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Trauma and Linguistic Markers for Symptom Severity in Prolonged Exposure for Primary Care, as Observed Through the Use of Narrative Review

by

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2021

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for the degree of

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in
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We the undersigned committee, having examined the submitted doctoral research project, "Trauma and Linguistic Markers for Symptom Severity in Prolonged Exposure for Primary Care, as Observed Through the Use of Narrative Review" by Robert Alexander Ryan, M.A., M.S. hereby indicate its unanimous approval.

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Abstract

Trauma and Linguistic Markers for Symptom Severity in Prolonged Exposure for Primary Care, as Observed Through the Use of Narrative Review
by
Robert Alexander Ryan, M.A., M.S.
Committee Chair: Patrick J. Aragon, Psy.D.

Traditional trauma therapies used in the primary care setting (e.g., hospital, medical clinic, etc.) have posed challenges to patient success because they are not designed for the shorter duration treatment that is typical in primary care settings. One alternative solution is the Prolonged-Exposure for Primary Care protocol (PE-PC) that utilizes prolonged exposure using a brief take home assignment and several journaling prompts that are processed using principles from Cognitive Processing Therapy (CPT). Still in its early stages of development, the PE-PC protocol can provide symptom relief in as little as four, 30-minute sessions and reflects one of the first trauma therapies specific to the primary care setting. To maximize the potential effectiveness of PE-PC the present study identified markers for trauma symptom severity in narrative accounts of trauma. Surveys were used to acquire self-reported trauma symptom severity and open-ended descriptions of traumatic events like those in the PE-PC protocol. Using Linguistic Inquiry and Word Count (LIWC) to analyze responses, participant self-reported narratives of trauma experiences were compared to self-reported measures of trauma, adverse childhood experiences, and positive childhood experiences. A Kruskal-Wallis test demonstrated that individuals reporting the highest levels of trauma used a greater frequency of health related words $H(2) = 6.48$, $p = .039$, while individuals reporting moderate levels of trauma experienced, as reported on the PCL-5, used significantly more words in the feel category than the low trauma group $H(2) = 6.508$, $p = .039$. Spearman's rank correlation

demonstrated trauma symptom severity scores had weak, positive relationships with prepositions, biological processes, and health categories, in addition to a weak negative correlation with article usage. The results demonstrate differences in narrative accounts of trauma based on trauma symptom severity level and early childhood positive experiences. In support of emerging literature, regression analysis demonstrated positive childhood experiences had a greater buffering impact on trauma symptom severity scores than adverse childhood experiences.

Table of Contents

Acknowledgements……...…...v

Chapter 1: Introduction…….……..1

Chapter 2: Review of the Literature…….……...2

Trauma…….2

Biological Influences of Trauma…….4

The Salience Network…….7

Genetic Underpinnings……...10

Environmental Factors of Trauma……..10

Adverse Childhood Experiences (ACE)…….10

Positive Childhood Experiences (PCE)……..11

Survivors of Trauma……...12

Posttraumatic Growth…….13

Journaling…….....14

Therapy in Writing…….15

Alexithymia……19

Linguistic Inquiry and Word Count (LIWC)……..20

LIWC and Psychopathology……...…...23

Prolonged Exposure in Primary Care (PE-PC) ……...……...25

Chapter 3: Study Purpose and Rationale……..28

Chapter 4: Objectives and Hypotheses…….……...….29

Chapter 5: Methods……...…...30

Procedure……..…….30

Participants……..…30

Measures……31

Chapter 6: Results……34

Descriptive Statistics……..34

Trauma Symptoms and Linguistic Marker Correlations……36

Inferential Statistics……37

Chapter 7: Discussion……..……..38

Impact of Study……..38

Chapter 8: Limitations and Areas for Future Research…….……44

Chapter 9: Conclusion…….……48

References……..49

Appendices…….……67

Appendix A……....67

Appendix B……...68

Appendix C……69

Appendix D……...70

Appendix E……...71

Appendix F……72

Appendix G……...73

Appendix H……...74

Appendix I……75

Appendix J……76

Appendix K…….……..77

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Chapter 1: Introduction

The term “Trauma” has been used in medical literature dating back to the Greek ages to describe physical wounds. Something observable and easily identifiable, physical trauma is distinct from psychological trauma given its invisible nature. The term “invisible wound” has been used to describe psychological trauma to give credence to its validity in the absence of observable injuries by the naked eye. Traumatic events are everywhere; approximately 50-85 percent of people will experience one in their lifetime and of that group only 2-50 percent will reach a categorical diagnosis of posttraumatic stress disorder (PTSD; Alonso et al., 2002). Unfortunately, not all individuals inflicted with trauma are either aware of the impact of the psychological distress, nor find the means or access for treatment. Therefore, accessibility to screening and treatment in the primary care setting and unobtrusive interventions are very much in demand.

One intervention that allows clients creative freedom to express their thoughts and feelings, specific to trauma, with a clinician or on their own, is journaling. Whether it is a clinician prompting the client to explore their trauma or a journal prompt, the client is still expressing themselves in the context of their traumatic experience. Despite a breadth of literature identifying various facets of journaling and psychotherapy that are beneficial to client outcomes, the exact common mechanism that leads to symptom reduction is not quite known, but positive effects are observed nonetheless.

Journaling is a long-standing therapeutic intervention that allows clients to express themselves cognitively, emotionally, and ideally to integrate both. In some forms, journaling can be a daily reflective exercise or a personal deep dive into a past trauma that requires successive iterations of journaling sessions to fully unpack the complexities in search of a cathartic experience. Not only is journaling therapeutic, but it is also

hypothesized that it can also be an indication of psychological adjustment in the way a Beck Depression Inventory (BDI) informs depressiveness, or a Patient Health Questionnaire-9 (PHQ-9) reflects wellbeing (Krpan et al., 2013).

When integrating journaling to the therapeutic process, there are substantial benefits to both physical and mental health. Journaling has been shown to aid in individuals' therapeutic process with clinically significant reductions in depressive symptoms (Baikie & Wilhelm, 2005), traumatic symptoms (Booker et al., 2018), rumination (Sloan et al., 2008), self-injurious behaviors (Hooley et al., 2018), and a number of physical health outcomes. Specifically, Harris (2006) found that expressive writing provides a buffering factor for otherwise healthy individuals to reduce healthcare utilization (n=2,294). Conversely, Halpert et al. (2010) demonstrated expressive writing to be an effective therapeutic modality at reducing IBS symptoms. Ultimately, there is a wide array of applications journaling can serve in a therapeutic context, but the specific mechanisms of which positive emotional experiences are increased, negative emotional experiences are decreased, and physical health improves, is still uncertain. Thus, more research is warranted to shed light on the underlying processes that deem journaling therapeutic, specifically in the context of individuals who have encountered a traumatic event.

Chapter 2: Review of Literature

Trauma is a multifaceted construct. According to the Diagnostic and Statistical Manual–fifth edition (DSM-V; APA, 2013), a categorical diagnosis of post-traumatic stress disorder (PTSD) must include exposure to a traumatic event and have symptoms in three domains: reexperiencing of the event, avoidance of reminders of the event, and

hyperarousal for at least one month (Yehuda, 2002). Some forms of reexperiencing may manifest as intrusive distressing images, nightmares and/or flashbacks whereas avoidance of reminders of the event may be any behavior or cognitive strategy to avoid people, places, or even thoughts associated with the event (Yehuda, 2002). Lastly, symptoms of hyperarousal appear by way of autonomic arousal, increased startle reactions, irritability, hypervigilance, and insomnia, to name a few.

Just as trauma is multifaceted, an individual may struggle to operationalize what constitutes a traumatic event from a stressful one. In the context of clinical literature, a traumatic event is one where the event could provoke fear, helplessness, or horror (APA, 2013). This definition is rather vague and fails to accurately capture the prevalence of individuals who have experienced a traumatic event. However, the economic strain associated with treating individuals with PTSD is more telling. When assessing the effects of trauma in the population, there is a tremendous financial burden is associated with long lasting effects PTSD can have on an individual. Bothe and colleagues (2020) found that the overall direct health care costs in the United States was between $10,960-18,753 per patient per year. Such a finding underscores the need for accurate screening and diagnosis of PTSD and trauma-related disorder, as well as subsequent implementation of evidence-based interventions.

Just as not all traumas are the same, the way in which people perceive them varies greatly. In instances where hundreds of individuals are exposed to the same traumatic event, the outcomes can range from individuals being unaffected, to substance use disorders, to functionally impairing PTSD on the other extreme. The key differentiating

factor to individuals who are unaffected or greatly affected lies in the individual's perception, as opposed to the magnitude of the trauma.

Effective treatments for trauma include interventions that process trauma in some manner to reduce the symptoms associated with memories that cause distress and require further processing. Specifically, eye-movement desensitization and reprocessing (EMDR), cognitive processing therapy (CPT), prolonged exposure (PE), and cognitive behavioral therapy (CBT) are most commonly used to treat trauma. These treatments include active participation on behalf of the client to explore various facets of the traumatic event, associated symptoms, and how it affects their physical, emotional, behavioral, and relational functioning. Ideally, as treatment progresses, there is an adaptive shift that reflects a changed perspective on their trauma in the direction of acceptance and closure. This process is not always overt, but it is measured by reduction in symptoms and subjective wellbeing.

Some individuals are more prone to experience trauma than others based on biological and environmental factors as well as the interaction between the two. Whether it be temperament, career choice, or mental illness, there are a number of risk factors that can compound to greatly increase the risk of negative health and wellbeing outcomes. One such study identified adverse childhood experiences (ACE) that showed significant predictive power for a host of negative outcomes (Felitti et al., 1998b).

Biological Influences of Trauma

Per the experience of trauma, the nature of trauma is much less important than the perception or appraisal of the event. During stressful events, the hypothalamic pituitary axis induces an excitatory response to the central nervous system that results in some

degree of fight, flight, or freeze. Paired with a cognitive appraisal of the situation at hand, the amygdala or emotion center, can overwhelm the hippocampus, the memory center. This can dysregulate typical emotion and memory processing in such a way that emotions and memories are not processed efficiently.

Following traumatic events, an individual's cognitive state can return to baseline rather quickly. However, stress hormones can still be present for days following the event, reflecting the ongoing effects traumatic events can have. In instances where individuals have lingering effects of PTSD, some researchers have posited that their symptoms fall into four categories: (a) intrusive thoughts, (b) avoiding reminders, (c) negative emotionality, and (d) reactivity (Blum et al., 2019).

Fear conditioning, fear generalization, and failure of extinction are thought to undergird the development of PTSD symptoms (Beckers et al., 2013). Fear conditioning is the associative learning that occurs in the classical conditioning domain where otherwise innocuous stimuli are conditioned to evoke a fear response due to the association with an aversive stimulus. Once conditioned, fear generalization occurs when that conditioned stimulus becomes generalizable to other stimuli. That is, when an individual experiences a frightening event, it is not uncommon for aspects of that event to be inaccurately associated with the feared response as well. Fear generalization would occur when other stimuli resembling the aversive stimulus also elicits a fear response, for example, the little Albert experiment (Beck et al., 2009). Little Albert the infant was given a white rabbit and a fear response was not seen until the rabbit was presented with a loud noise. After repeated exposures of a loud noise with the white rabbit, little Albert demonstrated a fear response to the white rabbit by itself, as well as things that looked

like the white rabbit (e.g., fur coat, cotton wool, etc.) In the absence of exposure, as if little Albert avoided all things that resembled the rabbit, the intensity of the fear response cannot be weakened by experiences that would counter the negative valence, like pleasant experiences with white rabbits, cotton wool, fur coats, etc. Without experiences countering the negative association, extinction of the fear conditioned response cannot occur.

Treatment is often difficult because the already unpleasant symptoms worsen during the activation of these memories so great care must be taken not to overburden clients initially. Then clinicians can increase the client's comfortability with clinically appropriate discomfort incrementally (Howell, 2016). Tolerating the effects of fear activation is important for early treatment continuity. In instances where there is activation early in a treatment regimen, the fear response is most intense and may be least supported by client coping skills and distress tolerance capacities. This can lead to early termination and maintenance of maladaptive experiences. Thus, early success tolerating treatment exposure serves as a buffer for early termination due to acute distress.

To better understand what is occurring in treatment when patients experience symptom exacerbation or relief, early literature has relied on the identification of large brain regions as opposed to specific microcircuits. For example, the failure of the prefrontal cortex to modulate hyperarousal reflects a failure of top-down processing and a reliance on bottom-up processing. This is particularly problematic because top-down cortical inhibition has been hypothesized to be related to suboptimal fear extinction (Milad et al., 2009). These findings, while helpful, do not necessarily guide targeted pharmacological or psychotherapeutic interventions.

