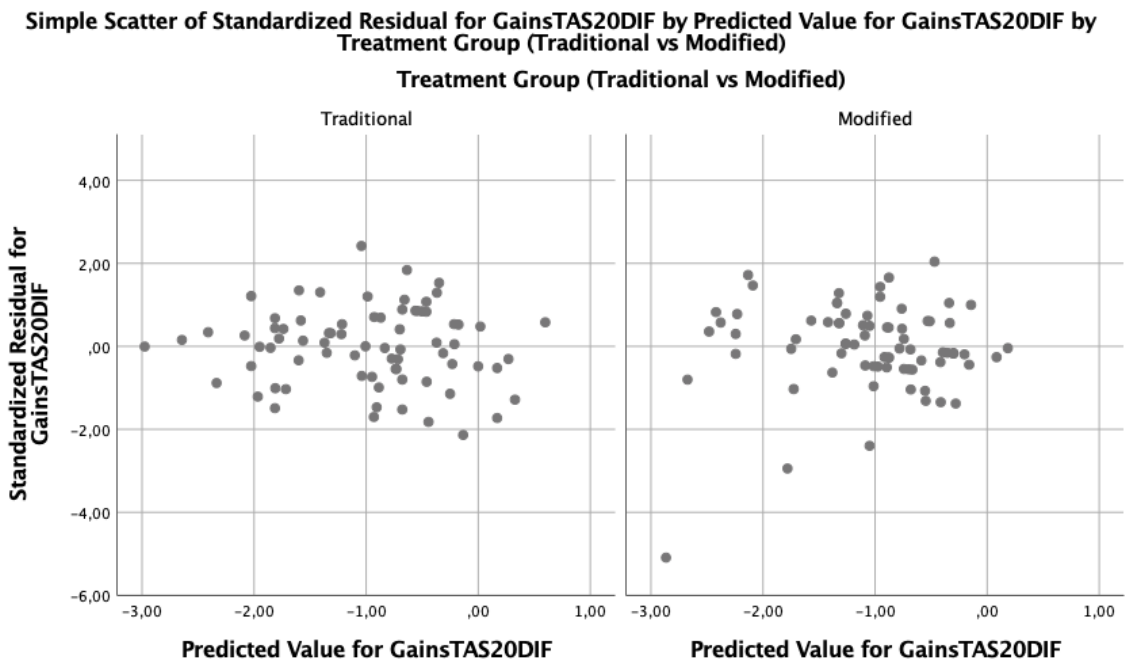


Figure 10. Difficulty identifying feelings gain score.

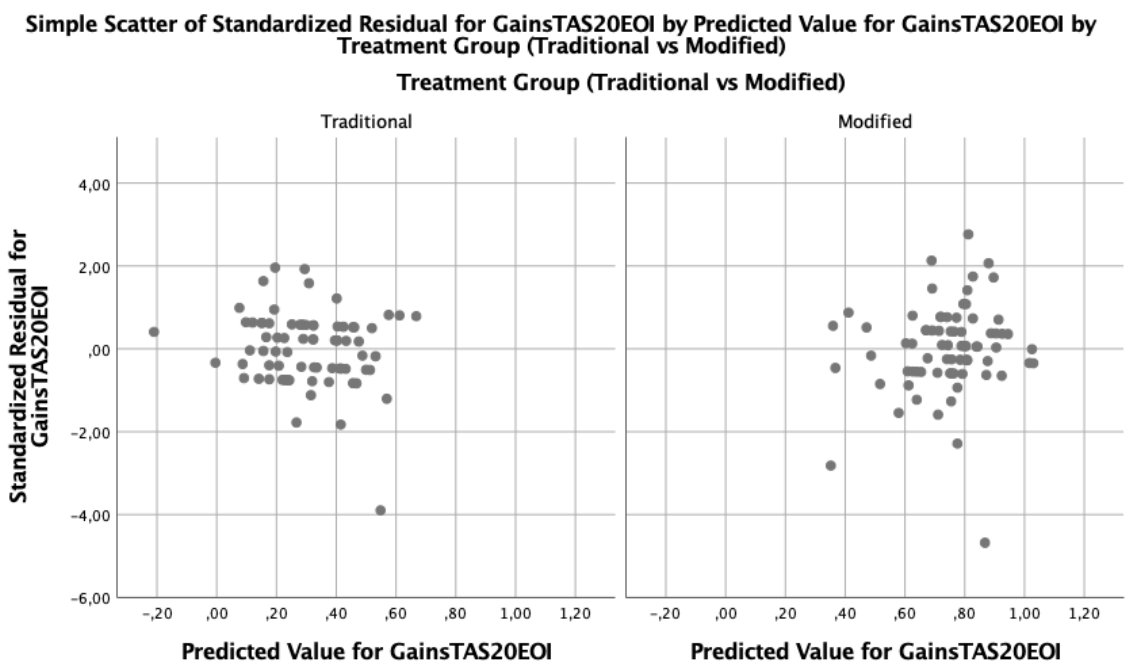


Figure 11. Externally oriented thinking gain score.

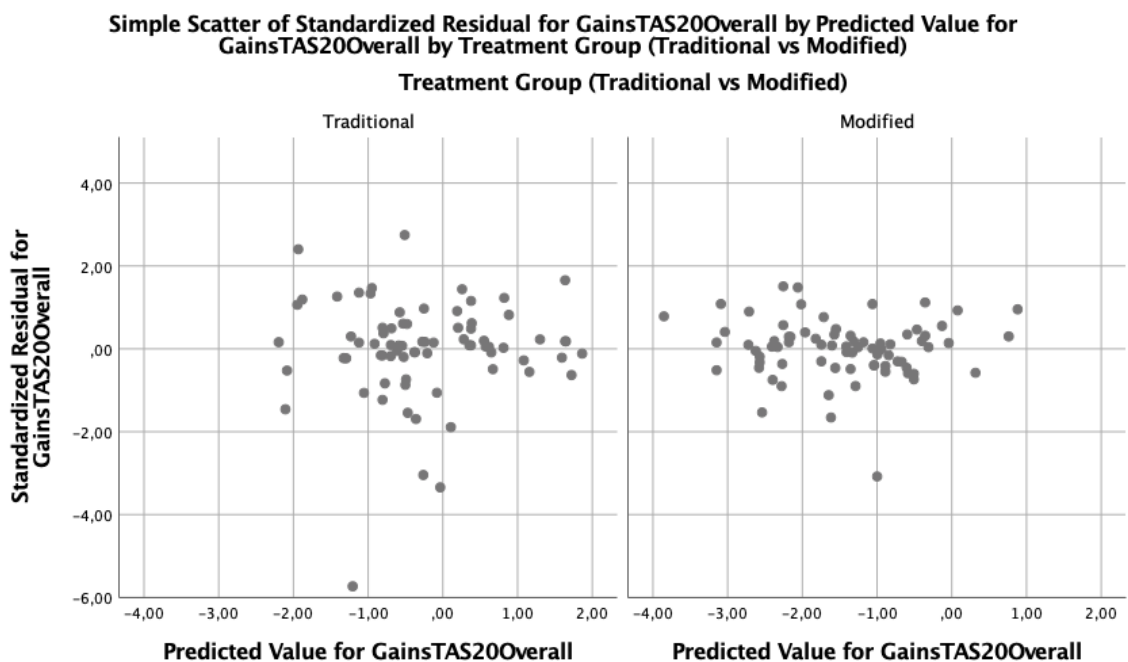


Figure 12. Toronto Alexithymia Scale-20 overall gain score.

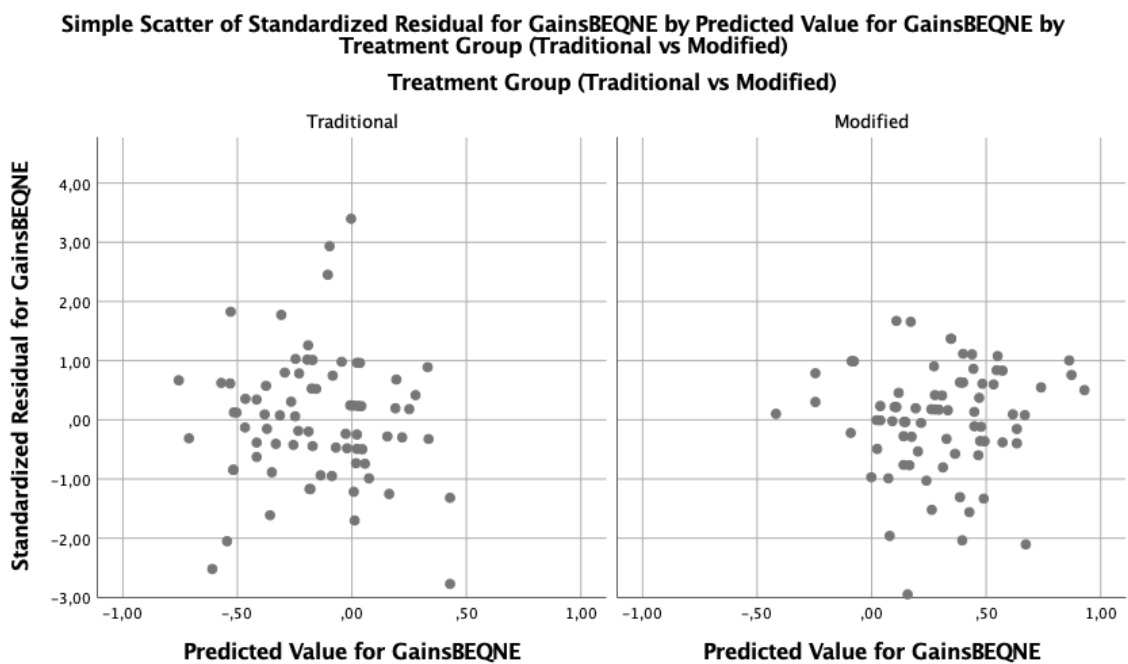


Figure 13. Negative expressivity gain score.

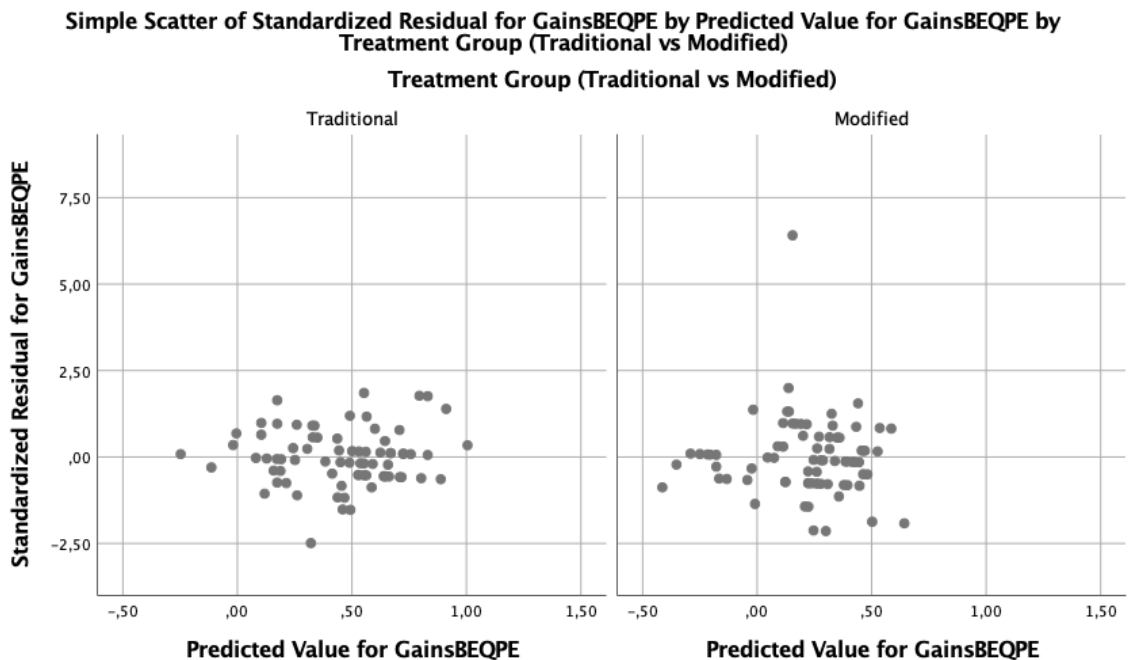


Figure 14. Positive expressivity gain score.