As the body of literature describing each facet of PTSD grows, there has been a shift to understanding more than simply observable symptoms, but also the neural circuits responsible for symptom manifestation. Fenster and colleagues (2018) outlined each of the four facets of PTSD and the related neural circuits thought to be responsible for those particular symptoms. More recent literature by Keller and colleagues (2022) has built off of these targeted neural circuits and have begun using biofeedback to more accurately identify when PTSD is present. This is striking because instances where anxiety, depressive, and PTSD symptoms are present, accurate diagnosis can be difficult. With objective indicators like unique activity in neural pathways, researchers can not only identify, but also repair the pathophysiology of PTSD.

The Salience Network

The salience network (SN) is one of three large-scale neural networks that is responsible for allocating neural resources. In addition to the SN, there are the default mode network (DMN), and central executive network (CEN). The DMN is often activated in states of daydream or rest and is inversely correlated with attention (Zhang et al., 2022), while the CEN is associated with working memory, attention, and complex problem solving (Menon, 2011). Together, these three large-scale neural networks have a tremendous influence of affective, cognitive, and behavioral responses.

Specifically, the SN is implicated in detecting and filtering relevant information from the external environment to internal emotional experiences. It is primarily housed in the dorsal anterior cingulate cortex (dACC) and the frontoinsular cortex (FIC; (Menon, 2011). Hyperactivity within the anterior insula, a component of the SN, has been shown to have significant implications on anxiety disorders (Paulus & Stein, 2006; Stein et al.,

2007). The SN has been referred to as the “switch” that mediates the DMN and CEN which is interesting because previous findings that hyperactivity has been associated with anxiety have been buttressed with subsequent literature that suggests under activation has been shown to be associated with autism (Uddin & Menon, 2009).

In a study conducted by Zhang and colleagues (2022), police recruits were given fMRIs to assess baseline SN, DMN, and CEN connectivity, in addition to self-report and clinician rated measures of PTSD. During baseline assessment, recruits were given stress inducing tasks with repeated measures of salivary cortisol and perceived stress symptoms at intervals approximating -10, 0, +10, +20, and +30 trial onset. Neural network configurations and trauma symptoms were assessed before and after acute-stress induction which is significant for a few reasons. Not only did researchers identify pre-existing neural configurations and symptoms, but also individual’s neural reorganization to the stress response and subsequent perceived and clinician rated symptoms. Researchers then explored the data for baseline findings and made predictions based on static and dynamic changes to acute-stress induction with the intention to predict post-trauma symptom development.

Given the natural resilience to PTSD symptoms police recruits possess, as well as the increased risk of substantial trauma exposure recruits would likely face both during training and on the job, this baseline was retested longitudinally after 16 months. Decreased connectivity between the DNM and SN at baseline was associated with an increase in perceived stress, but not post-traumatic stress symptoms. However increased connectivity between the SN and anterior cerebellum was associated with increased clinician-rated PTSD symptoms, specifically intrusion symptoms. This finding supports a

burgeoning body of literature that has linked the cerebellum to emotional processing, specifically negative emotional memories, as well as a neurobiological factor for the pathophysiology of PTSD.

These findings provide context for the well documented phenomenon that individual's quite literally view the world differently due to the influence of a given disorder such as the selective attending to negative or threatening stimuli in depression or PTSD (Augsburger & Galatzer-Levy, 2020). Fundamentally, PTSD symptoms severity has long been associated with overactivation of the amygdala and simultaneous hypoactivation of the pre-frontal cortex which is largely representative of the CEN (PFC; Fenster et al., 2018). Given the moderating nature of the SN, there is support in the notion that the neural circuits responsible for higher order thinking are reduced in activity while the salience network reorganizes to attend to evolutionarily-relevant stimuli. It is hypothesized that this reorganization is responsible for the unconscious effects trauma may have on which words are chosen by participants and to what frequency. If a post traumatic brain is quite literally primed to attend to negative and threatening stimuli while reducing the emphasis of higher order cognitive processing, these effects are likely observable and quantifiable in communication.

From an intervention perspective, reorganization of the SN, DMN, and CEN have appeared feasible in the context of neuroplasticity. Localized brain regions have been shown to be malleable to the benefits of certain interventions, so it is reasonable to hypothesize the same to be true with a series of localized brain regions comprising a network. For example, individuals with a diagnosis of PTSD subsequent to prolonged stress had significantly smaller hippocampi volume than individuals without a PTSD

diagnosis (Logue et al., 2018). Fortunately, these structural changes are reversible with psychotherapy as observed by Butler and colleagues (2018) who found an increase in hippocampal volume in the PTSD group, compared to control, after just six weeks of multimodal psychotherapy.

Genetic Underpinnings

In the paradigm of the stress-diathesis model, the cause of psychopathology is thought to be a host of predisposing factors (diathesis) that manifest into a categorical diagnosis depending on exposure to a certain environmental stressor (Beckers et al., 2013, p. 23). Although PTSD is largely environmental, there are predisposing factors that increase the risk of developing PTSD, namely hypodopaminergia (Noble, et al., 1991). Literature has linked PTSD with increased risk of substance use and addiction, which later prompted inquiry into the common factors that may explain this association. Blum and colleagues (2019) argue the important role of dopamine in substance use disorders and PTSD, largely because similar polymorphic genes are present in both disorders. Reportedly reviewing thousands of association studies and using the Genetic Addiction Risk Score (GARS), they found significant predictive validity to 11 polymorphisms from 10 genes involved in the regulation of reward. Ultimately, their recommendations are for an increased emphasis on dopamine homeostasis with future goals of genetically guided therapy given the substantial overlap of polymorphic genes and comorbidity of disorders.

Environmental Factors for Trauma

ACE: Adverse Childhood Experiences

Adverse Childhood Experiences (ACEs) are experiences before the age of 18 that were found to have statistically significant predictive power over later in life health

outcomes. These outcomes include substance use, chronic disease, and early mortality. An ACE can be anything from having a harsh childhood environment with an abusive parent to household member going to prison (See Appendix B). While there are 10 items, each item has multiple criteria such that endorsing one aspect of a question would suggest that it counts towards your ACE score which is from 0-10. The original adverse childhood experiences study found that almost two thirds of participants (n=17,000) had at least one ACE (Felitti et al., 1998; See Appendix B).

In the original study, more than half of the sample reported one or more ACEs and approximately one quarter of the sample reported 2 or more experienced ACEs (Felitti et al., 1998). Additionally, 20% endorsed 3 or more ACEs, while 12% reported having four or more ACEs (Felitti et al., 1998). There was a dose-response relationship between adverse childhood experiences and health risk.

Positive Childhood Experiences (PCE)

Identifying the effects of adverse childhood experiences has been an epidemiological breakthrough, subsequently leading to increased screening and mental health treatment for vulnerable populations (Bethell et al., 2017). However, assessing what to avoid or reduce does not provide any prescriptive guidance on what should be fostered in childhood for positive outcomes. Bethell and colleagues (2019) evaluated the association between positive childhood experiences (PCEs) against mental health wellbeing, specific disorders, and social/emotional support in similar fashion of the original Kaiser Permanente ACE study. The results suggested that there is a dose-response relationship with depressive symptoms and social/emotional support when

accounting for ACE scores. Furthermore, Bethell and colleagues (2019) noted that there was an equal if not greater buffering factor for each ACE incurred.

From a preventative medicine perspective, ACEs were noted to be transmitted over generations. PTSD symptom severity was found to mediate the relationship between parental ACE scores and offspring ACE scores, though positive childhood experiences were also found to be intergenerationally transmissible (Narayan et al., 2021). Given the significance of positive childhood experiences in buffering against ACEs, the researchers suggested that positive childhood experiences should be measured alongside ACEs for their substantial buffering effects and benefit for cultivating across generations(Bethell et al., 2019; Bethell et al., 2017; Narayan et al., 2021). Just as ACEs had wide reaching medical associations, PCEs were found to be associated with ideal cardiovascular health in midlife and even reduced likelihood of depressive symptoms in disadvantaged women receiving prenatal care (Chung et al., 2008; Slopen et al., 2017). The seven items comprising the positive childhood experience questionnaire can be found in Appendix F.

Survivors of Trauma

Trauma survivors may have a robust memory of the traumatic event, fragmented pieces, or have no recollection at all. The perceived severity and psychosocial factors dictate how well the individual can tolerate the distress as well as how susceptible they are to varying degrees of posttraumatic symptomatology. For individuals who remember some moments of their traumatic experience, it is common to observe “hotspots” or instances where the greatest level of emotional distress was present. Emotional processing theory suggests that exposure to the distress that follows activation of traumatic memories like hotspots, leads to habituation and a subsequent decrease in the

intensity of the fear response (Foa & Kozak, 1986). While hotspots may exist, they are not necessarily the intrusive thought or re-experiencing that an individual may experience (Jelinek et al., 2010). Rather, they are the emotionally charged apex of distress that is often referenced when intrusions occur. Holmes and colleagues (2005) found that 78% of these intrusions reflect emotionally charged high points.

Posttraumatic Growth

When experiencing traumatic events, there is a greater likelihood of developing psychiatric ailments. However, it is uncertain whether trauma precedes psychopathology. In its most basic form, Tedeschi and Calhoun (2004) characterize posttraumatic growth as the experience of positive change following an encounter with very challenging life crises. Domains of posttraumatic growth include: (a) personal strength, (b) relating to others, (c) new possibilities, (d) appreciation of life, and (e) spiritual and existential change (Zięba et al., 2019). Post traumatic growth has conceptual limitations in those positive changes following adversity may occur within or outside the context of post traumatic growth. The potential for growth to occur by happenstance following a traumatic event is both limiting and qualifying. On one hand, more stringent operationalization criteria can ameliorate limiting factors, but perhaps there is an increased chance for personal growth following an encounter with a traumatic event.
In the context of assessing trauma and post traumatic growth, individuals who achieved posttraumatic growth were found to have significantly greater levels of insight words than the non PTG group (Zheng et al., 2019). These insight words reflect causality and on a deeper level the cognitive organization of how individuals implicate themselves with their traumatic experience. A goal of CBT with cognitive restructuring, just as an

adaptive shift in EMDR, these intentionally reorganized appraisals of information have a powerful effect on experienced symptoms.

Journaling

Journaling has long been utilized as a means to increase wellness and psychological health. From a factor analysis perspective, there has appeared to be two primary mechanisms by which journaling bears efficacy, emotional disclosure (Pennebaker, 1988) and the development of a cogent narrative about adverse experiences (Horneffer & Chan, 2009; Pennebaker, 1988; Vanheule et al., 2011). There are several methods to journaling that concern what kind of prompts are used, what kind of self-disclosure, whether it's written instead of typed, whether it is communicated via writing or art, the type of audience (private journal instead of internet), and a myriad of other variables that can impact the outcomes.

Unsent letter journaling is a powerful mechanism to address residual cognitive or affective material (Jolly, 2010). Whether confronting a situation in the past to move towards reconciliation and acceptance, or actively managing what it is one would like to communicate to another, unsent letters are an effective way for patients to consolidate their thoughts and feelings in an intentional way. Additionally, reflective journaling is useful to record experiences of an event or time which is most akin to a dairy (Utley & Garza, 2011). The natural inclination of negativity bias can color perceptions with a dreary tint so mindfully focusing on positives can counteract this by increasing the presence of positive events in our awareness. This differs from gratitude journaling in that gratitude focuses on the things that already exist and we are grateful for, less about populating all the positives of the day (Kaczmarek et al., 2015). It is a more succinct and

intentional approach to inventorying the things we value and appreciate, whether big or small.

Recent technological developments have taken the contents of journaling or what used to be just speeches, conversations, and written word, and transformed them into variables to be studied. Each word we use reflects a conscious, and unconscious choice in how we are thinking and feeling. One could take the perspective that our word choice can serve as glass windows that can be looked through to study the contents of what is behind them. With the advent of linguistic analysis platforms like Linguistic Inquiry and Word Count (LIWC), all forms of communication can now be looked at for both manifest and latent content by simply uploading the text to a given platform and interpreting the results.