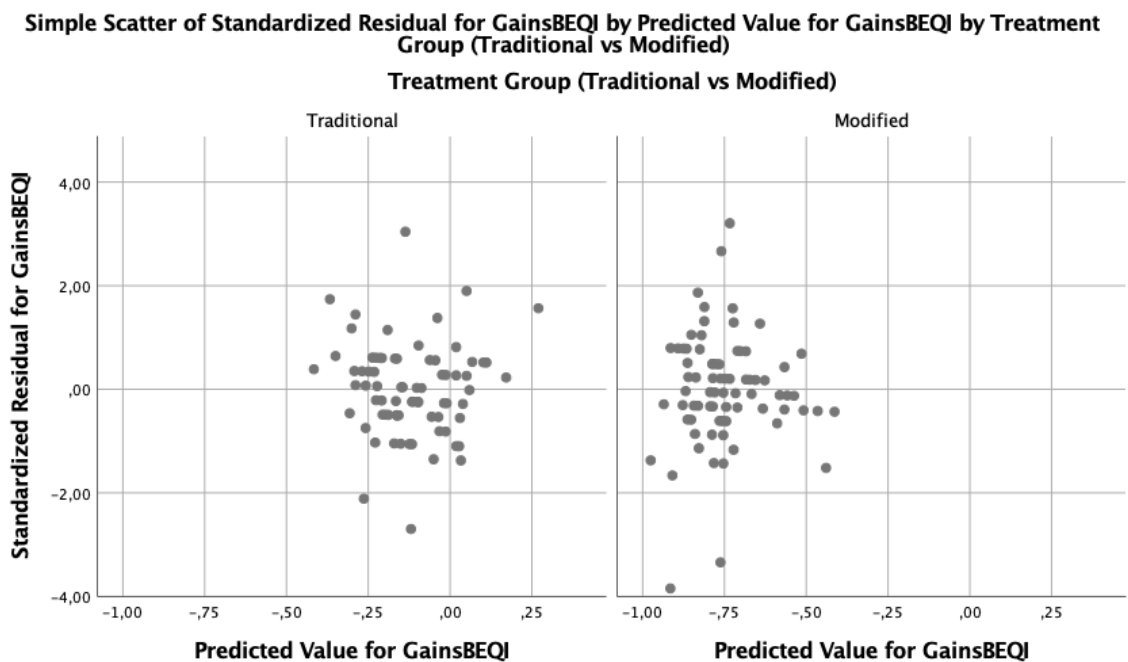


Figure 15. Impulse control gain score.

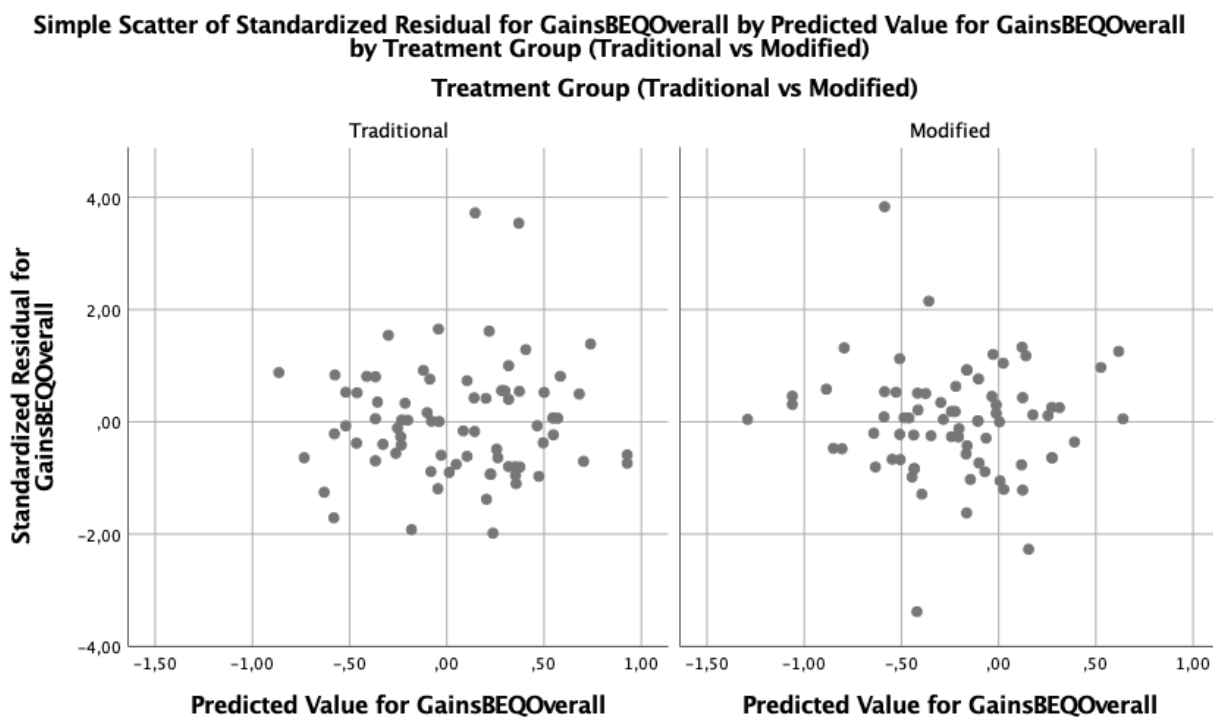


Figure 16. Berkeley Expressivity Questionnaire overall gain score.

Finally, the last assumption, which required homogeneity of regression slopes, meant there should be no interaction between the covariate and the independent variable of the gain scores of the facets. This assumption checked that there was no interaction between the covariates, MC-SDS (Short Form), ECR-RS, and the independent variable—treatment condition. In other words, the imaginary regression lines (in the section where the linear relationship was checked) must be parallel. Although the previous scatterplots gave an indication of whether the slopes were parallel, a test was run to confirm this assumption statistically by determining whether there was a statistically significant interaction term between the covariate and the independent variable. The results for each gain score facet of the TAS-20 and BEQ are provided in Table 14.

Table 14

Test of Between Subjects Effects: Treatment Condition, Attachment, and Social Desirability

Score	<i>F</i> Statistic	<i>p</i>
TAS-20 overall gain score	.410	.664
Difficulty describing feelings gain score	.279	.757
Difficulty identifying feelings gain score	.471	.625
Externally oriented thinking gain score	.729	.484
BEQ overall gain score	.639	.529
Negative expressivity gain score	.137	.872
Positive expressivity gain score	1.217	.299
Impulse strength expressivity gain score	.789	.456

Based on the results in Table 14, there was homogeneity of regression slopes as evidenced by the fact that the interaction terms were not statistically significant for either of the facet (p -values $< .05$). All the assumptions were met so the researcher moved on to the analyses.

Multiple Analysis of Covariance and Analysis of Covariance

A MANCOVA analysis was run with the dependent variables of the gain scores for TAS 20 (overall scores) and BEQ (overall scores). Treatment condition was included as a fixed effects variable (categorical variable) while attachment style and social desirability were run as covariates (scale variables). The analysis from all four

multivariate tests indicated no significant effect of treatment condition upon the dependent variables ($p = .750$, see Table 15).

Table 15

Multivariate Tests

Effect		Value	<i>F</i>	Hypothesis df	Error df	Sig.	Partial Eta Squared
Treatment Condition	Pillai's Trace	.035	.632 ^b	8.000	138.000	.750	.035
	Wilks' Lambda	.965	.632 ^b	8.000	138.000	.750	.035
	Hotelling's Trace	.037	.632 ^b	8.000	138.000	.750	.035
	Roy's Largest Root	.037	.632 ^b	8.000	138.000	.750	.035

a. Design: Intercept + MC-SDS (Short Form) Score + ECR-RS_Total + TreatmentGroup

b. Exact statistic

The between-subjects effects analysis confirmed that even in pairwise analysis, treatment condition had no significant effect on any of the dependent variables (TAS-20 or BEQ gain scores, see Table 16). The main effect of treatment condition was not significant for alexithymia gain scores, $p = .267$, nor for emotional expressivity gain scores, $p = .786$.

Table 16

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.	Partial Eta Squared
Treatment Condition	Gains in overall TAS 20 score	69.508	1	69.508	1.240	.267	.008
	Gains in TAS 20 Difficulty Describing Feelings facet	15.177	1	15.177	1.366	.224	.009
	Gains in TAS 20 Difficulty Identifying Feelings facet	.269	1	.269	.16	.901	.000
	Gains in TAS 20 Externally Oriented Thinking facet	7.218	1	7.218	.822	.366	.006
	Gains in BEQ Overall score	3.336	1	3.336	.074	.786	.001
	Gains in BEQ Negative Expressivity facet	7.374	1	7.374	.434	.511	.004
	Gains in BEQ Positive Expressivity facet	2.249	1	2.249	.260	.611	.002
	Gains in BEQ Impulse facet	14.636	1	14.636	1.092	.298	.008

R Squared = .004.

To assess the main effect of treatment condition on individual gain facet scores, an additional analysis (ANCOVA) was performed for both alexithymia and emotional expressivity facet gain scores. Treatment condition was set as a fixed effect variable while ECR-RS and MSCD were run as covariates. No significant effects of treatment condition were observed for the three facets of alexithymia (difficulty describing feelings

gain score, $p = .224$; difficulty identifying feelings gain score, $p = .901$; or externally oriented thinking gain score, $p = .366$) nor for the three facets of emotional expressivity (negative expressivity gain score, $p = .511$; positive expressivity gain score, $p = .611$; or impulse control gain score, $p = .298$).

Summary

A total of 150 college students (ranging from their first year to their sixth year) participated in the current study. The majority of participants were single, White, and female. Based on pretest TAS-20 scores, 50 participants were categorized as having low alexithymia, 50 had moderate alexithymia, and 50 had high alexithymia. Participants completed measures on alexithymia and emotional expressivity before and after receiving treatment (traditional or modified). Half of the participants were randomly assigned to the traditional treatment condition and half were randomly assigned to the modified treatment. Participants also completed items measuring their level of social desirability and attachment style (used as control/covariates in the analyses).

Based on two sets of analyses (controlling for social desirability and attachment style), no effect of the two expressive writing treatment conditions was detected. In other words, participants' levels of alexithymia and emotional expressivity did not vary as a function of whether they received traditional or modified treatment. However, there were significant impacts of social desirability and attachment style on both TAS-20 and BEQ scores. Participants' social desirability scores negatively impacted their TAS-20 (alexithymia) scores. In other words, as participants' responses were more "socially desirable," their TAS-20 scores (alexithymia) decreased. In fact, as an exploratory follow-up measure, correlations between participants' pretest alexithymia (TAS-20)

scores and their social desirability scores yielded a significant, negative relationship ($r = -.23, p = .004$). This suggested lower levels of alexithymia were associated with answering items in a perceived “socially acceptable” way.

Additionally, participants’ adult attachment style (ECR-RS) positively impacted their levels of alexithymia. As participants’ ECR-RS scores increased, their TAS-20 scores (alexithymia) increased. Regarding participants’ emotional expressivity (BEQ scale and sub-scale scores), ECR-RS scores (attachment style) negatively impacted BEQ overall scores as well as BEQ negative expressivity and BEQ positive expressivity. As participants’ ECR-RS scores (attachment style) increased, their emotional expressivity scores decreased.

CHAPTER V

DISCUSSION

The purpose of the present study was to investigate whether types of writing interventions impacted alexithymia and emotional expressivity. Alexithymia is a psychological construct described as individuals lacking the ability to describe their emotions or feelings to other people (Ashley et al., 2011; Muller, 2000). Crucially, individuals with alexithymia have limited capacity for emotional attachment and communication and are particularly poor at organizing focused thoughts (e.g. Serani, 2014).