Therapy in Writing

There is some debate as to exactly what occurs in the therapeutic writing process which has not gone unaddressed. If writing holds such great benefits, one may question if simply thinking about such events would yield similarly positive benefits. Lyubomirsky and colleagues (2006) set out to explore this difference and found that simply thinking about difficult life events has been paradoxically shown to have negative, ruminative effects if individuals are simply asked to think about difficult moments and nothing more. Lyubomirsky and colleagues (2006) asked participants to consider the most difficult moment of their life, for 15 minutes; for 3 consecutive days. An experimental group was assigned to write about their negative experience for the same frequency and duration as the thinking experimental group. What Lyubomirsky and colleagues (2006) found was that not only did the writing group report greater life satisfaction, fewer physiological

symptoms, and generally better mental health, but the thinking group reported a decreased satisfaction with life relative to controls. This was further supported in research conducted by Pennebaker & Beall (1986) who found that by simply writing about emotionally impactful events, college students demonstrated improvements in physical health during their time in college compared to the group who wrote about superficial topics (Pennebaker & Beall, 1986).

To lend credence to the wide range of positive health effects journaling can have both physically and mentally, Frisina and colleagues (2004) conducted a meta-analysis examining the relationship of written emotional disclosure and health outcomes. They found that expressive writing was found to have greater positive impacts on physiological symptoms than psychological, and that patients benefited whether low in risk of mortality (asthma) or high at risk for mortality (cancer). Specifically, statistically significant positive outcomes on symptom relief were found in those suffering from cancer (De Moor et al., 2002; (Hussain, 2010), Jensen-Johansen et al., 2018 & Stanton et al., 2002), posttraumatic stress disorder (Gidron et al., 1996; Schoutrop et al., 2002), asthma and rheumatoid arthritis (Smyth et al., 1999), severely depressed and suicidal (Kovac & Range, 2002), and psychiatric prison inmates. Effect sizes were observed to be as high as moderate (d = .49), though the mean weighted effect size across all studies was small (d =.19).

Given the wide array of journaling methods, the positive effects one can benefit from by journaling is contingent on how an individual implements it. For example, Krpan et al. (2013) found when assigning a sample of 20 individuals with Major Depressive Disorder to write every day, for five days, about their deepest thoughts and feelings, they

had significant reductions in depression scores immediately post treatment and at a four week follow up. The control group (n=20) was given a writing task to reflect unemotionally on daily events suggesting the mechanism of action lies within the progressive, iterative engagement with emotionally salient and personally relevant experiences. Expressive writing was also found to safeguard individuals prone to ruminative thinking (Sloan et al., 2008). Ruminative thinking has been a feature in the development, triggering, maintenance, and outcome of several psychopathologies. Expressive writing was shown to not only reduce ruminative thinking immediately after the exercise, but depression severity decreased over time and as it persisted for months (Sloan et al., 2008).

When confronting grief, journaling can serve as a powerful mechanism to immediately process the rawness of a stressful event. Margola et al. (2010) found when interviewing 26 adolescents who lost a classmate suddenly, after 3 consecutive days of journaling, that substantial, statistically significant differences occurred in the analysis of their journaling over time. What the researchers found was that adolescents were grappling with the cognitive aspects of the event initially, but over time moved to the emotionality of the event and by the third day had increased into the significantly more complex emotional and cognitive processing language in addition to a reduction in referencing the death itself. This balancing of cognitive and emotionally salient features reflects the progressive cognitive processing mechanism journaling allows which ultimately leads to integration (Margola et al., 2010).

A paradigm shifting study by Pennebaker, Colder, and Sharp (1990) found that college freshman writing about their experience transitioning to college had fewer

medical visits compared to the control group who wrote about trivial things, suggesting an accelerated coping process is present. This striking finding lends credence to Van Der Kolk's postulation that “the body keeps the score” as it pertains to holding onto unresolved emotional conflicts, whether consciously aware or not.

Journaling has been shown not only to influence mood and general physical health, but also undesirable self-harming behavior. Hooley et al. (2018) set out to assess the efficacy of a novel writing therapeutic intervention called Autobiographical Self Enhancement training (ASET), which is focused on reducing self-criticism and increasing positive self-worth in individuals with non-suicidal self-injury. They found that when comparing the ASET group to individuals assigned to an expressive writing group and a daily journaling group, all three interventions demonstrated statistically significant improvements at the end of treatment in reducing self-criticism, non-suicidal self-injury episodes, depression, and suicidal ideation from pre-treatment.

The integration of journaling as a means of unobtrusive clinical assessment is not new, as Piasecki and colleagues (2007) discussed at length in their publication discussing more naturalistic assessments like electronic diaries for greater external validity. Given the primary barriers discussed were economic and scientific, it appears technological advances have largely made economic access to electronic diaries much more feasible. From the scientific standpoint, the body of literature supporting nuanced linguistic analysis is wanting, suggesting a need for continued cultivation of rigorous inquiry into the inevitability of technological advancement. LIWC appears to be a cornerstone technology of this potential means of clinical assessment.

Alexithymia

Given the function of journaling is to express the cognitive and emotional components of one's experiences in pursuit of integration, there is a fundamental requirement to be able to articulate one's own experience. This may sound like an effortless task, but there is no standardized education on emotion regulation or expression leaving one's capacity to emotionally regulate largely up to the influence of their primary relationships, environment, and genetic predisposition. That said, for individuals who have struggled to articulate their own emotions and the intricacies that accompany one's internal experience and how they can relate to others' emotional experiences would suffer from alexithymia. Simply defined, Alexithymia is when an individual has difficulty identifying and describing their emotions. One study examined journaling, a relaxed condition, and alexithymia (Horneffer & Chan, 2009). This study explored whether journaling was helpful for individuals with deficits in emotional awareness and understanding. Alexithymia is a common phenomenon such that significant levels of Alexithymia can be found in up to 10% of the population (Taylor et al., 2000). Men are particularly more vulnerable to demonstrating greater scores on Alexithymia measures which has been attributed to traditional western ideals of masculinity that one may view as stereotypical. This has been characterized by some researchers as normative male alexithymia, though greater identification with masculine norms reflects greater degrees in alexithymia in both genders (Karakis & Levant, 2012).

Horneffer and Chan (2009) found that a short relaxation exercise followed by journaling about a stressful event can have generally positive effects, though seemingly paradoxical effects for individuals who scored high in alexithymia. Results suggested that

highly alexithymic individuals experienced heightened emotional distress immediately after journaling and for days after. The authors hypothesized that completing the initial 5-minute relaxation exercise may have disrupted the inherent relaxation that comes from journaling, so the overall relaxation effect may have been attenuated by the initial exercise (Horneffer & Chan, 2009). Previous studies have demonstrated that alexithymic individuals may separate their physical and emotional states. This separation, referred to as "decoupling," may explain the disconnect between their emotional and physiological state. It is hypothesized that journaling may actually bridge the gap and increase emotional awareness by becoming more present with physiological states, though these findings do not support that for individuals high in alexithymia. The results suggest levels of alexithymia should be accounted for when assigning expressive writing tasks.

Linguistic Inquiry and Word Count

Initially developed in 1993, Linguistic Inquiry and Word Count (LIWC) measures the frequency of words that are represented in psychologically meaningful categories giving another layer of meaning beyond the literal interpretation of words. It has been referenced in 761 publications on Web of Science since May of 2021 (Dudău & Sava, 2021). Linguistic inquiry and word count is a text analysis software developed by Pennebaker and colleagues that simply counts the frequency of words. Through a successive research process, words can be grouped into categories based on what they communicate, like positive words or negative words. These groupings are called dictionaries, for every word that LIWC encounters, it compares the word to its empirically validated dictionary, if it matches, say, the auxiliary verb category, it would note 'plus one' for that category (See Appendix A; Liang & Scammon, 2018). Norms

were developed for the frequency of such words, so any sample item can be compared against the norms for comparison to see if there is a statistically significant increase or decrease in, say positivity or negativity, compared to average. This has allowed researchers to take communication past face value, to glean psychological insights, emotional states, cognitive styles, and attention allocation all from a given communication (e.g., email, blog post, Tweet).

The simple function of counting words and comparing them against predefined categories gives meaningful psychological insights into any communication that can be converted to text. Interestingly, the average vocabulary is nearing 100,000 words, 500 of which (.05%) make up approximately 55% of what is commonly heard, read, and spoken (Miller, 1995). In the same way gaze tracks our attention, specific word choice can dictate what is being attended to cognitively and affectively. For example, Pennebaker and colleagues go on to suggest that personal pronoun use increases when experiencing physical or emotional pain because their attention is drawn to themselves (Rude, Gortner, & Pennebaker, 2004).

To explore the construct validity of emotional expression as measured by LIWC, Kahn and colleagues (2007) designed three experimental studies to test how well LIWC measures verbal expression of emotion. Writing about emotions has been shown to have positive physiological outcomes (Kahn et al., 2007). Talking about distressing emotions with someone has been shown to not only reduce subjective distress of the event, but also facilitate insight (Kennedy-Moore & Watson, 2001). Subsequent research has built a corpus of literature that is information about everything from personal feelings to how positively or negatively a speech is. In a study examining political ads, positive ads were

found to use more future and present tense verbs whereas negative ads used more past tense verbs (Gunsch et al., 2000).

This is not to say LIWC is without shortcomings. A major limitation of LIWC is the requirement for spoken language to be transcribed. While strides have been made with voice recognition software in accessible forms like Alexa or Siri, anyone who has used these very powerful technologies can speak to their magnificence as well as their shortcomings for 100% accurate transcription. This suggests that one cannot rely on a third-party application to reliably translate spoken word, like a patients account, without going back and verifying which is a very tedious process. `

Therapists in their training are confronted with several ways to assess their performance which has included video and audio recording sessions, having a supervisor sit in treatment, or simply report the therapeutic interaction after the fact. When tasked with transcribing sessions, clinicians may find the process of typing recorded sessions arduous and laborious. One potential solution for this dilemma is the use of automatic speech recognition for psychotherapy. While automatic speech recognition has been somewhat of a recent addition to day-to-day life, the commercialization of speech recognition is rapidly advancing the technologies ability to accurately identify speech to text (Miner et al., 2020).

Two factors that influence the efficacy of automatic speech recognition are baseline and training. At baseline, many automatic speech recognition platforms can achieve accuracy in the ballpark of 75% (Miner et al., 2020). With the addition of machine learning and deep learning, accuracy can achieve over 90% (Miner et al., 2020). Only once accurately transcribed can natural language processing be used to determine

what exactly is being communicated. Both artificial intelligence and deep learning require interaction with the participant in such a way that adjustments are made in early trial and error interactions and even then, adjustments are made as the interactions persist. This limitation makes automatic speech recognition inaccessible for now and ultimately relies on transcribing speech or using written text for analysis.

LIWC and Psychopathology

Even though LIWC was not designed for clinical purposes, it was designed to make psychological insights on written forms of communication which is quite relevant for clinical use. While there are many aspects of LIWC outputs that would appear to have nothing to do with mental illness or maladaptive thinking, countless studies have found associations between speech characteristics that do overlap with psychopathology. Exploratory factor analysis has identified common traits that those with categorical illnesses or subclinical levels of maladjustment demonstrate differences in the way they communicate (Huston et al., 2019). As it pertains to the psychological impact individuals who rely on extreme thinking often do so in states of depression, anxiety, and personality disorder. Cognitive rigidity can be measured with words that reflect extreme, absolutist, and unilateral positions. These words are quantifiable and included in LIWC dictionaries, but they are also included in the clinical literature because there are a few ways to assess cognitive rigidity.

Levels of cognitive rigidity have implications across a number of psychopathologies so identifying cognitively rigid styles of communication can indicate that maladaptive thinking is present. Cognitive rigidity does not necessarily reflect psychopathology, but as levels of cognitive rigidity increase, the likelihood of

maladjustment increases as well. Al-Mosaiwi & Johnstone (2018) set out to explore the psychological insights one could glean from internet forums founded around the discussion of mental illness. Their findings suggested that absolutist (i.e., cognitively rigid) thinking was most pronounced in suicide forums, followed by more subtle, but still statistically significant levels in anxiety and depression forums. These effects were associated more strongly with cognitive style than psychopathology, but there are cognitive styles that have greater associations with certain clusters of maladjustment.

As somewhat of a proof of concept for LIWC, depressed patients do in fact express more sadness words than anxiety disordered patients (Sonnenschein et al., 2018). When examining depression in expressive writing, the medium participants used to express them is significant. Differences in the way people engage with expressive writing differs from handwritten journaling to online blog-posting. Rodriguez and colleagues (2010) hypothesized features of social desirability are contributing factors to these differences.

Beyond psychopathology, LIWC can tap into more global and universally experienced constructs. Traits of personality have been associated with massive constructs like political affiliation and worldview, as well as deeply specific fears, vulnerabilities, and insecurities. Early but promising research by Cohen and colleagues (2008) found that personality variables accounted for almost 25% of the variance in emotional expressivity. At its core, these results suggest personality insights can be gleaned from LIWC for one, but also that personality variables have a massive influence on how individuals experience and express emotion.