Expressive writing interventions as a treatment for alexithymia have become more popular and have demonstrated several beneficial attributes (Frattaroli, 2006; Lumley, 2004), particularly in samples of college students (King & Miner, 2000; Mosher & Danoff-Burg, 2006). The literature was mixed on importance and effectiveness of different aspects of the expressive writing treatment, e.g., the setting (online or face-to-face), the number of sessions, or type of expressive writing treatment (traditional or modified). A recent review of the literature identified four directions for research on alexithymia intervention by examining the (a) impact of time of the intervention, (b) effects of medication (e.g., selective serotonin reuptake inhibitors), (c) effects of non-emotional interventions (e.g., cognitive-behavioral therapy), and (d) effects of guided, structured expressive writing interventions (Lumley, 2004). The present study

specifically tested this fourth aspect of alexithymia intervention by examining the differences between traditional and modified expressive writing treatments.

The traditional expressive writing exercise involved a standard, open-ended structure in which participants were asked to write about the most traumatic event of their lives and to write freely about what happened and whatever came to mind (Pennebaker, 2004). The modified expressive writing prompt specifically broke down the instructions into four steps. First, participants were asked to focus on a very important emotional event by framing the topic of interest. The second step asked participants to make connections with people in their lives. The third step promoted self-reflection (e.g., giving advice to themselves as if they were their own therapist). The final step asked participants to appraise the information they provided. It was thought that because the characteristics of high alexithymia included an inability to identify and describe one's feelings, a more guided prompt (i.e., modified) might counteract the negative emotional expressiveness mechanism associated with alexithymia. In other words, those high on alexithymia might feel emotions but would not be able to access and describe their emotions with the proper vocabulary, especially with minimal guidance. As such, it was thought a modified expressive writing intervention would be at least equally as effective as traditional expressive writing interventions for the treatment of alexithymia.

It was found the type of treatment participants received did not impact their degree of alexithymia nor their emotional expressivity. In this sample of college students, no difference was found in TAS-20 (alexithymia) or BEQ (emotional expressivity) for those exposed to traditional or modified expressive writing treatments (see Figure 17). Furthermore, the type of treatment (traditional or modified) did not

impact alexithymia even when categorizing participants' alexithymia into three levels (low, moderate, and high alexithymia) prior to receiving treatment. It was predicted the modified treatment condition would be more beneficial for participants of alexithymia. However, this prediction was not supported in the present study. Furthermore, there was no effect of either treatment on alexithymia or expressivity scores. In addition, no difference was found in average TAS-20 (alexithymia) or BEQ (emotional expressivity) from pretest to posttest.

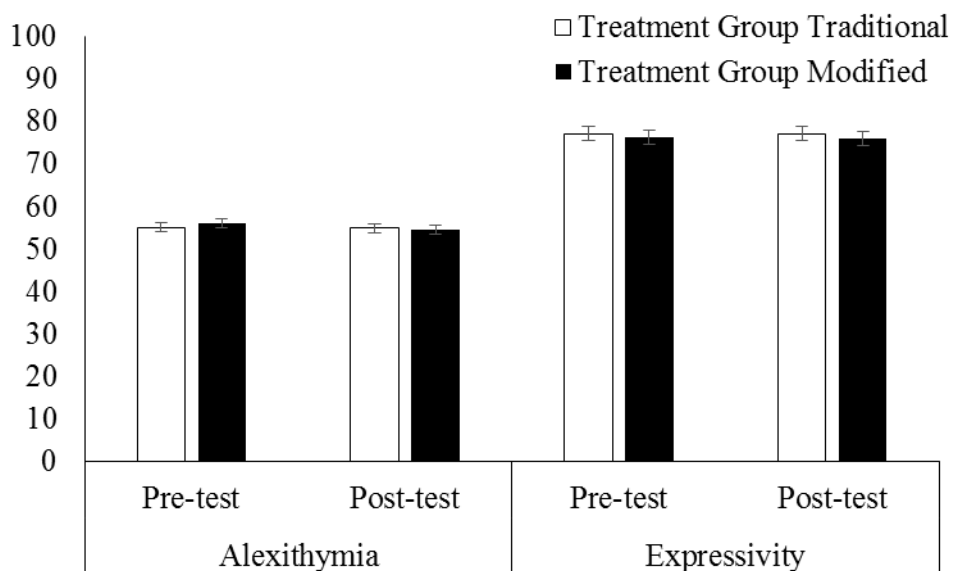


Figure 17. Estimated pretest and posttest scores of alexithymia and expressivity by treatment group controlling for attachment style and social desirability.

This null finding was consistent with previous research (Ashley et al., 2011). One study found no effect of different expressive writing conditions (writing about stress, writing about positive life experiences, or writing about a control topic) on alexithymia (Ashley et al., 2011). Similar studies also found no effects of emotional disclosure

interventions across a variety of different populations (Barton & Jackson, 2008; Harris, Thoresen, Humphreys, & Faul, 2005; Mackenzie, Wiprzycka, Hasher, & Goldstein, 2007; Schwartz & Drotar, 2004; Vedhara et al., 2007; Zakowski, Ramati, Morton, Johnson, & Flanigan, 2004). Specifically, for populations with alexithymia, a review of several studies found people with alexithymia were not likely to benefit from emotional disclosure by expressive writing or talking (Lumley, 2004). However, one study found changes in levels of alexithymia between participants who received a guided version (e.g., modified expressive writing treatment) compared to a control group, when given guided instructions (Lumley, 2004).

In another control study, Beresnevaite (2000) reported significant reductions for the trait alexithymia following group psychotherapy. Those changes were maintained even after two years follow up. This evidence supported the idea that alexithymia could be considered from an intervention perspective and reductions in the trait itself could have a significant impact on someone's health outcomes. Guided by those preliminary findings and results from a pilot study among college students, this study offered a method of emotional guidance through expressive writing that was hypothesized to show a significant benefit to participants. The intervention group received a modified expressive writing intervention tailored specifically for people who experienced difficulties identifying and describing feelings in hopes the opportunity and the offer of a context for participants to practice skills in emotional mastery would help them identify, describe, and process their emotions and feelings specifically around an identified event. The potential utility of such a self-help tool would be to offer a way for people,

specifically those with challenges around the construct of alexithymia, to systematize their emotional processing capacity.

One of the characteristics of alexithymia is difficulty in expressing emotional states. As such, people with alexithymia would not benefit from disclosing their emotions, written or spoken, because they cannot communicate their feelings. Alexithymia interferes with the benefits of emotional disclosure because alexithymics have difficulty identifying, describing, and exploring their emotional thoughts and feelings. On the other hand, alexithymics do not have the opportunity to practice emotional mastery skills in their day-to-day life and could potentially benefit from focused interventions like the one offered here.

Other literature studies regarding the effect of expressive writing interventions as a treatment for alexithymia were mixed. Some found participants with lower alexithymia levels received a greater benefit from expressive writing treatments (e.g., Lumley, 2004; O'Connor & Ashley, 2008) while others found individuals with high alexithymia scores benefited more from expressive writing treatments (Paez, Velasco, & Gonzales, 1999; Solano, Donati, Pecci, Persichetti, & Colaci, 2003). The present study did not demonstrate a greater benefit of either expressive writing condition for individuals with higher or lower levels of alexithymia.

One explanation for these null findings might be participants' levels of social desirability—one of the most commonly identified sources of bias in research studies, particularly for surveys (Mick, 1996). Indeed, the present study found participants' social desirability influenced their responses on the alexithymia and emotional expressivity measures. The relationship between social desirability and alexithymia was

negative, indicating as participants social desirability response bias increased, their alexithymia scores decreased. Additionally, only one-third of participants were categorized as having high alexithymia. If lower alexithymia scores were associated with social desirability bias, failing to find an effect of expressive writing condition on alexithymia might have been due to participants in the present sample demonstrating more social desirability bias in their responses.

A related explanation might have been the relatively low levels of alexithymia in the present sample. This study categorized participants as having low, moderate, or high alexithymia. However, other literature identified a cut-off score for the presence of alexithymia (Bagby et al., 1994). Participants with scores on the TAS-20 of 60 or less were classified as non-alexithymia and those with scores of 61 or greater were alexithymic. According to those cut-offs, only 50 participants in the present sample were alexithymic and most likely to benefit from expressive writing treatment. This would have limited the sample size and, in turn, the statistical power of the treatment manipulation. As such, it might have been harder to detect an effect of treatment (modified versus traditional) in a smaller sub-sample (i.e., high alexithymia group) because of the relatively small sample size.

Another explanation for the null findings might have been the attachment styles of participants in the present sample. It was thought insecure adult attachment might share characteristics such as impaired emotional ability and a separation from emotional awareness (Moran, 2004). As such, it was predicted both the modified and traditional expressive writing interventions would be beneficial for individuals with attachment-related issues as well as alexithymia. The present study did find a significant impact of

participants' attachment styles on their levels of alexithymia. Participants' ECR-RS scores (attachment style) increased along with their TAS-20 (alexithymia) scores. Higher scores on the ECR-RS were thought to represent individuals with insecure attachment style. Consistent with this finding, ECR-RS scores were negatively related to participants' emotional expressivity. As participants' ECR-RS scores (attachment style) increased, their emotional expressivity scores decreased, indicating participants with more insecure attachment displayed less emotional response tendencies. To summarize, participants with less secure attachment had higher levels of alexithymia and less emotional expressivity. The present findings regarding attachment style and alexithymia and emotional expressivity were consistent with previous research demonstrating attachment style as a better predictor than expressive writing treatments, particularly for those with insecure adult attachment (Stroebe et al., 2006). It was thought individuals with secure attachment had other avenues and paradigms for disclosure in their everyday lives, whereas individuals with non-secure attachment might not have other avenues for disclosure.

Limitations

One limitation of the present intervention study was there were only two intervention time-points and one posttest assessment. People with alexithymia might benefit from emotional disclosure, and/or other expressive writing techniques if given more time and practice. One study suggested extending the number and time of exercises from three to four days for 20 minutes daily; Lumley, 2004). Another study failed to find differences in expressive writing interventions after one session (Walker et al., 1999). The present study found extra guidance or instruction alone (i.e., the modified writing

treatment group) did not sufficiently improve alexithymia levels. Further research is needed to determine whether long-term guided expressive writing interventions might successfully treat alexithymia over time.

Another limitation to the present findings was due to social desirability response bias. Social desirability scores did impact participants' responses. While self-reported data were important to perceive how participants subjectively perceived their own symptoms, future research might combine survey responses with objective, physiological measures (e.g., heart-rate, blood pressure, etc.) to provide different lines of converging evidence.

Potential limitations also included the uncontrolled effect factors such as concurrent disorders potentially had on the outcome of this study. For example, it has been shown that stress can have a negative impact in people with alexithymia and can prevent individuals from gaining benefit from therapeutic interventions (Hendryx et al., 1991). As such, future research should address participants' anxiety before any therapeutic intervention is employed and see how the relationship between stress and alexithymia impacts participants.

Finally, the student sample in the current study presented a limitation. Most participants were traditional college students, ranging from their first to fourth year in school ($n = 109$; 72.7%). While alexithymia might be prevalent in certain populations, the prevalence of alexithymia in the general population was approximately 10% (Franz et al., 2008; Salminen, Sarrijarvi, Aarela, Toikka, & Kauhanen, 1999). As such, this population could be problematic for generalizability purposes.

Conclusions

The present research investigated the impact of two types of expressive writing prompts (traditional versus modified) on levels of alexithymia and emotional expressivity in college students. Alexithymia can have a wide range of negative effects including depression and anxiety (Hendryx et al., 1991; Jones, 1984) as well as physical risks (Serani, 2014). Furthermore, these individuals are at a far greater risk for substance abuse and addiction (Lumley et al., 1994; Serani, 2014). Expressive writing interventions are becoming more popular in their treatment of psychologically traumatic events such as PTSD (Lange et al., 2000).

The present study implemented a pretest/posttest design wherein 150 college students completed measures of alexithymia (TAS-20) and emotional expressivity (BEQ). Additionally, two confounding variables were controlled for: social desirability and attachment style. The present study did not detect any effect of either expressive writing condition on alexithymia or emotional expressivity in college students with low, moderate, and high levels of alexithymia. However, the two covariates of social desirability and emotional attachment style did indeed affect participants' levels of alexithymia and emotional expressivity. The null findings of the present study might have been due to several factors including general low levels of alexithymia in the sample, only two sessions and one posttest, as well as participants' social desirability bias and emotional attachment styles. Participants' insecure emotional attachment did affect their levels of alexithymia and emotional expressivity.

The current research added to a growing body of literature on the efficacy of expressive writing prompts as treatments for alexithymia and provided a foundation for

future research. Future studies might extend the experimental design utilized in the present study to a longitudinal design to determine whether expressive writing interventions were effective over time. Additionally, future studies might explore the relationship between emotional attachment style, stress, and alexithymia. Finally, other studies conducted on a variety of samples are needed for generalizability.

REFERENCES

- Adams, H. E., & Sutker, P. B. (2007). *Comprehensive handbook of psychopathology*. New York: Springer Science and Business Media.
- Ashley, L., O'Connor, D. B., & Jones, F. (2011). Effects of emotional disclosure in caregivers: Moderating role of Alexithymia. *Stress and Health, 27*(5), 376–387.
doi:10.1002/smi.1388
- Averill, A. J., Kasarskis, E. J., & Segerstrom, S. C. (2013). Expressive disclosure to improve well-being in patients with amyotrophic lateral sclerosis: A randomised, controlled trial. *Psychology & Health, 28*(6), 701–713.
<http://doi.org/10.1080/08870446.2012.754891>
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto alexithymia scale-I: Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research, 38*(1), 23–32.
doi:10.1016/0022-3999(94)90005-1
- Baikie, K. A. (2008). Who does expressive writing work for? Examination of alexithymia, splitting, and repressive coping style as moderators of the expressive writing paradigm. *British Journal of Health Psychology, 13*(1), 61-66.
- Baikie, K. A., & Wilhelm, K. (2005). Emotional and physical health benefits of expressive writing. *Advances in Psychiatric Treatment, 11*(5), 338–346.

- Barton, K., & Jackson, C. (2008). Reducing symptoms of trauma among carers of people with psychosis: Pilot study examining the impact of writing about caregiving experiences. *The Australian and New Zealand Journal of Psychiatry*, *42*, 693-701.
- Beresnevaite, M. (2000). Exploring the benefits of group psychotherapy in reducing alexithymia in coronary heart disease patients: A preliminary study. *Psychotherapy and Psychosomatics*, *69*, 117-122.
- Beretvas, S. N., Meyers, J. L., & Leite, W. L. (2002). A reliability generalization study of the Marlowe-Crowne Social Desirability Scale. *Educational and Psychological Measurements*, *62*, 570-589.
- Berkowitz, L., & Troccoli, B. T. (1990). Feelings, direction of attention, and expressed evaluations of others. *Cognition & Emotion*, *4*(4), 305-325.
- Bhullar, N., Schutte, N., & Malouff, J. (2011). Writing about satisfaction processes increases well-being. *Individual Differences Research*, *9*, 22-32.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. New York: Basic Books.
- Breuer, J., & Freud, S. (1895/1966). *Studies on hysteria*. New York: Avon.
- Broderick, J. E., Junghaenel, D. U., & Schwartz, J. E. (2005). Written emotional expression produces health benefits in fibromyalgia patients. *Psychosomatic Medicine*, *67*(2), 326-334. <http://doi.org/10.1097/01.psy.0000156933.04566.bd>
- Burke, P. A., & Bradley, R. G. (2006). Language use in imagined dialogue and narrative disclosures of trauma. *Journal of Traumatic Stress*, *19*(1), 141-146.
- Burton, C. M., & King, L. A. (2008). Effects of (very) brief writing on health: The two-minute miracle. *British Journal of Health Psychology*, *13*(1), 9-14.
<http://doi.org/10.1348/135910707x250910>

- Campbell, J. (2003). Efficacy of behavioral interventions for reducing problem behavior in persons with autism: A quantitative synthesis of single-subject research. *Research in Developmental Disabilities, 24*(2), 120-138.
- Campbell, R. S., & Pennebaker, J. W. (2003). The secret life of pronouns: Flexibility in writing style and physical health. *Psychological Science, 14*(1), 60–65.
<http://doi.org/10.1111/1467-9280.01419>
- Chang, J.-H., Huang, C.-L., & Lin, Y.-C. (2012). The psychological displacement paradigm in diary-writing (PDPD) and its psychological benefits. *Journal of Happiness Studies, 14*(1), 155–167.
- Christiansen, B. (2014). Straight line fitting and predictions: On a marginal likelihood approach to linear regression and errors-in-variables models. *Journal of Climate, 27*(5), 2014-2031. doi:10.1175/JCLI-D-13-00299.1
- Chung, C. K., & Pennebaker, J. W. (2008). Variations in the spacing of expressive writing sessions. *British Journal of Health Psychology, 13*(1), 15–21.
- Danoff-Burg, S., Mosher, C. E., Seawell, A. H., & Agee, J. D. (2010). Does narrative writing instruction enhance the benefits of expressive writing? *Anxiety, Stress & Coping, 23*(3), 341–352. <http://doi.org/10.1080/10615800903191137>
- DeSalvo, L. A. (1999). *Writing as a way of healing: How telling our stories transforms our lives* (1st ed.). San Francisco: Harper.
- Deters, F. G., & Mehl, M. R. (2012). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science, 4*(5), 579–586.
<http://doi.org/10.1177/1948550612469233>

- Diener, M. J., Hilsenroth, M. J., & Weinberger, J. (2007). Therapist affect focus and patient outcomes in psychodynamic psychotherapy: A meta-analysis. *The American Journal of Psychiatry*, *164*(6), 936-941.
- Dunnack, E. S., & Park, C. L. (2009). The effect of an expressive writing intervention on pronouns: The surprising case of I. *Journal of Loss and Trauma*, *14*(6), 436-446. <http://doi.org/10.1080/15325020902925084>
- Earle, C. (2018). *Director surveys public*. Retrieved from <https://www.aucccd.org/director-surveys-public>
- Edwards, A. L. (1957). *The social desirability variable in personality assessment and research*. New York: The Dryden Press.
- Engelbreton, T. O., Matthews, K. A., & Scheier, M. F. (1989). Relations between anger expression and cardiovascular reactivity: Reconciling inconsistent findings through a matching hypothesis. *Journal of Personality and Social Psychology*, *57*, 513-521.
- Esterling, B. A., L'Abate, L., Murray, E. J., & Pennebaker, J. W. (1999). Empirical foundations for writing in prevention and psychotherapy: Mental and physical health outcomes. *Clinical Psychology Review*, *19*(1), 79-96.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using g*power 3.1: Tests for correlation and regression analysis. *Behavior Research Methods*, *41*(4), 1149-1160.
- Feeney, J. A., Noller, P., & Hanrahan, M. (1994). Assessing adult attachment. In M. B. Sperting & W. H. Berman (Eds.), *Attachment in adults: Clinical and developmental perspectives*. New York: Guilford Press.

- Franz, M., Popp, K., Schaefer, R., Sitte, W., Schneider, C., Hardt, J., ... Braehler, E. (2008). Alexithymia in the German general population. *Social Psychiatry Psychiatric Epidemiology*, 43, 54-62.
- Frattaroli, J. (2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin*, 132, 823-865. doi:10.1037/0033-2909.132.6.823
- Frattaroli, J., Thomas, M., & Lyubomirsky, S. (2011). Opening up in the classroom: Effects of expressive writing on graduate school entrance exam performance. *Emotion*, 11(3), 691-696. <http://doi.org/10.1037/a0022946>
- Friedlander, L., Lumley, M. A., Farchione, T., & Doyal, G. (1997). Testing the alexithymia hypothesis: Physiological and subjective responses during relaxation and stress. *Journal of Nervous & Mental Disease*, 185, 233-239.
- Furnes, B., & Dysvik, E. (2010). A systematic writing program as a tool in the grief process: Part 1. *Patient Preference and Adherence*, 2010, 425. <http://doi.org/10.2147/ppa.s14864>
- Gillis, M. E., Lumley, M. A., Mosley-Williams, A., Leisen, J. C. C., & Roehrs, T. (2006). The health effects of at-home written emotional disclosure in fibromyalgia: A randomized trial. *Annals of Behavioral Medicine*, 32(2), 135-146.
- Gortner, E., Rude, S., & Pennebaker, J. (2006). Benefits of expressive writing in lowering rumination and depressive symptoms. *Behavior Therapy*, 37(3), 292-303. <http://doi.org/10.1016/j.beth.2006.01.004>
- Gross, J. J., & John, O. P. (1995). Facets of emotional expressivity: Three self-report factors and their correlates. *Personality and Individual Differences*, 19(4), 555-568. doi:10.1016/0191-8869(95)00055-b

- Gross, J., & John, O. (1997). Revealing feelings: Facets of emotional expressivity in self-reports, peer ratings, and behavior. *Journal of Personality and Social Psychology*, 72(2), 435-448. <http://dx.doi.org/10.1037//0022-3514.72.2.435>
- Gross, J., & John, O. (1998). Mapping the domain of expressivity: Multimethod evidence for a hierarchical model. *Journal of Personality and Social Psychology*, 74(1), 170-191. <http://dx.doi.org/10.1037//0022-3514.74.1.170>
- Gross, J., John, O., & Richards, J. (2000). The dissociation of emotion expression from emotion experience: A personality perspective. *Personality and Social Psychology Bulletin*, 26(6), 712-726. <http://dx.doi.org/10.1177/0146167200268006>
- Halpert, A., Rybin, D., & Doros, G. (2010). Expressive writing is a promising therapeutic modality for the management of IBS: A pilot study. *The American Journal of Gastroenterology*, 105(11), 2440–2448. <http://doi.org/10.1038/ajg.2010.246>
- Harris, A. H. S., Thoresen, C. E., Humphreys, K., & Faul, J. (2005). Does writing affect asthma? A randomized trial. *Psychosomatic Medicine*, 67, 130-136.
- Hendryx, S. M., Haviland, G. M., & Shaw, G. D. (1991). Dimensions of alexithymia and their relationships to anxiety and depression. *Journal of Personality*, 56(2), 227–237.
- Hill, E., Berthoz, S., & Frith, U. (2004). Brief report: Cognitive processing of own emotions in individuals with autistic spectrum disorder and in their relatives. *Journal of Autism and Developmental Disorders*, 34(2), 229–235. [doi:10.1023/b:jadd.0000022613.41399.14](https://doi.org/10.1023/b:jadd.0000022613.41399.14)

- Hoyt, T. (2011). The effects of negative emotion and expressive writing on posttraumatic stress symptoms. *Journal of Social and Clinical Psychology, 30*(6), 549–569.
- Imrie, S., & Troop, N. A. (2012). A pilot study on the effects and feasibility of compassion-focused expressive writing in Day Hospice patients. *Palliative and Supportive Care, 10*(02), 115–122. <http://doi.org/10.1017/s1478951512000181>
- Jin, S. (2005). *The dialectical effect of psychological displacement: A narrative analysis*. Taipei: National Science Council.
- Jones, B. A. (1984). Panic attacks with panic masked by Alexithymia. *Psychosomatics, 25*(11), 858–859. doi:10.1016/s0033-3182(84)72947-1
- Kellner, R. (1990). Somatization: Theories and research. *The Journal of Nervous and Mental Disease, 178*(3): 150–158.
- Kennes, L., Hilgers, R., & Heussen, N. (2012). Choice of the reference set in a randomization test based on linear ranks in the presence of missing values. *Communications in Statistics: Simulation & Computation, 41*(7), 1051-1061. doi:10.1080/03610918.2012.625797
- Kim, J. H., Lee, S. J., Rim, H. D., Kim, H. W., Bae, G. Y., & Chang, S. M. (2008). The relationship between alexithymia and general symptoms of patients with depressive disorders. *Psychiatry Investigation, 5*(3), 179. doi:10.4306/pi.2008.5.3.179
- King, L. A., & Miner, K. N. (2000). Writing about the perceived benefits of traumatic events: Implications for physical health. *Personality and Social Psychology Bulletin, 26*, 220-230.