In a study using another trauma therapy, Eye-Movement Desensitization and Reprocessing (EMDR) and linguistic analysis in patients suffering from Anorexia Nervosa, linguistic analysis was utilized before, during, and after treatments. The researchers found statistically significant changes in the following linguistic categories: affective processes, cognitive processes, biological processes, and non-fluency words (Cardazzone et al., 2021). This suggests as clients desensitized and reprocessed trauma, their internal representation of the trauma and how it relates to their life has fundamentally shifted as evidenced by a statistically significant changes in the words they choose and the frequency they choose them.

Interestingly, a particular category called non-fluency words was found to substantially decline following treatment. This category includes words like “uhh,” “um,” and “oh,” which have been associated with insecurity or uncertainty that may reflect the way the client relates to the trauma (Cardazzone et al., 2021). While this study was a preliminary single-case study, their participants and methods were of sound design, so it is reasonable to extrapolate these findings conceptually. By extension, if positive changes can be observed within subjects it is the hope that it can also be observed between subjects on a baseline level.

Prolonged Exposure in Primary Care (PE-PC)

In the absence of an established trauma-informed care intervention designed specifically for trauma in primary care, novel interventions are in high demand. One such novel intervention is a trauma protocol that leverages cognitive processing theory in addition to a series of self-directed expressive prompts and in vivo processing exercises over the course of several primary care visits. Preliminary data for Prolonged Exposure

for Primary Care (PE-PC) is promising and shows therapeutic gains in this novel context. Further clinical trials may lead to PE-PC becoming a standard of care in this setting. The (PE-PC) treatment protocol utilizes six journaling prompts for the client to answer on their own and process with the therapist (See Appendix E). Therefore, targeting the probing questions of this protocol for further inquiry may provide a greater understanding of what exactly is occurring and where therapeutic benefits are being observed.

Using PE-PC to treat trauma requires patients to write about their difficulties through open ended questions while also providing them resources to help manage difficult emotions or physical reactions as they arise. This empowers clients to learn to work through unpleasant emotions on their own while giving them the emotional material to bring to session to further unpack with a mental health professional. The questions are contained in the At-Home Practice Assignment that accompany the PE-PC protocol originally developed by Corso and colleagues (2009) and expanded upon by Cigrang and colleagues (2011). While this treatment is still under investigation for more robust clinical data given its recent development, early research is promising and suggests that PE-PC is an effective abridged trauma therapy suitable for the primary care setting.

Given that it is still under investigation for efficacy, access is controlled, and training is tightly regulated. As of January 2021, the principal investigators reported that 155 clinicians have been trained in this intervention with two initial studies demonstrating successful treatment outcomes between 4 and 8 sessions ("VA Researcher Tests Condensed Form of Psychotherapy to Treat PTSD Patients," 2021).

The short treatment model used in PE-PC may be less than 10, 30-minute sessions which is markedly shorter than more other treatments. For example, traditional prolonged

exposure therapy can be 8 to 15 weekly, 90-minute sessions, which may become prohibitive due to time commitment, stigma, and attrition. The VA and DoD have addressed this by integrating behavioral health consultants (BHCs) in primary care under the Primary Care Behavioral Health (PCBH) initiative to address behavioral health concerns including, but not limited to: trauma. These sessions are confined to 30 minutes, and with traditional psychotherapies it can be difficult to implement effectively in such a short period of time. Guidelines for addressing PTSD in the primary care setting include referring to specialty care and psychoeducation on treatment options, which given the findings of Hodge et al. (2007) above, may be squandering the only opportunity to address PTSD at all.

Fortunately, recent directives from the VA/DoD and other civilian regulatory bodies have encouraged the use of trauma focused psychotherapy for PTSD in the primary care setting despite the limitations discussed. The PE-PC protocol can be completed in as little as 4, 30-minute sessions which allow clients to receive mental health services within the primary care setting, effectively mitigating stigma and referral follow-through concerns. In the event certain journaling prompts can shed greater insight into the status of the patient with regard to trauma symptoms, perhaps it could be a less direct way to probe symptoms by avoiding checklists and inventories while also opening the opportunity to perhaps discuss these questions in the event speech to text capacities reach acceptable levels of accuracy. Proceeding from the position that some of the patients who need this degree of trauma informed care most may be most likely to avoid it, every effort should be made to reduce the time and effort commitment on both the

clinician and client. In the absence of a trauma focused therapy in the primary care setting, it is a novel trauma focused therapy with great promise.

Chapter 3: Study Purpose and Rationale

Addressing trauma in the primary care setting is an important area of development. Research has suggested that the population most in need of receiving care for clinically significant trauma is also one of the least likely to seek it out regardless of the setting (Rauch et al., 2017). Furthermore, Primary Care settings see a greater proportion of individuals with PTSD as compared to the general population (Hoge et al., 2007). Therefore, the primary care setting has been identified as one of the most likely places to not only identify but provide short-term targeted care for individuals suffering from trauma related symptoms.

This study was designed to explore the feasibility of assessing trauma symptom severity by using linguistic analysis of targeted trauma probing prompts. With the development of prolonged exposure for primary care (PE-PC), the same six open-ended questions are used to assess the client's relationship to the traumatic event in their own words in addition to other standardized probing questions. It is hypothesized that linguistic analysis can be used with the PE-PC protocol to enhance the richness of information gleaned in assessing populations that formal assessment is often not feasible or is limited in scope. Ideally, as speech to text technology becomes more accurate, linguistic analysis becomes more sophisticated, and technology is increasingly utilized to deliver mental health services, more unobtrusive methods like the present application of LIWC and trauma symptoms may become viable.

Chapter 4: Objectives and Hypotheses

Objective 1: Objective one examines the relationship between reported trauma symptom severity and the language used to describe the event. Given the limitations in assessing trauma through time intensive clinical interviews of self-reported symptom checklists, analyzing trauma narratives with LIWC may be more efficient and patient-centered than traditional measures (Brónnimann et al., 2013; Frissa et al., 2016).

Hypothesis 1: As Trauma symptoms increase, as reflected on total PCL-5 scores, there will be a negative relationship with cognitive processing, first person pronoun, and emotion words.

Objective 2: Objective two explores the relationships between ACE scores and Trauma symptom severity.

Hypothesis 2: There will be a positive correlation between ACE scores and total trauma symptoms reported on the PCL-5.

Objective 3: Objective three explores the impact of positive childhood experiences (PCEs) on the presence of adverse childhood experiences (ACE) scores, post traumatic growth scores (PTG), subsequent trauma symptom severity (PCL-5) scores, and resulting LIWC outputs.

Hypothesis 3: There will be a negative relationship between PCEs and trauma symptom severity scores.

Chapter 5: Methods

Procedure

Participants responded to an online questionnaire created using the Qualtrics online survey platform. Following a survey correspondence, the data collected from the survey questionnaires was analyzed using IBM Statistical Package for the Social Sciences (SPSS) software. The participants were separated into appropriate domains for analysis based primarily on their posttraumatic stress disorder checklist for DSM-5 scores, but subsequent analysis also grouped participants based on their adverse childhood experience, positive childhood experience, posttraumatic growth, and linguistic inquiry and wordcount scores. Individual factors, including age, gender, educational attainment, occupation (first responder/LEO/veteran vs civilian), and marital status were utilized for analysis.

Participants

Participants were selected by a convenience sampling method through an anonymous link that was shared on several social networking platforms. Additionally, civilians were included by word of mouth and snowball sampling distribution. The inclusion criteria consisted of an individual willing to participate in the survey regardless of trauma history who was 18 years of age or older. Standard demographics such as age, identified gender, ethnicity, and marital status were obtained. Specific demographics such as annual income, first responder status, type of first responder, and veteran status were also obtained. (See Appendix A).

Measures

Adverse Childhood Experiences Questionnaire (ACEs)

The Adverse Childhood Experience Questionnaire (ACEs) is a 10-item self-reported retrospective questionnaire that assesses the number of adverse childhood experiences individuals experienced before the age of 18. Decades of research has established that ACE scores are positively correlated with negative health outcomes like increased risk for physical ailments like heart and respiratory disease, to risk of substance abuse, and early mortality (Felitti et al., 1998a). Individuals with high ACE scores are also more likely to experience subsequent trauma and victimization (Ports et al., 2016).

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5)

The PTSD Checklist for DSM-5 (PCL-5) with Life Events Checklist for DSM-5 (LEC-5), and Criterion A from the National Center for PTSD, was utilized to assess traumatic symptoms. The PCL-5 is a 20-item self-report measure that assesses the 20 symptoms associated with a PTSD diagnosis. The PCL-5 is a useful instrument that has been empirically validated and widely used in the clinical literature. In an ideal sense, a diagnosis of PTSD would include a more thorough evaluation as one may find in the Clinician-Administered PTSD scale (CAPS-5) or another structured clinical interview. However, the PCL-5 has utility for screening, provisional diagnosis, and assessing the changes in symptom presentation over time. (*PTSD Checklist for DSM-5 (PCL-5) - PTSD*, n.d.) In the DSM-IV, there were three versions of the PCL: the PCL-M (military), PCL-C (civilian), and PCL-S (specific). In the DSM-V, there is one PCL-5 that is used without specificity to the population (*PTSD Checklist for DSM-5 (PCL-5) - PTSD*, n.d.) so for that reason no distinctions will be made between civilian and military populations.

The PCL-5 has strong internal consistency (α = .94 to .96) and test-retest reliability (*rs* = .74 to .85) while also demonstrating convergent and divergent validity (Blevins et al., 2015; Bovin et al., 2016). A variety of cut scores have been studied ranging from 28 to 37 (Ashbaugh et al., 2016), however the consensus for provisional diagnoses of PTSD is a cut score of 31 to 33. To reduce the likelihood of statistical noise and prevent false positives, a higher cut off score of 38 will be used for a provisional diagnosis of PTSD because it has both high sensitivity (.78) and specificity (.98; Cohen et at., 2015). Items can be found in Appendix G.

Positive Childhood Experiences Scale

The positive childhood experiences scale was developed to include 7 items from several existing measures. Bethell and colleagues (2019) selected items from 4 subscales in the Child and Youth Resilience Meausre-28: 4 items were derived from the psychological, caregiving subscale (PCE items 1, 2, 6 and 7), 1 item was derived from the Education subscale (PCE item 4), 1 item was derived from the Peer Support subscale (PCE item 5) and 1 from the Culture subscale (PCE item 5). Psychometric soundness has been demonstrated in both the original item inventory, the Child and Youth Resilience Measure-28 as well as independently as a 7-item questionnaire.

Posttraumatic Growth Inventory

The posttraumatic growth inventory was utilized to assess adaptive changes following exposure to traumatic events. This scale was developed by Tedeschi and Calhoun (2004) and contains 21 items (See Appendix H). The inventory asks participants to rate the degree they have experienced a given positive change (i.e. priorities about what is important in life) from 0 not at all due to the crisis to 5 experienced this change to

a very great degree as a result of the crisis. This measure loads onto five factors: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. This measure reflects constructs similar to resilience and assesses positive changes in the context of growth following a traumatic event.

This measure has good internal consistency with (α = .90). The psychometric properties of the five factors are also statistically sound which include new possibilities (α = .84), relating to others (.85), personal strength (α =.72), spiritual change (α = .85), and appreciation of life (a = .67; Tedeschi & Calhoun, 2004). This measure also demonstrates sound convergent and divergent validity, though there has not been firm cut scores that have been widely studied. The general consensus on researches quantifying meaningful levels of posttraumatic growth have used 46 as the cut score so the same will applied herein (Mazor et al., 2016).

Linguistic Inquiry and Word Count (LIWC)

LIWC was used for text analysis in a manner consistent with the user manual (Tausczik & Pennebaker, 2010b) and contemporary literature (Pennebaker, 2018; Pennebaker et al., 2003; Slatcher & Pennebaker, 2006; Tausczik & Pennebaker, 2010a). Outputs were compared based on trauma symptom severity levels, adverse childhood experiences, and positive childhood experiences to determine the relationship between trauma and emotional expression in trauma narratives. Based on existing literature (Cardazzone et al., 2021), the following LIWC categories were used: cognitive processing, first person pronoun, and emotion words. Beyond those preselected categories, regression and correlations were used to identify the most predictive variables on the outcome of LIWC scores.