- Klein, K., & Boals, A. (2001). Expressive writing can increase working memory capacity. *Journal of Experimental Psychology: General*, *130*(3), 520–533.
<http://doi.org/10.1037//0096-3445.130.3.520>
- Klugh, H. E. (2013). *Statistics: The essentials for research*. New York: Psychology Press.
- Konig, A., Eonta, A., Dyal, S. R., & Vrana, S. R. (2014). Enhancing the benefits of written emotional disclosure through response training. *Behavior Therapy*, *45*(3), 344–357. <http://doi.org/10.1016/j.beth.2013.12.006>
- Krpan, K. M., Kross, E., Berman, M. G., Deldin, P. J., Askren, M. K., & Jonides, J. (2013). An everyday activity as a treatment for depression: The benefits of expressive writing for people diagnosed with major depressive disorder. *Journal of Affective Disorders*, *150*(3), 1148-1151.
- Lange, A., van de Ven, J. P., Schrieken, B. A., Bredeweg, B., & Emmelkamp, B. M. (2000). Internet-mediated, protocol-driven treatment of psychological dysfunction. *Journal of Telemedicine and Telecare*, *6*, 15–21.
- Langens, T. A. (2005). Written emotional expression and emotional well-being: The moderating role of fear of rejection. *Personality and Social Psychology Bulletin*, *31*(6), 818–830.
- Leedy, P. D., & Ormrod, J. E. (2013). *Practical research: Planning and design* (9th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.
- Lengelle, R., Meijers, F., Poell, R., & Post, M. (2013). The effects of creative, expressive, and reflective writing on career learning: An explorative study. *Journal of Vocational Behavior*, *83*(3), 419–427. <http://doi.org/10.1016/j.jvb.2013.06.014>

- Lepore, S., Fernandez-Berrocal, P., Ragan, J., & Ramos, N. (2012). It's not that bad: Social challenges to emotional disclosure enhance adjustment to stress. *Anxiety, Stress & Coping, 17*, 341-321.
- 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 *The writing cure: How expressive writing promotes health and emotional well-being* (pp. 99–117). Washington, DC: American Psychological Association. <http://doi.org/10.1037/10451-005>
- Lepore, S. J., & Greenberg, M. A. (2010). Mending broken hearts: Effects of expressive writing on mood, cognitive processing, social adjustment and health following a relationship breakup. *Psychology and Health, 17*(5), 547-560.
- Lepore, S., & Smyth, J. (2002). *The writing cure: How expressive writing promotes health and emotional well-being*. Washington, DC: American Psychological Association. doi:10.1037/10451-000
- Lichtenthal, W. G., & Cruess, D. G. (2010). Effects of directed written disclosure on grief and distress symptoms among bereaved individuals. *Death Studies, 34*, 475-499.
- Light, J. C., Roberts, B., Dimarco, R., & Greiner, N. (1998). Augmentative and alternative communication to support receptive and expressive communication for people with autism. *Journal of Communication Disorders, 31*, 153–180.
- 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 & Health, 25*(6), 669–684.

- Lumley, M. A. (2004). Alexithymia, emotional disclosure, and health: A program of research. *Journal of Personality, 72*, 1271–1300.
- Lumley, A. M., Gustavson, J. B., Partridge, T., & Labouvie-Vief, G. (2005). Assessing alexithymia and related emotional ability constructs using multiple methods: Interrelationships among measures. *Emotion, 5*(3), 329–342.
- Lumley, M. A., Downey, K., Stettner, L., Wehmer, F., & Pomerleau, O. F. (1994). Alexithymia and negative affect: Relationship to cigarette smoking, nicotine dependence, and smoking cessation. *Psychotherapy and Psychosomatics, 61*(3-4), 156–162. doi:10.1159/000288884
- Lusinchi, D. (2017). The rhetorical use of random sampling: Crafting and communicating the public image of polls as a science (1935–1948). *Journal of the History of the Behavioral Sciences, 53*(2), 113-132. doi:10.1002/jhbs.21836
- Lutgendorf, S. K., & Antoni, M. H. (1999). Emotional and cognitive processing in a trauma disclosure paradigm. *Cognitive Therapy and Research, 23*(4), 423–440. <http://doi.org/10.1023/A:1018760118863>
- Mackenzie, C. S., Wiprzycka, U. J., Hasher, L., & Goldstein, D. (2007). Does expressive writing reduce stress and improve health for family caregivers of older adults? *The Gerontologist, 47*, 296-306.
- Maestas, K. L., & Rude, S. S. (2012). The benefits of expressive writing on autobiographical memory specificity: A randomized controlled trial. *Cognitive Therapy and Research, 36*(3), 234–246. <http://doi.org/10.1007/s10608-011-9358-y>

- Magnavita, J. J. (2010). *Evidence-based treatment of personality dysfunction: Principles, methods, and processes*. Washington, DC: American Psychological Association.
- Mattila, A. K., Kronholm, E., Jula, A., Salminen, J. K., Koivisto, A.-M., Mielonen, R.-L., & Joukamaa, M. (2008). Alexithymia and somatization in general population. *Psychosomatic Medicine, 70*(6), 716–722. doi:10.1097/psy.0b013e31816ffc39
- McFarlane, A. C., Weisaeth, L., & Bessel Van der Kolk, A. (Eds.). (1996). *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (1st ed.). New York: Guilford Publications.
- McGuire, K. M. B., Greenberg, M., & Gevirtz, R. (2005). Autonomic effects of expressive writing in individuals with elevated blood pressure. *Journal of Health Psychology, 10*(2), 197–209. <http://doi.org/10.1177/1359105305049767>
- Mick, D. (1996). Are studies of dark side variables confounded by socially desirable responding? The case of materialism. *Journal of Consumer Research, 23*(2), 106. doi:10.1086/209470
- Mikulincer, M., & Shaver, P. R. (2010). *Attachment in adulthood: Structure, dynamics, and change*. New York: Guilford Press.
- Montebarocci, O., Codispoti, M., Baldaro, B., & Rossi, N. (2004). Adult attachment style and alexithymia. *Personality and Individual Differences, 36*(3), 499-507.
- Moran, M. H. (2004). Toward a writing and healing approach in the basic writing classroom: One professor's personal odyssey. *Journal of Basic Writing, 23*(2), 93–115.
- Mosher, C. E., & Danoff-Burg, S. (2006). Health effects of expressive letter writing. *Journal of Social and Clinical Psychology, 25*, 1122–1139.

- Muller, R. J. (2000). *When a patient has no story to tell: Alexithymia*. Retrieved from <http://www.psychiatrictimes.com/somatoform-disorder/when-patient-has-no-story-tell-Alexithymia>
- Murray, B. (2018). *Writing to heal*. Retrieved from <http://www.apa.org/monitor/jun02/writing.aspx>
- Myers, L. (1995). Alexithymia and repression: The role of defensiveness and trait anxiety. *Personality and Individual Differences, 19*(4), 489-492.
- National Association of School Psychologists. (2015a). *Ready to learn, empowered to teach: Guiding principles for effective schools and successful students* [Policy brief]. Bethesda, MD: Author. Retrieved from <http://www.nasponline.org/research-and-policy/ready-to-learn-empowered-to-teach>
- National Association of School Psychologists. (2015b). *School psychologists: Improving student and school outcomes* [Research summary]. Bethesda, MD: Author. Retrieved from <http://www.nasponline.org/research-andpolicy/nasp-research-center/research-summaries>
- Nazarian, D., & Smyth, J. M. (2013). An experimental test of instructional manipulations in expressive writing interventions: Examining processes of change. *Journal of Social and Clinical Psychology, 32*(1), 71–96.
<http://doi.org/10.1521/jscp.2013.32.1.71>
- Nemiah, J. C., Freyberger, H., & Sifneos, P. E. (1976). Alexithymia: A view of the psychosomatic process. In O. W. Hill (Ed.), *Modern trends in psychosomatic medicine*. (Vol. 3, pp. 430-439). London: Butterworth.

- Nichols, M. P. (1974). Outcome of brief cathartic psychotherapy. *Journal of Consulting and Clinical Psychology, 42*(3), 403–410. <http://doi.org/10.1037/h0036715>
- Nunnally, J. C., & Bernstein, I. R. (1994). *Psychometric theory*. New York: McGraw-Hill.
- O'Connor, D., & Ashley, L. (2008). Are alexithymia and emotional characteristics of disclosure associated with blood pressure reactivity and psychological distress following written emotional disclosure. *British Journal of Health Psychology, 13*(3), 495-512. doi:10.1348/135910707x224496
- Office of Special Education Programs. (2016). *38th annual report to Congress on the Implementation of the Individuals with Disabilities Education Act*. Washington, DC: U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs.
- Oskis, A., Clow, A., Hucklebridge, F., Bifulco, A., Jacobs, C., & Loveday, C. (2013). Understanding alexithymia in female adolescents: The role of attachment style. *Personality and Individual Differences, 54*(1), 97-102.
- Paez, D., Velasco, C., & Gonzales, J. L. (1999). Expressive writing and the role of alexithymia as a dispositional deficit in self-disclosure and psychological health. *Journal of Personality and Social Psychology, 77*, 630-641.
- Pagano, R. R. (2010). *Understanding statistics in the behavioral sciences* (9th ed.). Belmont CA: Wadsworth.
- Palmer, G., & William, B. (2002). Exceptional human experiences, disclosure, and a more inclusive view of physical, psychological, and spiritual well-being. *Journal of Transpersonal Psychology, 34*(1), 29–39.

- Pennebaker, J. W. (1997). *Opening up: The healing power of expressing emotions*. New York: Guilford Publications.
- Pennebaker, J. W. (2004). *Writing to heal: A guided journal for recovering from trauma and emotional upheaval*. Oakland, CA: New Harbinger Publications.
- 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. <http://doi.org/10.1037/0021-843x.95.3.274>
- Pennebaker, J. W., & Chung, C. K. (2011). *Expressive writing: Connections to physical and mental health*. Retrieved from https://www.researchgate.net/publication/287529579_Expressive_Writing_Connections_to_Physical_and_Mental_Health
- 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. <http://doi.org/10.1037//0022-006x.56.2.239>
- Pierzchlewski, J., & Arildsen, T. (2016). Generation and analysis of constrained random sampling patterns. *Circuits, Systems and Signal Processing, 35*(10), 3619–3643. doi:1007/s00034-015- 0216-0
- Range, L. M., & Jenkins, S. R. (2010). Who benefits from Pennebaker’s expressive writing paradigm? Research recommendations from three gender theories. *Sex Roles, 63*(3-4), 149–164. doi:10.1007/s11199-010-9749-7
- Reich, W. (1972). *Character analysis* (3rd, enlarged ed.). New York: Farrar, Straus and Giroux.

- Remler, D. K., & Van Ryzin, G. G. (2014). *Research methods in practice: Strategies for description and causation*. Thousand Oaks, CA: SAGE Publication, Inc.
- Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 38*(1), 119-125.
- Rickwood, D., & Bradford, S. (2012). The role of self-help in the treatment of mild anxiety disorders in young people: An evidence-based review. *Psychology Research and Behavior Management, 5*, 25-36.
<http://doi.org/10.2147/prbm.s23357>
- Robbins, M. (1989). Primitive personality organization as an interpersonally adaptive modification of cognition and affect. *The International Journal of Psycho-Analysis, 70*(Pt 3), 443-459.
- Rosenblum, A., Foote, J., Cleland, C., Magura, S., Mahmood, D., & Kosanke, N. (2005). Moderators of effects of motivational enhancements to cognitive behavioral therapy. *The American Journal of Drug and Alcohol Abuse, 31*(1), 35-58.
[doi:10.1081/ada-37562](https://doi.org/10.1081/ada-37562)
- Salminen, J. K., Sarrijarvi, S., Aarela, E., Toikka, T., & Kauhanen, J. (1999). Prevalence of alexithymia and its association with sociodemographic variables in the general population of Finland. *Journal of Psychosomatic Research, 46*, 75-82.
- Sameroff, A. J., & Emde, R. N. (Eds.). (1989). *Relationship disturbances in early childhood: A developmental approach*. New York: Basic Books.

- Sârbescu, P., Costea, I., & Rusu, S. (2012). Psychometric properties of the Marlowe-Crowne Social Desirability Scale in a Romanian sample. *Procedia - Social and Behavioral Sciences*, 33, 707-711. <http://dx.doi.org/10.1016/j.sbspro.2012.01.213>
- Scheff, T. J. (1979). *Catharsis in healing, ritual, and drama*. Berkeley: University of California Press.
- Schwartz, L., & Drotar, D. (2004). Effects of written emotional disclosure on caregivers of children and adolescents with chronic illness. *Journal of Pediatric Psychology*, 29, 105-118.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 527-561). New York: Guilford.
- Serani, D. (2014). *The emotional blindness of alexithymia*. Retrieved from <http://blogs.scientificamerican.com/mind-guest-blog/the-emotional-blindness-of-Alexithymia/>
- Seih, Y. T., Lin, Y. C., Huang, C. L., Peng, C. W., & Huang, S. P. (2008). The benefits of psychological displacement in diary writing when using different pronouns. *British Journal of Health Psychology*, 13(1), 39-41. <http://doi.org/10.1348/135910707x250875>
- Shah, P., Hall, R., Catmur, C., & Bird, G. (2016). Alexithymia, not autism, is associated with impaired interoception. *Cortex*, 81, 215-220. [doi:10.1016/j.cortex.2016.03.021](https://doi.org/10.1016/j.cortex.2016.03.021)

- Sheese, B. E., Brown, E. L., & Graziano, W. G. (2004). Emotional expression in cyberspace: Searching for moderators of the Pennebaker disclosure effect via e-mail. *Health Psychology, 23*(5), 457–464.
- Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology, 1*(2), 73–82.
<http://doi.org/10.1080/17439760500510676>
- Shen, L., Yang, L., Zhang, J., & Zhang, M. (2018). Benefits of expressive writing in reducing test anxiety: A randomized controlled trial in Chinese samples. *PLOS ONE, 13*(2), e0191779. doi10.1371/journal.pone.0191779
- Sibley, C., Fischer, R., & Liu, J. (2005). Reliability and validity of the Revised Experiences in Close Relationships (ECR-R) self-report measure of adult romantic attachment. *Personality and Social Psychology Bulletin, 31*(11), 1524–1536. <http://dx.doi.org/10.1177/0146167205276865>
- Sifneos, P. E. (1973). The prevalence of 'alexithymic' characteristics in psychosomatic patients. *Psychotherapy and Psychosomatics, 22*(2), 255–262.
- Sloan, D. M., & Marx, B. P. (2004). A closer examination of the structured written disclosure procedure. *Journal of Consulting and Clinical Psychology, 72*(2), 165–175. <http://doi.org/10.1037/0022-006x.72.2.165>
- Sloan, D. M., Marx, B. P., & Epstein, E. M. (2005). Further examination of the exposure model underlying the efficacy of written emotional disclosure. *Journal of Consulting and Clinical Psychology, 73*(3), 549–554.
<http://doi.org/10.1037/0022-006x.73.3.549>

- Sloan, D., Marx, B., Epstein, E., & Lexington, J. (2007). Does altering the writing instructions influence outcome associated with written disclosure? *Behavior Therapy, 38*(2), 155-168. doi:10.1016/j.beth.2006.06.005
- Smyth, J. M., Hockemeyer, J. R., & Tulloch, H. (2008). Expressive writing and post-traumatic stress disorder: Effects on trauma symptoms, mood states, and cortisol reactivity. *British Journal of Health Psychology, 13*(1), 85–93.
doi:10.1348/135910707x250866
- Smyth, J. M., Nazarian, D., & Arigo, D. (2008). Expressive writing in the clinical context. *Emotion Regulation, 57*, 215–233.
http://doi.org/10.1007/978-0-387-29986-0_14
- Smyth, J. M., True, N., & Souto, J. (2001). Effects of writing about traumatic experiences: The necessity for narrative structuring. *Journal of Social and Clinical Psychology, 20*(2), 161–172. <http://doi.org/10.1521/jscp.20.2.161.22266>
- Smyth, J. S. (1998). Written emotional expression: effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66*, 174-184.
- Solano, L., Donati, V., Pecci, F., Persichetti, S., & Colaci, A. (2003). Postoperative course after papilloma resection: Effects of written disclosure of the experience in subjects with different alexithymia levels. *Psychosomatic Medicine, 65*(3), 477-484. doi:10.1097/01.psy.0000035781.74170.f1
- Sperling, M. B., & Berman, W. H. (1994). *Attachment in adults: Clinical and developmental perspectives*. New York: Guilford Press.

- Sroufe, A., Duggal, S., Weinfield, N., & Carlson, E. (2000). *Relationships, development and psychopathology*. In A. Sameroff, M. Lewis, & S. Miller (Eds.), *Developmental psychopathology* (2nd ed., pp.75-93). New York: Kluwer Academic/Plenum Publishers.
- Stanton, A. L., & Low, C. A. (2012). Expressing emotions in stressful contexts: Benefits, moderators, and mechanisms. *Current Directions in Psychological Science*, 21(2), 124–128. <http://doi.org/10.1177/0963721411434978>
- Stanton, A. L., Kirk, S. B., Cameron, C. L., & Danoff-Burg, S. (2000). Coping through emotional approach: Scale construction and validation. *Journal of Personality and Social Psychology*, 78, 1150-1169.
- Stanton, A., Danoff-Burg, S., Sworowski, L., Collins, C., Branstetter, A., & Rodriguez-Hanley, A., ... Austenfeld, J. L. (2002). Randomized, controlled trial of written emotional expression and benefit finding in breast cancer patients. *Journal of Clinical Oncology*, 20(20), 4160-4168.
- Strahan, R., & Gerbasi, K. (1972). Short, homogeneous versions of the Marlow-Crowne Social Desirability Scale. *Journal of Clinical Psychology*, 28(2), 191-193.
doi:10.1002/1097-4679(197204)28:2<191::aid-jclp2270280220>3.0.co;2-g
- Stroebe, M., Schut, H., & Stroebe, W. (2006). Who benefits from disclosure? Exploration of attachment style differences in the effects of expressing emotions. *Clinical Psychology Review*, 26(1), 66–85. doi:10.1016/j.cpr.2005.06.009
- Stroebe, M., Stroebe, W., Schut, H., Zech, E., & van den Bout, J. (2002). Does disclosure of emotions facilitate recovery from bereavement? Evidence from two prospective studies. *Journal of Consulting and Clinical Psychology*, 70, 169-178.

- Suedfeld, P., & Pennebaker, J. W. (1997). Health outcomes and cognitive aspects of recalled negative life events. *Psychosomatic Medicine*, 59(2), 172–177.
- 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.
<http://doi.org/10.1348/135910707x251180>
- Szijarto, B. (2014). Review of an applied reference guide to research designs: Quantitative, qualitative, and mixed methods. *The Canadian Journal of Program Evaluation*, 29(1), 135.
- Tabachnick, B. G. & Fidell, L. S. (2012). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson.
- Taylor, G. J. (2000). Recent developments in alexithymia theory and research. *The Canadian Journal of Psychiatry / La Revue canadienne de psychiatrie*, 45(2), 134-142.
- Taylor, G., & Bagby, R. (2004). New trends in alexithymia research. *Psychotherapy and Psychosomatics*, 73(2), 68-77.
- Taylor, G. J., Bagby, R. M., & Parker, J. D. A. (1999). *Disorders of affect regulation: Alexithymia in medical and psychiatric illness*. Cambridge, UK: Cambridge University Press.
- Toepfer, S., & Walker, K. (2009). Letters of gratitude: Improving well-being through expressive writing. *Journal of Writing Research*, 1(3), 181–198.
<http://doi.org/10.17239/jowr-2009.01.03.1>

- Twenge, J., & King, L. (2005). A good life is a personal life: Relationship fulfillment and work fulfillment in judgments of life quality. *Journal of Research in Personality, 39*(3), 336-353. doi:10.1016/j.jrp.2004.01.004
- Vaillant, L. M. (1997). *Changing character: Short-term anxiety-regulating psychotherapy for restructuring defenses, affects, and attachment*. New York: Basic Books.
- Vedhara, K., Moss, M. R., Booth, R., Horgan, M., Lawrence, M., & Birchall, N. (2007). Changes in mood predict disease activity and quality of life in patients with psoriasis following emotional disclosure. *Journal of Psychosomatic Research, 62*, 611-619.
- Walker, B. L., Nail, L. M., & Croyle, R. T. (1999). Does emotional expression make a difference in reactions to breast cancer? *Oncology Nursing Forum, 26*, 1025–1032.
- Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques* (2nd ed.). Los Angeles: SAGE Publications.
- Warner, L. J., Lumley, M., Casey, R. J., Pierantoni, W., Salazar, R., Zoratti, E., ... Simon, M. (2005). Health effects of written emotional disclosure in adolescents with asthma: A randomized, controlled trial. *Journal of Pediatric Psychology, 31*(6), 557–568. <http://doi.org/10.1093/jpepsy/jsj048>
- Watson, D., Clark, L., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070. <http://dx.doi.org/10.1037//0022-3514.54.6.1063>

Wei, M., Russell, D. W., Mallinckrodt, B., & Vogel, D. L. (2007). The experiences in Close Relationship Scale (ECR)-Short Form: Reliability, validity, and factor structure. *Journal of Personality Assessment*, 88, 187-204.

Weiner, I. B. (2003). *The LEA series in personality and clinical psychology: Principles of Rorschach interpretation* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Willmott, L., Harris, P., Gellaitry, G., Cooper, V., & Horne, R. (2011). The effects of expressive writing following first myocardial infarction: A randomized controlled trial. *Health Psychology*, 30(5), 642–650. <http://doi.org/10.1037/a0023519>

Wilson, T. D. (2002). *Strangers to ourselves: Discovering the adaptive unconscious*. Cambridge, MA: Harvard University Press.

Yogo, M., & Fujihara, S. (2008). Working memory capacity can be improved by expressive writing: A randomized experiment in a Japanese sample. *British Journal of Health Psychology*, 13(1), 77–80. <http://doi.org/10.1348/135910707x252440>

Yuan, K., Fung, W. K., & Reise, S. P. (2004). Three Mahalanobis distances and their role in assessing unidimensionality. *British Journal of Mathematical and Statistical Psychology*, 57, 151-165.

Zakowski, S., Ramati, A., Morton, C., Johnson, P., & Flanigan, R. (2004). Written emotional disclosure buffers the effects of social constraints on distress among cancer patients. *Health Psychology*, 23(6), 555-563.

doi:10.1037/0278-6133.23.6.555

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2010). *Business Research Methods*. Marion, OH: South-Western Publishing.

Zimmerman, D. (2004). A note on preliminary tests of equality of variances. *British Journal of Mathematical and Statistical Psychology*, 57(1), 173-181.

doi:10.1348/000711004849222

APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board

DATE: November 26, 2018

TO: John Tzanos, BS

FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [1347400-2] A COMPARISON BETWEEN A MODIFIED AND A TRADITIONAL EXPRESSIVE WRITING INTERVENTION AND THEIR EFFECT ON ALEXITHYMIA AND EMOTIONAL EXPRESSIVITY

SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVAL/VERIFICATION OF EXEMPT STATUS

DECISION DATE: November 26, 2018

EXPIRATION DATE: November 26, 2022

Thank you for your submission of Amendment/Modification materials for this project. The University of Northern Colorado (UNCO) IRB approves this project and verifies its status as EXEMPT according to federal IRB regulations.

John -

Thank you for the thorough and clear amendments and modifications to your IRB application materials and protocols. Please be sure to use these amendments/modifications in your participant recruitment and data collection.

Best wishes with your study and don't hesitate to contact me with any IRB-related questions or concerns.

Sincerely,

Dr. Megan Stellino, UNC IRB Co-Chair

We will retain a copy of this correspondence within our records for a duration of 4 years.

If you have any questions, please contact Nicole Morse at 970-351-1910 or nicole.morse@unco.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Northern Colorado (UNCO) IRB's records.

APPENDIX B
CONSENT FORM TO PARTICIPATE IN
HUMAN RESEARCH



UNIVERSITY OF
NORTHERN
COLORADO

**CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO**

Project Title: A comparison between a modified and a traditional expressive writing intervention and their effect on alexithymia and emotional expressivity

Researcher: Giannis Tzanos, Doctoral student, Department of School Psychology

Email: tzan0301@bears.unco.edu

Research Advisor: Achilles Bardos, Ph.D. Department of School Psychology

Email: achilles.bardos@unco.edu

Introduction

You are being asked to be in a research study that purports to measure the effects of two expressive writing tasks on your ability to identify, describe and process emotions. Please read this form carefully before agreeing to be in the study.