Chapter 6: Results

Sample Demographics

A total of 284 participants completed the survey, however, due to partial responses a final sample of 171 is included (See Appendix B). Participants were aged 25 to 75 (*M* = 40, *SD* =14) and were 88% White (*n* = 151), 2.3% Black or African American (*n*= 4), 4.1% Hispanic (*n* = 7), 1.2% Asian (*n* = 2), and .6% native Hawaiian or Other Pacific Islander (*n*= 1) while 2.3% identified as two or more races (*n* = 4). Highest levels of education ranged from 4.1 % GED (*n* = 7), to 19.3% achieving some college (*n* = 33), 19.3% having a Bachelors (*n* = 33), to 4.7% achieving some graduate school (*n* = 8), 20.5% with a Masters (*n* = 35), and 6.4% had Doctorate degrees (*n* = 11).

Marital status was found to be heterogenous with 47.4% of the sample reporting being married (*n* = 81), while 42.1% were single (*n* = 72), 8.2% divorced (*n* = 14), and 2.3% widowed (*n* = 4). Careers reported in this sample were 35.1% civilian (*n* = 60) and the other 64.9% represents first responders (*n* = 111). Of the first responders, this sample consisted of 18.1% Fire Department (*n* = 31), 25.1% Police (*n* = 43), 11.7% EMS (*n* = 20), and 9.9% other (probation, corrections, volunteer, etc.; *n* = 17). Military veterans made up approximately 10% of the sample (*n* = 13; See Appendix C)

Descriptive Statistics

Of the 171 responses, responses ranged from 2 to 371 words (*M* = 59.31, *SD* = 60.46). The traumas in question were recorded by the number of months that have elapsed since the trauma. The spread of data was rather wide, as the text entries describing their most difficult trauma ranged from 2 weeks to 52 years from the time the

participant recorded the response. Individuals described traumas on average 10 years (125 months; *SD* = 130.1) previous to their taking the survey in 2022. The events of September 11, 2001 was the most frequently cited singular event for first responders. Adverse childhood experience scores ranged from zero to eight with a sample average of 1.89 (*SD* = 2.1). Positive childhood experiences scores ranged from nine to 35 with a sample average of 23.5 (*SD* = 6.2). For better comparison to adverse childhood experiences, data were also dichotomized to reflect the presence or absence of a positive childhood experience. Resulting scores ranged from zero to seven with a sample mean of 5.22 (*SD* = 2.03). Values can be found in table format in Appendix D.

The average PCL score was 16.37 (*SD* = 13.29), which is far from a clinically relevant cut score of 31. Interestingly the PCL subscales reflected some differences between frequency of symptom reporting. re-experiencing symptoms, had (*M* = 4.27, *SD* = 3.77). The hypervigilance subscale had the second highest score (*M* = 5.20, *SD* = 4.71) while negative emotionality (*M* = 4.78, *SD* = 5.1) and avoidance (*M* = 2.12, *SD* = 2.20) followed, respectively.

When examining posttraumatic growth, PTG scores ranged from 21 to 126 with a sample average of 72.8 (*SD* = 29.3). Tedeschi and Calhoun (2004) suggested a cut score of 46, which demonstrated from this study 101 participants, or 59.1% of the sample, could be categorized as having experienced posttraumatic growth. This reflects the anticipated posttraumatic growth prevalence as measured by Tedeschi and Calhoun (2004) placing the estimate to be approximately 50% of traumas may be followed by posttraumatic growth.

Trauma Symptom Severity and Linguistic Markers

Spearman's *rho (p)* was utilized to assess the relationship between total trauma symptom severity scores and LIWC categories. As trauma symptom severity scores increased, there was also an increase in the following categories: prepositions r_s = .195, 95% BCa Cl [.041 , .339], p = .011, N = 171, biological processes r_s = .174, 95% BCa Cl [.020 , .320], p = .023, N = 171, and health r_s = .184, 95% BCa Cl [.031, .329], p = .016, N = 171. Conversely, as trauma symptom severity scores increased, there was a weak negative correlation with articles r_s= -.166, 95% BCa Cl [-.312, -.011], p = .03, N = 171. Therefore, hypothesis one was not supported, which hypothesized trauma symptom scores would have a negative relationship with cognitive processing, first person pronoun, and emotion words.

As it pertains to adverse childhood experiences, hypothesis two predicted that there would be a positive relationship between adverse childhood experience scores and trauma symptoms severity scores. Spearman's *rho* demonstrated adverse childhood experiences had a weak positive relationship with trauma symptom severity scores r_s = .224, 95% BCa Cl [.073, .366], p = .003, N = 171 which ultimately supports hypothesis two. Furthermore, a strong negative relationship between adverse childhood experiences and positive childhood experiences was also observed r_s = -.500, 95% BCa Cl [-.607, -.374], p = < .001, N = 171.

The relationship between trauma symptom severity and positive childhood experience was found to be stronger than the relationship between adverse childhood experiences and trauma symptom severity scores. When assessing positive childhood experiences, Spearman's *rho* demonstrated a moderate negative relationship with overall

trauma symptom severity r_s = -.302, 95% BCa Cl [-.436, -.155], p = < .01, N = 171. Therefore, hypothesis three was supported, which stated that there will be a negative relationship between positive childhood experiences and trauma symptom severity scores. Additional bivariate correlations can be found in Appendix K.

Inferential Statistics

Trauma Symptom Severity

Because the data are non-normal in distribution and LIWC scores are inherently non-normal, non-parametric tests were preferred over parametric tests. It should be noted that both non-parametric and parametric tests were run concurrently, and only minor differences were observed. Trauma symptom severity captured by PCL-5 scores were not found to be significantly different via Kruskal-Wallis test for occupational status $H(4)$ = 6.618, p = .157 (See Appendix I). Interestingly, trauma symptom severity scores were found to be significantly different between males and females $H(2)$ = 6.86, p = .032. Females who reported their trauma symptom severity demonstrated greater scores (*Mdn* = 17.5) than males (*Mdn* = 11.0), regardless of occupation.

When stratifying the trauma symptom severity to low, moderate, and high, a Kruskal-Wallis Test showed significant differences between the high trauma and low trauma groups in the health related linguistic category $H(2)$ = 6.48, p = .039 (adjusted significance) via a pairwise comparison after adjustment by the Bonferroni correction. Additional analyses yielded differences in the feel category $H(2)$ = 6.508, p = .039, such that the moderate trauma group demonstrated significantly higher scores than the low trauma group (p = .033).

A regression analysis was conducted to determine the impact of positive childhood experiences on trauma symptom severity scores. A simple linear regression model was significant in that positive childhood experiences explained 8.7% of the variance seen in trauma symptom severity scores $F(1, 169) = 17.11$, $p < .001$. This is significant because for every 2.03 positive childhood experiences that a participant reported, there was a 3.93-point reduction in total trauma symptoms severity scores. This is substantial because the average trauma symptom severity score was 16.37.

For every 2.08 incident increase in adverse childhood experiences there was a 3.0-point increase in trauma symptom severity scores. The model was significant $F(1, 169) = 9.07$, $p = .003$ and explains 4.5% of the variance seen in the dependent variable (trauma symptom severity scores). Further, a regression analysis was modeled to assess the impact that adverse childhood experience and positive childhood experience scores had on posttraumatic growth. The model was not significant $F(2, 168) = 1.157$, $p = .317$.

Chapter 7: Discussion

Impact of Study

The need for robust, timely, and evidence-based trauma therapies in the Primary Care setting remains one of the challenges that VA's, Primary Care Providers, and Patient Centered Medical Homes (PCMH) have difficulty confronting. Developed by Corso and colleagues (2009) and expanded upon by Cigrang and colleagues (2011) Prolonged Exposure for Primary Care (PE-PC) was in the evaluation stages at selected VA's with positive preliminary results at the time of this writing. Within the PE-PC protocol, patients were encouraged to write about their traumatic experience as a part of

treatment, which may be an additional point of data for symptom severity, treatment progress, and outcomes. The present study sought to determine the feasibility of examining written responses surrounding individuals and their traumatic experiences while also measuring trauma symptom severity to determine the relationship between linguistic markers of high trauma, moderate trauma, and low trauma patients. This was done while controlling for a well-studied risk factor for negative health outcomes, Adverse Childhood Experiences, and their empirically grounded protective buffering factor Positive Childhood Experiences (PCEs). Lastly, Post Traumatic Growth was measured to control for potential positive effects of growth, post trauma.

This study contributed to the corpus of literature in two key ways. First, the addition of positive childhood experiences appears to have a substantial buffering effect on the extent of trauma experienced by individuals exposed to traumatic events. While the literature has clearly demonstrated the dangers of adverse childhood experiences (Narayan et al., 2021), this study affirmed the importance of the increased attention paid to positive childhood experiences. Secondly, this study identified differences in linguistic profiles of individuals based on the associations of their trauma symptom severity scores. This may be beneficial in instances of guardedness or defensiveness because it can measure trauma without utilizing pointed self-report questions.

More specific to hypothesis one, the data supported the significant relationship between reported trauma symptom severity and the language used to describe the event. Given the limitations in assessing trauma through time intensive clinical interviews or self-reported symptom checklists, analyzing trauma narratives with LIWC may be more

efficient and patient-centered than traditional measures (Brónnimann et al., 2013; Frissa et al., 2016).

Patients may find that they have functional impairments due to specific features within the wide latitude of PTSD symptoms like memory fragmentation, distorted view of self, or cognitively fatalistic worldviews (Gray & Lombardo, 2001). While these PTSD related symptoms are clinically relevant and identifiable by clinicians, dictionaries have yet to be identified and/or validated for use in LIWC to specifically reflect different domains of symptoms. Similarly, the present study did not find any moderate, strong, or very strong relationships between trauma symptom severity subscales and LIWC outputs.

Existing literature has identified linguistic markers associated with PTSD like pronoun use, cognitive processing words, emotion words, overall word count, and somatosensory detail in adults with some literature representing adolescents as well (Marshall et al., 2017). Aspects of these results are somewhat similar in the present study which assessed for trauma symptoms generally in the somatosensory (feel), health, prepositions, biological processes, and articles categories. With the added standardization of prompts within the PE-PC protocol, these particular questions may provide a more robust view into baseline symptomatology, ongoing progress, and outcomes of short-term trauma focused therapy.

The present study demonstrated increased use of health and feel words in higher trauma symptom participants. This may reflect a heightened awareness of the self that other researchers have observed in the overarching somatosensory category which contains feel words (Marshall et al., 2017). This may reflect the description of how the trauma has impacted the participant in both physical manifestations of feeling and

intangible emotional experiences. Relatedly, the health category speaks more to physical health than emotional, but the presentation of severe trauma symptoms often has physical manifestations that are hallmark of PTSD. These findings appear face valid in the context of common presentations of a traumatized individual.

As it pertains to adverse childhood experiences, hypothesis two was supported in that ACE scores were found to have a statistically significant relationship with trauma symptom severity. The introduction of adverse childhood experiences dates back to the original study by Kaiser Permanente and the Centers for Disease Control and Prevention in the 1990s (Felitti et al., 1998a). Epidemiologically groundbreaking, adverse childhood experiences have become a staple in assessing risk factors for negative health outcomes in a number of private, local, state, and federal agencies (Felitti et al., 1998; Ports et al., 2016; Scully et al., 2020). The association between ACE scores and negative outcomes supports existing literature and also bolsters the notion that victimization leads to a greater likelihood of subsequent victimization (Ports et al., 2016). Ultimately, hypothesis two was supported.

In the corpus of literature describing the negative influence of ACE scores on health and wellbeing outcomes, a burgeoning topic has been the buffering effects that certain positive childhood experiences can have. Conceptualized as positive childhood experiences (PCEs), findings suggest that PCEs have a dose-response buffering effect against the already established maladaptive dose-response relationship between ACE score elevations and negative health and wellbeing outcomes (Bethell et al., 2019; Bethell et al., 2017).

The recent introduction of positive childhood experiences on a broad protective factor level showed promise for providing meaningful direction on what experiences can provide protective factors in youth development. A prospective research study initiated by Skodol and colleagues in the 1990s that was published in 2007 identified the protective effects positive childhood experiences had on the recovery from personality disorders in youth. Ultimately treatment directed towards strengths and resilience-based recovery with interpersonal skills, in addition to positive childhood experiences across childhood, demonstrated the greatest effect for symptom reduction and personality disorder remission (Skodol et al., 2007).

Sometimes referred to in the literature as “counter-ACEs,” positive childhood experiences are increasingly being included in literature to promote positive childhood experiences from a public health perspective. Crandall and colleagues (2019) explored the relationships between ACEs and Counter-ACEs and found that counter-aces did in fact neutralize ACEs, but only to a moderate degree. For individuals with 4 or more ACEs, the protective effects of Counter-ACEs diminished (Crandall et al., 2019).