Purpose of Study

This work will be considered in the context of a college-aged population. As revealed by existing literature, college-aged adults show a higher rate of mental illness than members of the general population. One student in three reports “prolonged periods of depression” and having issues with school-work due to issues of mental health. For this reason, this study will collect data from those attending college and who may benefit from an expressive writing tool that will serve the purpose of helping individuals identify and process their emotions in a way that will serve their mental health. As this population is at increased risk for the psychological and physical ramifications of mental health, the need to create an intervention for the specific population is of importance.

The results of this study will be written up as a dissertation and may be presented at academic conferences and/or published in peer-reviewed academic journals.

Description of the Study Procedures

If you agree to be in this study, you will be asked to perform a writing task. You will be assigned to one of two groups with participants in each group being asked to write about a traumatic or emotional event in different ways.

The definition of “emotional event” is left to you to decide, but it has to be of importance to your lives and has carried a strong emotional weight or has had a significant emotional impact. The essay content will not be read by the researcher or his research advisor. This study is not intended to analyze narratives; thus, what you write will not be read by anyone; however a fidelity check will be performed. This check will include analyzing your writings with software, in order to see if you wrote text that is above 2nd grade

level. In the event that your writing is below that level your data will be excluded from this study as it will be considered invalid.

Once you are directed in the platform where the study will take place you will be asked to provide your email address. This email will be solely used for subsequent communications between you and the principal researcher. During the initial session you will be asked to fill out demographic information and complete 4 surveys, based on which you will be assigned to a writing task. A few days later, a second invitation will be sent to your email in the form of a link asking you to participate in the expressive writing task fill out the final survey.

In summary, by participating in this study you will be asked to provide your email address that will be used to send you materials to complete. In addition, you will be asked to provide demographic information concerning your age, race, sex, if you have a learning disability, and if you have experienced a serious “emotional event” that shaped your worldview. Participation in the study will take less than an hour in total to complete.

Risks/Discomforts of Being in this Study

There may be some minimal risks if you take part in this study. You will be asked to write about an emotionally charged event or a traumatic event. This may bring back unpleasant memories which could make you feel upset. These effects are often short-lived but in the case that you are in need of someone to talk to you are encouraged to alert the researcher who will help you find mental health resources in your area. If you are a student of UNC or a resident of Colorado the following resources are available to you.

University of Northern Colorado
Counseling Center
Cassidy Hall
Phone: 970-351-2496
Monday-Friday
8:00 am- 5:00 pm

Emergency and After Hours Crisis Resources:
Medical or Police Emergencies: 911
North Range Behavioral Health Emergency Line: 970-347-2120
Suicide Prevention Lifeline: 1-800-273-8255

Benefits of Being in the Study

Past research stemming from more than 30 years of experimentation with expressive writing suggests that emotional expression, reflective thinking and even pointing one’s attention to how one processes thoughts and emotions can provide a lot of mental and physical health benefits. These may include lower levels of depression, anxiety and fewer hospital and doctor visits. Although the benefits are not guaranteed and the mechanism of change is still under debate, there is more evidence to suggest short and long term benefits of expressive writing than there is evidence to suggest the opposite. Overall,

expressive writing has shown great promise for mitigating an array of emotional and other challenges.

Confidentiality

Participant confidentiality cannot be guaranteed due to the use of electronic data collection. To maximize confidentiality, your information along with any data that are collected will be stored in a password protected computer and will be disposed 3 years after the end of this research study according to research protocol. To further maximize confidentiality results will be reported in aggregate form to mask individual participants' identities.

Payments

If you choose to participate in this study and complete the two sessions, you will get a 12\$ Amazon gift card sent in the email you provided.

Right to Refuse or Withdraw

The decision to participate in this study is entirely at your discretion. Even after you decide to participate and at any point you wish to end your participation, you may simply close your web browser or email the researcher retroactively to remove any data that you may have entered in the surveys or essay. The researcher will then remove you completely from the study without affecting your relationship with the researcher or UNC. You also have the right not to answer a single or a series of questions if you do not feel like doing it. You also have the right to ask questions about this study before, during, or after the research and I will answer your questions as best as I can. My contact information and the contact information of my research advisor are on the top of this document. In addition, if you would like a summary of the results of this study, I will send it to you.

Consent

Your participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please check "yes" below if you would like to participate in this study. You may print a copy of this form to retain for future reference.

If you are a participant from the UNC School of Psychological Sciences Participant Pool: I understand that participation in this study is only one way to satisfy the research experience requirement for my PSY120 class and I may, if I choose, select an alternative assignment to being a research participant. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Research, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Check on of the following options:

Yes, I would like to participate YES

No, I do not want to participate NO

APPENDIX C

MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE

Marlowe-Crowne Social Desirability Scale

13-Item Short Form Highlighted

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you.

1.	Before voting I thoroughly investigate the qualifications of all the candidates.	True	False
2.	I never hesitate to go out of my way to help someone in trouble.	True	False
3.	It is sometimes hard for me to go on with my work if I am not encouraged.	True	False
4.	I have never intensely disliked anyone.	True	False
5.	On occasion I have doubts about my ability to succeed in life.	True	False
6.	I sometimes feel resentful when I don't get my own way.	True	False
7.	I am always careful about my manner of dress.	True	False
8.	My table manners at home are as good as when I eat out in a restaurant.	True	False
9.	If I could get into a movie without paying and be sure I was not seen, I would probably do it.	True	False
10.	On a few occasions, I have given up doing something because I thought too little of my ability.	True	False
11.	I like to gossip at times.	True	False
12.	There have been times when I felt like rebelling against people in authority even though I knew they were right.	True	False
13.	No matter who I'm talking to, I'm always a good listener.	True	False
14.	I can remember "playing sick" to get out of something.	True	False
15.	There have been occasions when I took advantage of someone.	True	False
16.	I'm always willing to admit it when I make a mistake.	True	False
17.	I always try to practice what I preach.	True	False

18.	I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.	True	False
19.	I sometimes try to get even, rather than forgive and forget.	True	False
20.	When I don't know something I don't at all mind admitting it.	True	False
21.	I am always courteous, even to people who are disagreeable.	True	False
22.	At times I have really insisted on having things my own way.	True	False
23.	There have been occasions when I felt like smashing things.	True	False
24.	I would never think of letting someone else be punished for my own wrongdoings.	True	False
25.	I never resent being asked to return a favour.	True	False
26.	I have never been irked when people expressed ideas very different from my own.	True	False
27.	I never make a long trip without checking the safety of my car.	True	False
28.	There have been times when I was quite jealous of the good fortune of others.	True	False
29.	I have almost never felt the urge to tell someone off.	True	False
30.	I am sometimes irritated by people who ask favours of me.	True	False
31.	I have never felt that I was punished without cause.	True	False
32.	I sometimes think when people have a misfortune they only got what they deserved.	True	False
33.	I have never deliberately said something that hurt someone's feelings.	True	False

APPENDIX D

**EXPERIENCES IN CLOSE RELATIONSHIPS-REVISED
ADULT ATTACHMENT QUESTIONNAIRE
SHORT VERSION**

**Experiences in Close Relationships-Revised (ECR-RS) Adult Attachment
Questionnaire Short Version**

"Please read each of the following statements and rate the extent to which you believe each statement best describes your feelings about close relationships in general." We then follow those instructions with 9 items that are similar in theme to those used to assess relationship-specific Attachment. (Moreover, they are keyed in a similar way. The first 6 items tap avoidance with the first 4 items reverse keyed; the last 3 items tap anxiety.)

1. It helps to turn to this person in times of need.

strongly disagree 1 2 3 4 5 6 7 strongly agree

2. I usually discuss my problems and concerns with this person.

strongly disagree 1 2 3 4 5 6 7 strongly agree

3. I talk things over with this person.

strongly disagree 1 2 3 4 5 6 7 strongly agree

4. I find it easy to depend on this person.

strongly disagree 1 2 3 4 5 6 7 strongly agree

5. I don't feel comfortable opening up to this person.

strongly disagree 1 2 3 4 5 6 7 strongly agree

6. I prefer not to show this person how I feel deep down.

strongly disagree 1 2 3 4 5 6 7 strongly agree

7. I often worry that this person doesn't really care for me.

strongly disagree 1 2 3 4 5 6 7 strongly agree

8. I'm afraid that this person may abandon me.

strongly disagree 1 2 3 4 5 6 7 strongly agree

9. I worry that this person won't care about me as much as I care about him or her.

strongly disagree 1 2 3 4 5 6 7 strongly agree

APPENDIX E
BERKELEY EXPRESSIVITY QUESTIONNAIRE

Berkeley Expressivity Questionnaire (BEQ)

For each statement below, please indicate your agreement or disagreement. Do so by filling in the blank in front of **each** item with the appropriate number from the following rating scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

- ___ 1. Whenever I feel positive emotions, people can easily see exactly what I am feeling.
- ___ 2. I sometimes cry during sad movies.
- ___ 3. People often do not know what I am feeling.
- ___ 4. I laugh out loud when someone tells me a joke that I think is funny.
- ___ 5. It is difficult for me to hide my fear.
- ___ 6. When I'm happy, my feelings show.
- ___ 7. My body reacts very strongly to emotional situations.
- ___ 8. I've learned it is better to suppress my anger than to show it.
- ___ 9. No matter how nervous or upset I am, I tend to keep a calm exterior.
- ___ 10. I am an emotionally expressive person.
- ___ 11. I have strong emotions.
- ___ 12. I am sometimes unable to hide my feelings, even though I would like to.
- ___ 13. Whenever I feel negative emotions, people can easily see exactly what I am feeling.
- ___ 14. There have been times when I have not been able to stop crying even though I tried to stop.
- ___ 15. I experience my emotions very strongly.
- ___ 16. What I'm feeling is written all over my face.

APPENDIX F
TORONTO ALEXITHYMIA SCALE

TAS-20

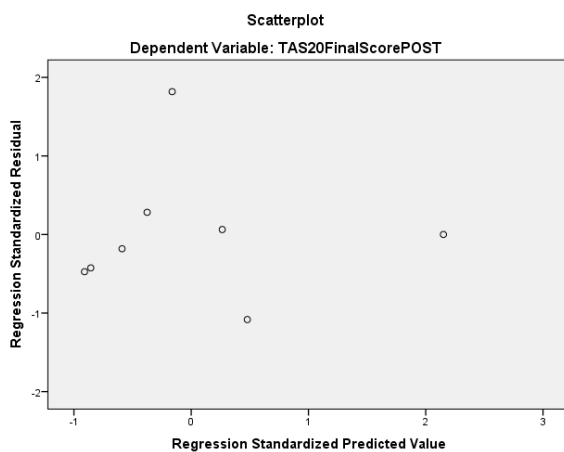
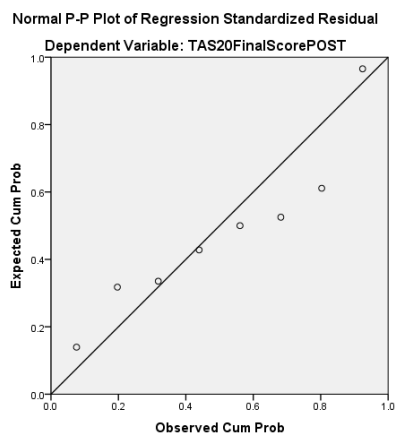
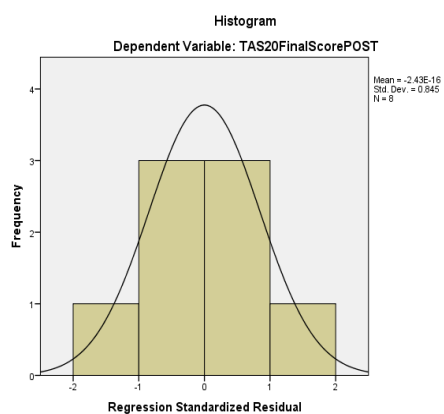
Using the scale below, indicate how much you agree or disagree with each of the following statements by circling the appropriate number.

- 1 = Strongly Disagree
 2 = Moderately Disagree
 3 = Neither agree nor disagree
 4 = Moderately Agree
 5 = Strongly Agree

1. I am often confused about what emotion I am feeling.	1	2	3	4	5
2. It is difficult for me to find the right words for my feelings.	1	2	3	4	5
3. I have physical sensations that even doctors don't understand.	1	2	3	4	5
4. I am able to describe my feelings easily.	1	2	3	4	5
5. I prefer to analyze problems rather than just describe them.	1	2	3	4	5
6. When I am upset, I don't know if I am sad, frightened, or angry.	1	2	3	4	5
7. I am often puzzled by sensations in my body.	1	2	3	4	5
8. I prefer to just let things happen rather than to understand why they turned out that way.	1	2	3	4	5
9. I have feelings that I can't quite identify.	1	2	3	4	5
10. Being in touch with emotions is essential.	1	2	3	4	5

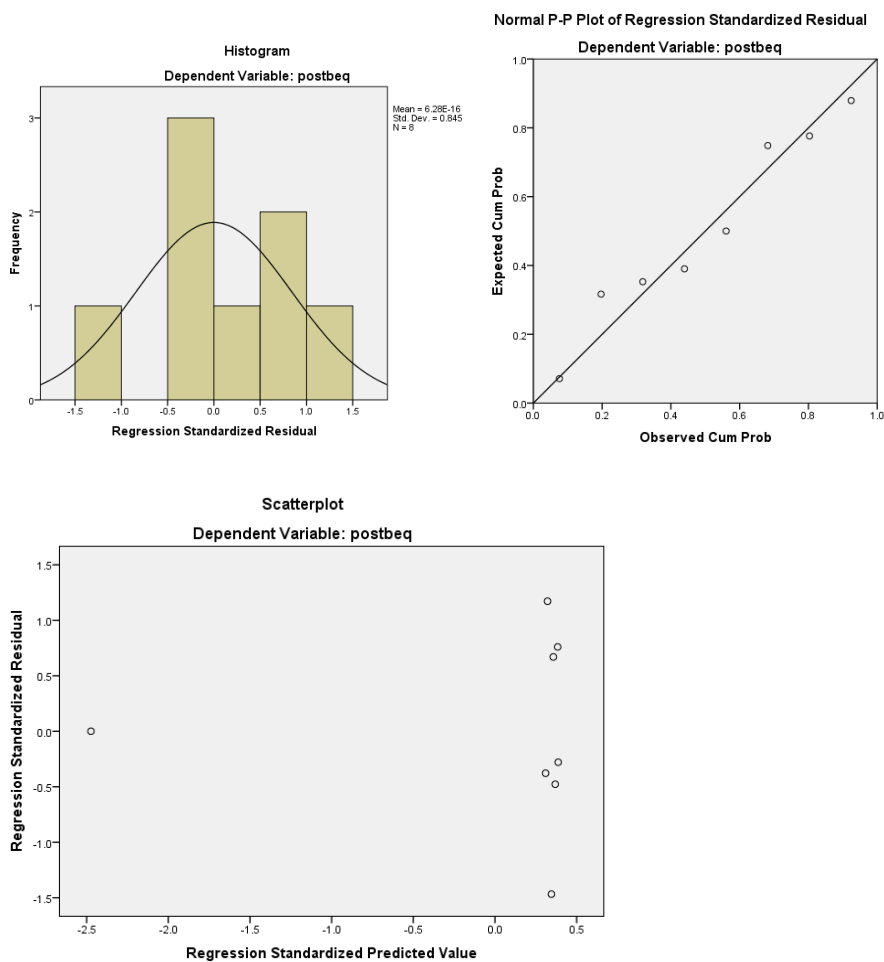
11. I find it hard to describe how I feel about people.	1	2	3	4	5
12. People tell me to describe my feelings more.	1	2	3	4	5
13. I don't know what's going on inside me.	1	2	3	4	5
14. I often don't know why I am angry.	1	2	3	4	5
15. I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16. I prefer to watch "light" entertainment shows rather than psychological dramas.	1	2	3	4	5
17. It is difficult for me to reveal my innermost feelings, even to close friends.	1	2	3	4	5
18. I can feel close to someone, even in moments of silence.	1	2	3	4	5
19. I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20. Looking for hidden meanings in movies or plays distracts from their enjoyment.	1	2	3	4	5

APPENDIX G
VISUAL DESCRIPTIVE STATISTICS

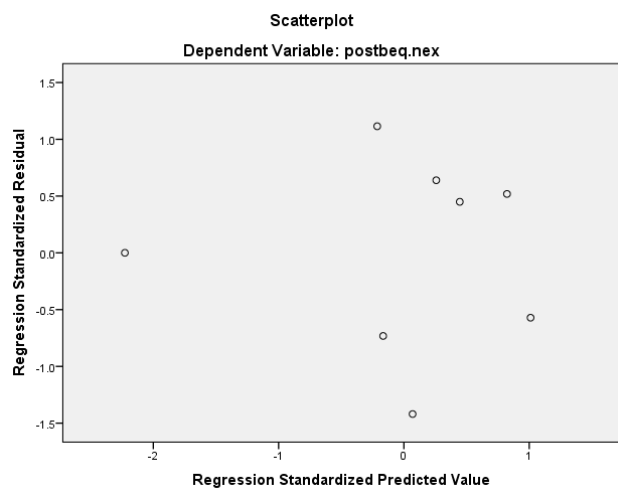
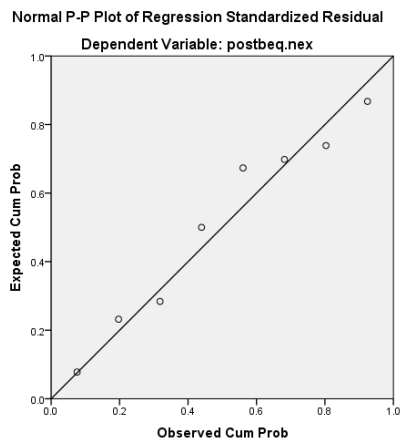
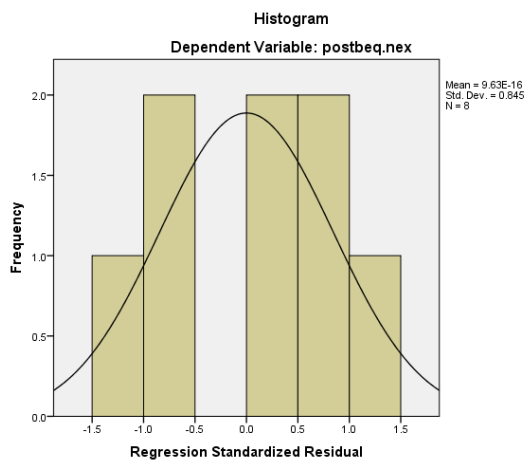


Visual descriptive statistics for BEQ overall and three facets

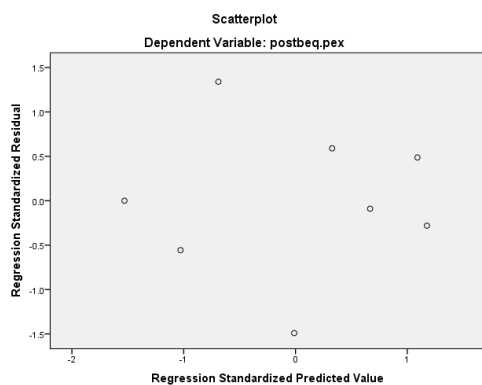
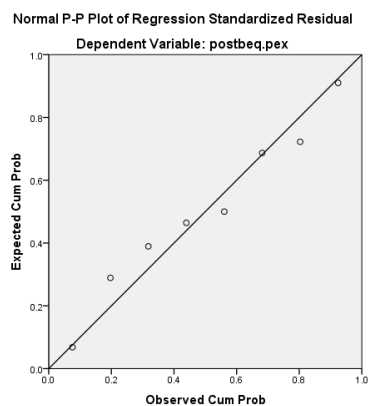
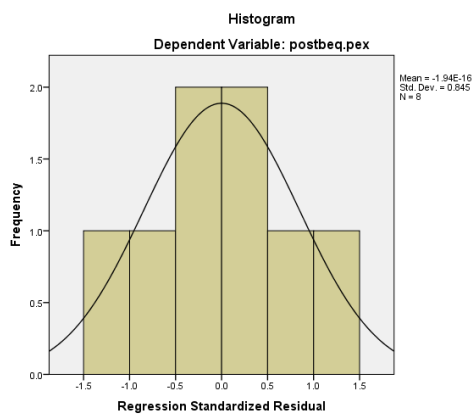
BEQ overall score



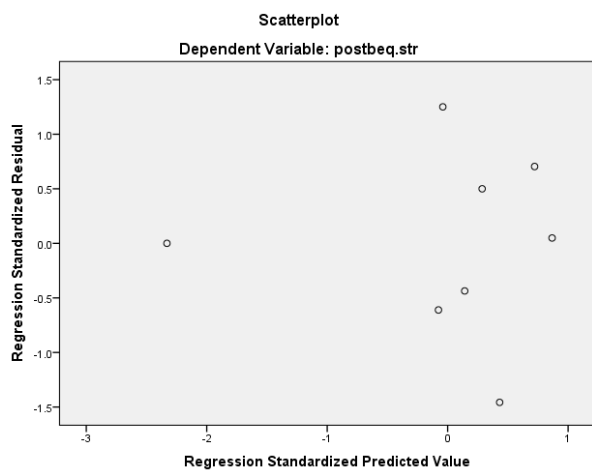
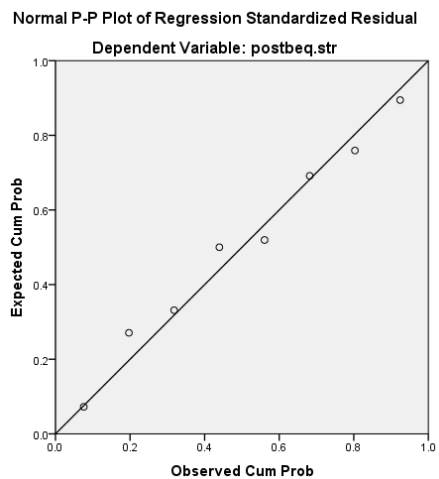
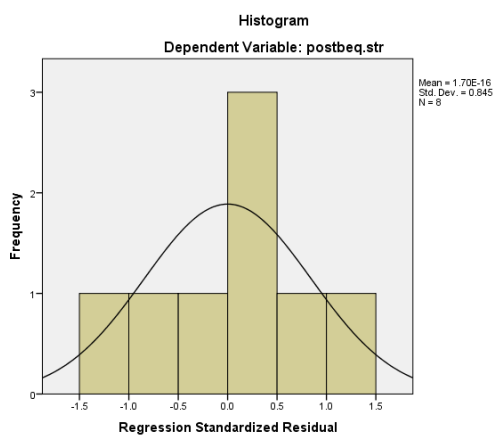
BEQ negative



BEQ positive



BEQ impulse control



APPENDIX H
PILOT STUDY

Descriptive Statistics for Modified Writing Prompt

Factors	Range	<i>M</i>	<i>SD</i>
I thought that the writing prompts were clear	1-5	3.91	1.5
I understood what the writing prompts were asking me to write about	1-5	4	1.5
The writing prompts helped me focus on important aspects of my emotional experience	1-5	3.8	1.00
The writing prompts asked me to write about important aspects of my emotional experience	1-5	4.45	.68
I feel that this was a useful way to process my emotion	1-5	4	1.00
I feel that the writing prompts covered most aspects of my emotional experience	1-5	3.91	1.00

M = Mean, *SD* = Standard Deviation.

Note. The above questions were given to modified expressive writing participants at the end of their first session.

Summary of Pearson Correlations for Variables Germane to Alexithymia

Factors	Alexithymia	Emotional Expressivity	Attachment Style	Social Desirability
Alexithymia	-			
Emotional Expressivity	-.570	-		
Attachment Style	.695	-.208	-	
Social Desirability	-.041	.014	.273	-

Note: * $p < .05$.