The importance of positive childhood experiences appeared to be increasing in salience, as the CDC published a paper in May of 2022 whose introductory sentence reads, “Adverse and positive childhood experiences have a profound impact on lifespan health and well-being. However, their incorporation into ongoing population-based surveillance systems has been limited.” (Anderson et al., 2022, p. S31). Similarly, Figure Two represents the increase in attention paid to this construct as documented by Google search trends noting the search term “positive childhood experiences” which has seen a substantial increase in frequency of searches over time (See Appendix J).

The present study buttresses the previous findings by Bethell and colleagues (2019) in that counter-ACEs were found to have a buffering effect against adverse childhood experiences in their impact on current trauma symptom severity scores. Regression analysis found that positive childhood experiences had a greater buffering effect on trauma symptom severity scores than adverse childhood experiences' negative effects. While the difference is small, it speaks to the importance of integrating positive childhood experiences into the literature and stakeholders in public health.

Similar to the resilient nature of counter-ACEs, posttraumatic growth (PTG) has been described to be the positive change that results from facing difficult life crises (Tedeschi & Calhoun, 2004). This construct has been shown to rely heavily on cognitive processing, specifically processing of the cognitive structures that the traumatic event challenged (Tedeschi & Calhoun, 2004). While the present research did not significantly reflect this assertion, it did shed light on the resilience of the current sample. The data describing post traumatic growth poses a directionality challenge in that post traumatic growth may require exposure to trauma, but also may have occurred from a trauma other than what the individual attributed the growth to. To attempt to control for directionality issues, post traumatic growth was analyzed as both a predictor and outcome, which did not yield meaningful differences in outcomes. Directionality aside, this sample demonstrated normative levels of posttraumatic growth for the general population (Tedeschi & Calhoun, 2004).

While text analysis did not adequately capture posttraumatic growth, there may be other useful applications. Additional benefits of using text analysis to assess patients can extend beyond snapshot moments to monitor progress over time. Cardazzone and

colleagues (2020) used LIWC to assess patients during their therapy over the course of a year in an eating disorder clinic. Their findings identified distinct linguistic changes over the course of treatment for eating disorders. Increased frequency in cognitive processing words, specifically insight words, appeared to be a marker of positive change (Cardazzone et al., 2021). Given their findings it is reasonable to suggest that as progress is made with clients by way of symptom relief, the nonrandom process of word selection to describe their experience would reflect subjective changes in relevant word categories over time. Therefore, linguistic analysis may be a helpful outcome and progress monitoring adjunct to standardized measures.

Chapter 8: Limitations and Areas for Future Research

While this study set out to study psychopathology in a novel manner, there were a number of limitations that require acknowledgement. Firstly, the data was acquired by non-treatment seeking individuals in a convenience sample. This suggests that motivation for disclosure may be low as evidenced by the length of responses. Of the 171 responses, the minimum response was two words while the largest response was 371 (M = 59.31, SD = 60.46). While LIWC does not have a standardized minimum response, responses with less than 17 words were excluded from analysis, though this exclusion did not have substantial effects on the statistical tests utilized so they were reintroduced to the final analysis for statistical fidelity.

Furthermore, the setting (work, home, school, etc.) and manner of disclosure (journal, socially shared, written, etc.) has been shown to influence levels of disclosure (Balon & Rimé, 2016). The PE-PC protocol utilizes a workbook that requires patients to write about their experiences with guiding prompts and reflection questions which are

more robust than the one narrative inquire included in this study. It is possible that asking several questions in the context of a treatment setting would elicit more robust and open responses as opposed to the anonymity and artificial nature of research that may be influenced by social desirability and reporting biases.

Statistical limitations reflect the type of data acquired. LIWC outputs are relative frequencies of relevant categories. Therefore, the data is not normally distributed, nor were the other variables of interest. In order to preserve the fidelity of the data and avoid comparing normally distributed and non-normally distributed data, non-parametric tests were used in accordance with Field (2014) and others in the field utilizing LIWC data (Fernández-Cabana et al., 2012; Kim et al., 2022; Prins, n.d.; Waters et al., 2016). Parametric tests were run in parallel with the non-parametric tests which yielded largely insignificant effects with the exception of means testing.

A limitation that also requires acknowledgement is the elimination of PE-PC journaling prompt questions due to methodological concerns. The crux of this study was to assess the feasibility of analyzing open ended responses to questions probing a client's trauma. Due to the anticipated attrition rate of individuals being asked to describe their most difficult traumatic experience in detail, followed by six additional open-ended responses as well as questions assessing demographic, adverse childhood experience, positive childhood experience, posttraumatic stress disorder symptoms, and posttraumatic growth, the journaling questions ultimately were decided to be excluded. However, the initial prompt asking participants to describe their trauma is still relevant and a part of the PE-PC protocol, so there is still utility in the data. The results are applicable to the PE-PC

protocol, however future research should expand upon the six journaling prompts to assess the potential therapeutic benefits of standardized prompts.

Further limitations lie in discerning the order of events given the retrospective nature of several measures in the study. In instances where individuals rate highly on trauma symptoms, adverse childhood experiences, positive childhood experiences, and posttraumatic growth, there is room for interpretation as to which occurred first. It is reasonable to suggest trauma must precede posttraumatic growth, but can growth follow trauma outside of the context of posttraumatic growth? Furthermore, does elevated trauma symptom severity have a relationship with commensurate posttraumatic growth scores or can they be two truly independent constructs. For example, posttraumatic growth was found to correlate with trauma symptom severity, but to what degree that reflects growth or simply a byproduct of increased trauma exposure has yet to be understood in full.

In the context of how the present study contributes to the areas for future research, there are applications specific to trauma and linguistic analysis that are relevant as opposed to mood or personality disorders. A study conducted by Wiegersma and colleagues (2019) found that utilizing several linguistic analysis programs allowed them to identify “hotspots” in patients with PTSD which essentially reflect the most traumatic part of a memory. By identifying and increasing the time spent processing these hotspots through imaginal exposure with Brief Eclectic Psychotherapy for PTSD (BEPP), the researchers found they could not only identify the hotspots through linguistic analysis, but also improve client outcomes, and even client monitoring. The findings of the present study, in addition to what is outlined by Cardazzone and colleagues (2020) and

Wiegersma and colleagues, suggests there are potential applications for the data captured in the PE-PC protocol for both patient assessment and monitoring.

Future research appears to be dependent on the advances of linguistic analysis. The current corpus of literature outlines small to moderate associations and lacks meaningful, clinically significant findings. Wiegersma and colleagues (2019) used LIWC in concert with several other linguistic analysis programs to demonstrate marginally clinically relevant outcomes. Perhaps advancements in these applications will provide more predictive and descriptive power to linguistic analysis in clinical settings, but at present LIWC does not appear to be the most effective means of capturing clinically relevant data. Therefore, future researchers should use LIWC in concert with other means of linguistic analysis to ensure the data are being analyzed beyond word count and frequencies.

As it pertains to clinical utility, at this stage LIWC and similar linguistic analysis applications do not appear to add enough clinical value to justify the time, effort, and resources that were used in this study. The primary care setting is fast paced and simply collecting the data to feed through LIWC would exceed typical time allotted for things like risk assessment, mental status exams, and intervention. Furthermore, the quality of the results suggest some differences in linguistic profiles reflect differences in reported trauma symptom severity, but not to an extent that would warrant integration into a treatment setting.

Chapter 9: Conclusion

This study found that linguistic markers for identifying trauma in trauma narratives were identified by Linguistic Inquiry and Word Count (LIWC). The high trauma group reported a significantly higher frequency of words in the health category than low and moderate trauma participants while the moderate trauma group used significantly more feeling words than the low trauma group. Furthermore, this study found that trauma symptom severity did not significantly differ between occupational categories like fire, police, EMS, civilians, or other first responders, but it did differ between genders as women reported significantly higher trauma symptom severity scores than men. Furthermore, this study supported existing literature that positive childhood experiences do have a statistically significant buffering effect on trauma symptom severity as evidenced by linear regression despite also confirming the negative effects of adverse childhood experiences. This is important because adverse childhood experiences have been a well-documented risk factor, and positive childhood experiences are a relatively new positive finding. While these results are significant, they do not appear to have a magnitude of effect great enough for clinical application at this time.

References

Al-Mosaiwi, M., & Johnstone, T. (2018). In an Absolute State: Elevated Use of Absolutist Words Is a Marker Specific to Anxiety, Depression, and Suicidal Ideation. *Clinical Psychological Science*, *6*(4), 529–542. https://doi.org/10.1177/2167702617747074

Alonso, J., Angermeyer, M. C., Bernert, S., Bruffaerts, R., Brugha, T. S., Bryson, H., de Girolamo, G., Graaf, R., Demyttenaere, K., Gasquet, I., Haro, J. M., Katz, S. J., Kessler, R. C., Kovess, V., Lépine, J. P., Ormel, J., Polidori, G., Russo, L. J., Vilagut, G., … ESEMeD/MHEDEA 2000 Investigators, European Study of the Epidemiology of Mental Disorders (ESEMeD) Project. (2004). Prevalence of mental disorders in Europe: Results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatrica Scandinavica. Supplementum*, *420*, 21–27. https://doi.org/10.1111/j.1600-0047.2004.00327.x

Alonso, J., Ferrer, M., Romera, B., Vilagut, G., Angermeyer, M., Bernert, S., Brugha, T. S., Taub, N., Mccolgen, Z., Girolamo, G. D., Polidori, G., Mazzi, F., Graaf, R. D., Vollebergh, W. A. M., Buist-Bowman, M. A., Demyttenaere, K., Gasquet, I., Haro, J. M., Palacín, C., … Bruffaerts, R. (2006). The European Study of the Epidemiology of Mental Disorders (ESEMeD/MHEDEA 2000) project: Rationale and methods. *International Journal of Methods in Psychiatric Research*, *11*(2), 55–67. https://doi.org/10.1002/mpr.123

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Fifth edition.). American Psychiatric Association.

Anderson, K. N., Swedo, E. A., Clayton, H. B., Niolon, P. H., Shelby, D., & McDavid Harrison, K. (2022a). Building Infrastructure for Surveillance of Adverse and Positive Childhood Experiences: Integrated, Multimethod Approaches to Generate Data for Prevention Action. *American Journal of Preventive Medicine*, *62*(6, Supplement 1), S31–S39. https://doi.org/10.1016/j.amepre.2021.11.017

Anderson, K. N., Swedo, E. A., Clayton, H. B., Niolon, P. H., Shelby, D., & McDavid Harrison, K. (2022b). Building Infrastructure for Surveillance of Adverse and Positive Childhood Experiences: Integrated, Multimethod Approaches to Generate Data for Prevention Action. *American Journal of Preventive Medicine*, *62*(6, Supplement 1), S31–S39. https://doi.org/10.1016/j.amepre.2021.11.017

Anderson, M. E. (2019). *Doctoral Students' Perceptions of Trauma Training in Clinical Psychology Programs* [ProQuest Dissertations Publishing]. https://search.proquest.com/docview/2311653272?pq-origsite=primo

Augsburger, M., & Galatzer-Levy, I. R. (2020). Utilization of machine learning to test the impact of cognitive processing and emotion recognition on the development of PTSD following trauma exposure. *BMC Psychiatry*, *20*, 325. https://doi.org/10.1186/s12888-020-02728-4

Baikie, K. A., & Wilhelm, K. (2005). Emotional and physical health benefits of expressive writing. *Advances in Psychiatric Treatment*, *11*(5), 338–346. https://doi.org/10.1192/apt.11.5.338

Balon, S., & Rimé, B. (2016). Lexical Profile of Emotional Disclosure in Socially Shared Versus Written Narratives. *Journal of Language and Social Psychology*, *35*(4), 345–373. https://doi.org/10.1177/0261927X15603425

Bantum, E. O., & Owen, J. E. (2009). Evaluating the Validity of Computerized Content Analysis Programs for Identification of Emotional Expression in Cancer Narratives. *Psychological Assessment*, *21*(1), 79–88.

Beck, H. P., Levinson, S., & Irons, G. (2009). Finding Little Albert: A journey to John B. Watson's infant laboratory. *The American Psychologist*, *64*(7), 605–614. https://doi.org/10.1037/a0017234

Beckers, T., Krypotos, A.-M., Boddez, Y., Effting, M., & Kindt, M. (2013). What's wrong with fear conditioning? *Biological Psychology*, *92*(1), 90–96. https://doi.org/10.1016/j.biopsycho.2011.12.015

Bethell, C. D., Carle, A., Hudziak, J., Gombojav, N., Powers, K., Wade, R., & Braveman, P. (2017). Methods to Assess Adverse Childhood Experiences of Children and Families: Toward Approaches to Promote Child Well-being in Policy and Practice. *Academic Pediatrics*, *17*(7 Suppl), S51–S69. https://doi.org/10.1016/j.acap.2017.04.161

Bethell, C., Jones, J., Gombojav, N., Linkenbach, J., & Sege, R. (2019). Positive Childhood Experiences and Adult Mental and Relational Health in a Statewide Sample: Associations Across Adverse Childhood Experiences Levels. *JAMA Pediatrics*, *173*(11), e193007. https://doi.org/10.1001/jamapediatrics.2019.3007

Blum, K., Gondré-Lewis, M. C., Modestino, E. J., Lott, L., Baron, D., Siwicki, D., McLaughlin, T., Howeedy, A., Krengel, M. H., Oscar-Berman, M., Thanos, P. K., Elman, I., Hauser, M., Fried, L., Bowirrat, A., & Badgaiyan, R. D. (2019). Understanding the Scientific Basis of Post-traumatic Stress Disorder (PTSD): Precision Behavioral Management Overrides Stigmatization. *Molecular Neurobiology*, *56*(11), 7836–7850. https://doi.org/10.1007/s12035-019-1600-8

Bomyea, J., Johnson, A., & Lang, A. J. (2017). Information Processing in PTSD: Evidence for Biased Attentional, Interpretation, and Memory Processes. *Psychopathology Review*, *a4*(3), 218–243. https://doi.org/10.5127/pr.037214

Booker, J. A., Graci, M. E., Hudak, L. A., Jovanovic, T., Rothbaum, B. O., Ressler, K. J., Fivush, R., & Stevens, J. (2018). Narratives in the Immediate Aftermath of Traumatic Injury: Markers of Ongoing Depressive and Posttraumatic Stress Disorder Symptoms. *Journal of Traumatic Stress*, *31*(2), 273–285. https://doi.org/10.1002/jts.22271

Bothe, T., Jacob, J., Kröger, C., & Walker, J. (2020). How expensive are post-traumatic stress disorders? Estimating incremental health care and economic costs on anonymised claims data. *The European Journal of Health Economics*, *21*(6), 917–930. https://doi.org/10.1007/s10198-020-01184-x

Brónnimann, R., Herlihy, J., Müller, J., & Ehlert, U. (2013). Do testimonies of traumatic events differ depending on the interviewer? *The European Journal of Psychology Applied to Legal Context*, *5*(1), 97–121.

Butler, O., Willmund, G., Gleich, T., Gallinat, J., Kühn, S., & Zimmermann, P. (2018). Hippocampal gray matter increases following multimodal psychological treatment for combat-related post-traumatic stress disorder. *Brain and Behavior*, *8*(5), e00956. https://doi.org/10.1002/brb3.956

Cardazzone, E., Gallucci, M., Callerame, C., Cussino, M., Gelo, O., Pasca, P., & Zaccagnino, M. (2021). Linguistic changes during EMDR sessions: A preliminary single-case study. *Counselling and Psychotherapy Research*, *21*(2), 422–432. https://doi.org/10.1002/capr.12394

Chung, C. K., & Pennebaker, J. W. (2008). Variations in the spacing of expressive writing sessions. *British Journal of Health Psychology*, *13*(1), 15–21. https://doi.org/10.1348/135910707X251171

Chung, E. K., Mathew, L., Elo, I. T., Coyne, J. C., & Culhane, J. F. (2008). Depressive Symptoms in Disadvantaged Women Receiving Prenatal Care: The Influence of Adverse and Positive Childhood Experiences. *Ambulatory Pediatrics*, *8*(2), 109–116. https://doi.org/10.1016/j.ambp.2007.12.003

Cigrang, J., Rauch, S., Avila, L. L., Bryan, C., Goodie, J., Hryshko-Mullen, A., & Peterson, A. (2011). *Treatment of Active-Duty Military with PTSD in Primary Care: Early Findings*. https://doi.org/10.1037/A0022740

Cohen, AlexS., Minor, KyleS., Baillie, LaurenE., & Dahir, AmandaM. (2008). Clarifying the Linguistic Signature: Measuring Personality from Natural Speech. *Journal of Personality Assessment*, *90*(6), 559–563. https://doi.org/10.1080/00223890802388459

Crandall, A., Miller, J. R., Cheung, A., Novilla, L. K., Glade, R., Novilla, M. L. B., Magnusson, B. M., Leavitt, B. L., Barnes, M. D., & Hanson, C. L. (2019). ACEs and counter-ACEs: How positive and negative childhood experiences influence adult health. *Child Abuse & Neglect*, *96*, 104089. https://doi.org/10.1016/j.chiabu.2019.104089

de Moor, C., Sterner, J., Hall, M., Warneke, C., Gilani, Z., Amato, R., & Cohen, L. (2002). A pilot study of the effects of expressive writing on psychological and behavioral adjustment in patients enrolled in a Phase II trial of vaccine therapy for metastatic renal cell carcinoma. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *21*(6), 615–619. https://doi.org/10.1037//0278-6133.21.6.615

Dose-Dependent Decrease of Activation in Bilateral Amygdala and Insula by Lorazepam During Emotion Processing | Radiology | JAMA Psychiatry | JAMA Network. (n.d.). Retrieved July 22, 2022, from https://jamanetwork.com/journals/jamapsychiatry/article-abstract/208397

Dudău, D. P., & Sava, F. A. (2021). Performing Multilingual Analysis With Linguistic Inquiry and Word Count 2015 (LIWC2015). An Equivalence Study of Four Languages. *Frontiers in Psychology*, *12*, 2860. https://doi.org/10.3389/fpsyg.2021.570568

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998a). Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults. *American Journal of Preventive Medicine*, *14*(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

Fenster, R. J., Lebois, L. A. M., Ressler, K. J., & Suh, J. (2018). Brain circuit dysfunction in post-traumatic stress disorder: From mouse to man. *Nature Reviews. Neuroscience*, *19*(9), 535–551. https://doi.org/10.1038/s41583-018-0039-7

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin*, *99*(1), 20–35. https://doi.org/10.1037/0033-2909.99.1.20

Francis, M., & Pennebaker, J. (1992). Putting Stress into Words: The Impact of Writing on Physiological, Absentee, and Self-Reported Emotional Well-Being Measures. *American Journal of Health Promotion : AJHP*. https://doi.org/10.4278/0890-1171-6.4.280

Frisina, P. G., Borod, J. C., & Lepore, S. J. (2004). A Meta-Analysis of the Effects of Written Emotional Disclosure on the Health Outcomes of Clinical Populations. *Journal of Nervous & Mental Disease*, *192*(9), 629–634. https://doi.org/10.1097/01.nmd.0000138317.30764.63

Frissa, S., Hatch, S. L., Fear, N. T., Dorrington, S., Goodwin, L., & Hotopf, M. (2016). Challenges in the retrospective assessment of trauma: Comparing a checklist approach to a single item trauma experience screening question. *BMC Psychiatry*, *16*(1), 20. https://doi.org/10.1186/s12888-016-0720-1

Gidron, Y., Peri, T., Connolly, J. F., & Shalev, A. Y. (1996). Written disclosure in posttraumatic stress disorder: Is it beneficial for the patient? *Journal of Nervous and Mental Disease*, *184*(8), 505–507. https://doi.org/10.1097/00005053-199608000-00009

Gray, M. J., & Lombardo, T. W. (2001). Complexity of trauma narratives as an index of fragmented memory in PTSD: A critical analysis. *Applied Cognitive Psychology*, *15*(7), S171–S186. https://doi.org/10.1002/acp.840

Groth-Marnat, G., & Wright, A. J. (2016). *Handbook of Psychological Assessment*. John Wiley & Sons, Incorporated. http://ebookcentral.proquest.com/lib/johnjay-ebooks/detail.action?docID=4461565

Gunsch, M. A., Brownlow, S., Haynes, S. E., & Mabe, Z. (2000). Differential linguistic content of various forms of political advertising. *Journal of Broadcasting & Electronic Media*, *44*(1), 27–42. https://doi.org/10.1207/s15506878jobem4401_3

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. https://doi.org/10.1038/ajg.2010.246

Harris, A. H. S. (2006). Does expressive writing reduce health care utilization? A meta-analysis of randomized trials. *Journal of Consulting and Clinical Psychology*, *74*(2), 243–252. https://doi.org/10.1037/0022-006X.74.2.243

Hase, M., Balmaceda, U. M., Ostacoli, L., Liebermann, P., & Hofmann, A. (2017). The AIP Model of EMDR Therapy and Pathogenic Memories. *Frontiers in Psychology*, *8*, 1578. https://doi.org/10.3389/fpsyg.2017.01578

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *The New England Journal of Medicine*, *351*(1), 13–22. https://doi.org/10.1056/NEJMoa040603

Hoge, C. W., Terhakopian, A., Castro, C. A., Messer, S. C., & Engel, C. C. (2007). Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *The American Journal of Psychiatry*, *164*(1), 150–153. https://doi.org/10.1176/appi.ajp.164.1.150

Holmes, E. A., Brown, R. J., Mansell, W., Fearon, R. P., Hunter, E. C. M., Frasquilho, F., & Oakley, D. A. (2005). Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review*, *25*(1), 1–23. https://doi.org/10.1016/j.cpr.2004.08.006

Hooley, J. M., Fox, K. R., Wang, S. B., & Kwashie, A. N. D. (2018). Novel online daily diary interventions for nonsuicidal self-injury: A randomized controlled trial. *BMC Psychiatry*, *18*(1), 264. https://doi.org/10.1186/s12888-018-1840-6

Horneffer, K. J., & Chan, K.-M. (2009). Alexithymia and relaxation: Considerations in optimising the emotional effectiveness of journaling about stressful experiences. *Cognition and Emotion*, *23*(3), 611–622. https://doi.org/10.1080/02699930802009381

Howell, M. K. (n.d.). *The Effect of Written Trauma Narratives on Patterns of Activation, Habituation, and Linguistic Change* [M.S., Howard University]. Retrieved November 14, 2021, from https://www.proquest.com/docview/1892132016/abstract/7D0F8994A104D6APQ/1

Hussain, D. (2010). Healing Through Writing: Insights from Research. *International Journal of Mental Health Promotion*, *12*(2), 19–23. https://doi.org/10.1080/14623730.2010.9721810

Huston, J., Meier, S., Faith, M., & Reynolds, A. (2019). Exploratory study of automated linguistic analysis for progress monitoring and outcome assessment. *Counselling and Psychotherapy Research*, *19*(3), 321–328. https://doi.org/10.1002/capr.12219

Jelinek, L., Stockbauer, C., Randjbar, S., Kellner, M., Ehring, T., & Moritz, S. (2010). Characteristics and organization of the worst moment of trauma memories in posttraumatic stress disorder. *Behaviour Research and Therapy*, *48*(7), 680–685. https://doi.org/10.1016/j.brat.2010.03.014

Jensen-Johansen, M. B., O'Toole, M. S., Christensen, S., Valdimarsdottir, H., Zakowski, S., Bovbjerg, D. H., Jensen, A. B., & Zachariae, R. (2018). Expressive writing intervention and self-reported physical health out-comes – Results from a nationwide randomized controlled trial with breast cancer patients. *PloS One*, *13*(2), e0192729–e0192729. https://doi.org/10.1371/journal.pone.0192729

Johnston, O., Startup, H., Lavender, A., Godfrey, E., & Schmidt, U. (2010). Therapeutic writing as an intervention for symptoms of bulimia nervosa: Effects and mechanism of change. *International Journal of Eating Disorders*, *43*(5), 405–419. https://doi.org/10.1002/eat.20714

Jolly, M. (2010). What I Never Wanted to Tell You: Therapeutic Letter Writing in Cultural Context. *The Journal of Medical Humanities*, *32*(1), 47–59. https://doi.org/10.1007/s10912-010-9127-z

Kaczmarek, L. D., Kashdan, T. B., Drążkowski, D., Enko, J., Kosakowski, M., Säefer, A., & Bujacz, A. (2015). Why do people prefer gratitude journaling over gratitude letters? The influence of individual differences in motivation and personality on web-based interventions. *Personality and Individual Differences*, *75*, 1–6. https://doi.org/10.1016/j.paid.2014.11.004

Kahn, J. H., Tobin, R. M., Massey, A. E., & Anderson, J. A. (2007). Measuring Emotional Expression with the Linguistic Inquiry and Word Count. *The American Journal of Psychology*, *120*(2), 263–286. https://doi.org/10.2307/20445398

Kahn, J., Tobin, R., Massey, A., & Anderson, J. (2007). Measuring emotional expression with the Linguistic Inquiry and Word Count. *American Journal of Psychology*, *120*(2).

Karakis, E. N., & Levant, R. F. (2012). Is Normative Male Alexithymia Associated with Relationship Satisfaction, Fear of Intimacy and Communication Quality among Men in Relationships? *The Journal of Men's Studies*, *20*(3), 179–186. https://doi.org/10.3149/jms.2003.179

Keller, M., Mendoza-Quiñones, R., Cabrera Muñoz, A., Iglesias-Fuster, J., Virués, A. V., Zvyagintsev, M., Edgar, J. C., Zweerings, J., & Mathiak, K. (2022). Transdiagnostic alterations in neural emotion regulation circuits – neural substrates of cognitive reappraisal in patients with depression and post-traumatic stress disorder. *BMC Psychiatry*, *22*(1), 1–15. https://doi.org/10.1186/s12888-022-03780-y

Kira, I. A., Lewandowski, L., Templin, T., Ramaswamy, V., Ozkan, B., & Mohanesh, J. (2008). Measuring Cumulative Trauma Dose, Types, and Profiles Using a Development-Based Taxonomy of Traumas. *Traumatology (Tallahassee, Fla.)*, *14*(2), 62–87. https://doi.org/10.1177/1534765608319324

Kovac, S. H., & Range, L. M. (2002). Does writing about suicidal thoughts and feelings reduce them? *Suicide and Life-Threatening Behavior*, *32*(4), 428–440. https://doi.org/10.1521/suli.32.4.428.22335

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. https://doi.org/10.1016/j.jad.2013.05.065

Lambert, M. J., Whipple, J. L., & Kleinstäuber, M. (2018). Collecting and delivering progress feedback: A meta-analysis of routine outcome monitoring. *Psychotherapy*, *55*(4), 520–537. https://doi.org/10.1037/pst0000167

Liang, B., & Scammon, D. (2018). We Learn From Each Other: Exploring Interpersonal Communications in Online Communities. *International Journal of Web Based Communities*, *14*. *LIWC Dictionary*. (n.d.). Retrieved July 13, 2020, from https://www.kovcomp.co.uk/wordstat/LIWC.html

Logue, M. W., van Rooij, S. J. H., Dennis, E. L., Davis, S. L., Hayes, J. P., Stevens, J. S., Densmore, M., Haswell, C. C., Ipser, J., Koch, S. B. J., Korgaonkar, M., Lebois, L. A. M., Peverill, M., Baker, J. T., Boedhoe, P. S. W., Frijling, J. L., Gruber, S. A., Harpaz-Rotem, I., Jahanshad, N., … Morey, R. A. (2018). Smaller Hippocampal Volume in Posttraumatic Stress Disorder: A Multisite ENIGMA-PGC Study: Subcortical Volumetry Results From Posttraumatic Stress Disorder Consortia. *Biological Psychiatry*, *83*(3), 244–253. https://doi.org/10.1016/j.biopsych.2017.09.006

Lyubomirsky, S., Sousa, L., & Dickerhoof, R. (2006). The costs and benefits of writing, talking, and thinking about life's triumphs and defeats. *Journal of Personality and Social Psychology*, *90*(4), 692–708. https://doi.org/10.1037/0022-3514.90.4.692

Lyubomirsky, S., & Tkach, C. (2003). The Consequences of Dysphoric Rumination. In C. Papageorgiou & A. Wells (Eds.), *Depressive Rumination* (pp. 21–41). John Wiley & Sons Ltd. https://doi.org/10.1002/9780470713853.ch2

Margola, D., Facchin, F., Molgora, S., & Revenson, T. A. (2010). Cognitive and emotional processing through writing among adolescents who experienced the death of a classmate. *Psychological Trauma: Theory, Research, Practice, and Policy*, *2*(3), 250–260. https://doi.org/10.1037/a0019891

Marshall, K., Venta, A., Henderson, C., Barker, M., & Sharp, C. (2017). Linguistic Analysis as a Method for Assessing Symptoms After Sexual Trauma Among Female Adolescent Psychiatric Inpatients. *Journal of Child Sexual Abuse*, *26*(8), 910–926. https://doi.org/10.1080/10538712.2017.1354349

Menon, V. (2011). Large-scale brain networks and psychopathology: A unifying triple network model. *Trends in Cognitive Sciences*, *15*(10), 483–506. https://doi.org/10.1016/j.tics.2011.08.003

Milad, M. R., Pitman, R. K., Ellis, C. B., Gold, A. L., Shin, L. M., Lasko, N. B., Zeidan, M. A., Handwerger, K., Orr, S. P., & Rauch, S. L. (2009). Neurobiological basis of failure to recall extinction memory in posttraumatic stress disorder. *Biological Psychiatry*, *66*(12), 1075–1082. https://doi.org/10.1016/j.biopsych.2009.06.026

Mind/body health; the effects of attitudes, emotions, and relationships, 3d ed. (2005). *SciTech Book News*, *29*(3).

Miner, A. S., Haque, A., Fries, J. A., Fleming, S. L., Wilfley, D. E., Terence Wilson, G., Milstein, A., Jurafsky, D., Arnow, B. A., Stewart Agras, W., Fei-Fei, L., & Shah, N. H. (2020). Assessing the accuracy of automatic speech recognition for psychotherapy. *Npj Digital Medicine*, *3*(1), 1–8. https://doi.org/10.1038/s41746-020-0285-8

Narayan, A. J., Lieberman, A. F., & Masten, A. S. (2021). Intergenerational transmission and prevention of adverse childhood experiences (ACEs). *Clinical Psychology Review*, *85*, 101997. https://doi.org/10.1016/j.cpr.2021.101997

Noble, E. P., Blum, K., Ritchie, T., Montgomery, A., & Sheridan, P. J. (1991). Allelic association of the D2 dopamine receptor gene with receptor-binding characteristics in alcoholism. *Archives of General Psychiatry*, *48*(7), 648–654. https://doi.org/10.1001/archpsyc.1991.01810310066012

ODea, B., Boonstra, T. W., Larsen, M. E., Nguyen, T., Venkatesh, S., & Christensen, H. (2018). The relationship between linguistic expression and symptoms of depression,

anxiety, and suicidal thoughts: A longitudinal study of blog content. *ArXiv:1811.02750 [Cs, Stat]*. http://arxiv.org/abs/1811.02750

Paulus, M. P., Feinstein, J. S., Castillo, G., Simmons, A. N., & Stein, M. B. (2005). Dose-dependent decrease of activation in bilateral amygdala and insula by lorazepam during emotion processing. *Archives of General Psychiatry*, *62*(3), 282–288.

Pennebaker, J. W. (1997). Writing About Emotional Experiences as a Therapeutic Process. *Psychological Science (0956-7976)*, *8*(3), 162–166. https://doi.org/10.1111/j.1467-9280.1997.tb00403.x

Pennebaker, J. W. (2018). Expressive Writing in Psychological Science. *Perspectives on Psychological Science*, *13*(2), 226–229. https://doi.org/10.1177/1745691617707315

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

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. https://doi.org/10.1037/0022-006X.56.2.239

Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological Aspects Of Natural Language Use: Our Words, Our Selves. *Annual Review of Psychology*, *54*(1), 547. https://doi.org/10.1146/annurev.psych.54.101601.145041

Piasecki, T. M., Hufford, M. R., Solhan, M., & Trull, T. J. (2007). Assessing Clients in Their Natural Environments With Electronic Diaries: Rationale, Benefits, Limitations, and Barriers. *Psychological Assessment*, *19*(1), 25–43. https://doi.org/10.1037/1040-3590.19.1.25

Ports, K. A., Ford, D. C., & Merrick, M. T. (2016). Adverse childhood experiences and sexual victimization in adulthood. *Child Abuse & Neglect*, *51*, 313–322. https://doi.org/10.1016/j.chiabu.2015.08.017

PTSD Checklist for DSM-5 (PCL-5) - PTSD: National Center for PTSD. (n.d.). [General Information]. Retrieved September 23, 2021, from https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp

Rachel, Y. (2002). Post-Traumatic Stress Disorder. *The New England Journal of Medicine*, 7.

Rauch, S. A. M., Cigrang, J., Austern, D., & Evans, A. (2017). Expanding the Reach of Effective PTSD Treatment Into Primary Care: Prolonged Exposure for Primary Care. *Focus: Journal of Life Long Learning in Psychiatry*, *15*(4), 406–410. https://doi.org/10.1176/appi.focus.20170021

Rauch, S. A. M., Wilson, C. K., Jungerman, J., Bollini, A., & Eilender, P. (2020). Implementation of Prolonged Exposure for PTSD: Pilot Program of PE for Primary Care in VA. *Cognitive and Behavioral Practice*. https://doi.org/10.1016/j.cbpra.2020.09.004

Recent Developments in Alexithymia Theory and Research—Graeme J Taylor, 2000. (n.d.). Retrieved July 22, 2022, from https://journals.sagepub.com/doi/10.1177/070674370004500203

Schoutrop, M. J. A., Lange, A., Hanewald, G., Davidovich, U., & Salomon, H. (2002). Structured Writing and Processing Major Stressful Events: A Controlled Trial. *Psychotherapy and Psychosomatics*, *71*(3), 151–157.

Skodol, A. E., Bender, D. S., Pagano, M. E., Shea, M. T., Yen, S., Sanislow, C. A., Grilo, C. M., Daversa, M. T., Stout, R. L., Zanarini, M. C., McGlashan, T. H., & Gunderson, J. G. (2007). Positive Childhood Experiences: Resilience and Recovery From Personality Disorder in Early Adulthood. *The Journal of Clinical Psychiatry*, *68*(07), 1102–1108. https://doi.org/10.4088/JCP.v68n0719

Sloan, D. M., Marx, B. P., Epstein, E. M., & Dobbs, J. L. (2008). Expressive Writing Buffers Against Maladaptive Rumination. *Emotion (Washington, D.C.)*, *8*(2), 302–306. https://doi.org/10.1037/1528-3542.8.2.302

Slopen, N., Chen, Y., Guida, J. L., Albert, M. A., & Williams, D. R. (2017). Positive childhood experiences and ideal cardiovascular health in midlife: Associations and mediators. *Preventive Medicine*, *97*, 72–79. https://doi.org/10.1016/j.ypmed.2017.01.002

Smyth, J. M., Stone, A. A., Hurewitz, A., & Kaell, A. (1999). Effects of writing about stressful experiences on symptom reduction in patients with asthma or rheumatoid arthritis: A randomized trial. *JAMA*, *281*(14), 1304–1309. https://doi.org/10.1001/jama.281.14.1304

Sonnenschein, A. R., Hofmann, S. G., Ziegelmayer, T., & Lutz, W. (2018). Linguistic analysis of patients with mood and anxiety disorders during cognitive behavioral therapy. *Cognitive Behaviour Therapy*, *47*(4), 315–327. https://doi.org/10.1080/16506073.2017.1419505

Stanton, A. L., Danoff-Burg, S., Sworowski, L. A., Collins, C. A., Branstetter, A. D., Rodriguez-Hanley, A., Kirk, S. B., & Austenfeld, J. L. (2002). Randomized, controlled trial of written emotional expression and benefit finding in breast cancer patients. *Journal of Clinical Oncology: Official Journal of the American Society of Clinical Oncology*, *20*(20), 4160–4168. https://doi.org/10.1200/JCO.2002.08.521

Stanton, A. L., & Low, C. A. (2004). Toward Understanding Posttraumatic Growth: Commentary on Tedeschi and Calhoun. *Psychological Inquiry*, *15*(1), 76–80.

Stein, M. B., Simmons, A. N., Feinstein, J. S., & Paulus, M. P. (2007). Increased Amygdala and Insula Activation During Emotion Processing in Anxiety-Prone Subjects. *American Journal of Psychiatry*, *164*(2), 318–327. https://doi.org/10.1176/ajp.2007.164.2.318

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic Growth: Conceptual Foundations and Empirical Evidence. *Psychological Inquiry*, *15*(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01

Uddin, L. Q., & Menon, V. (2009). The anterior insula in autism: Under-connected and under-examined. *Neuroscience & Biobehavioral Reviews*, *33*(8), 1198–1203. https://doi.org/10.1016/j.neubiorev.2009.06.002

Utley, A., & Garza, Y. (2011). The Therapeutic Use of Journaling With Adolescents. *Journal of Creativity in Mental Health*, *6*(1), 29–41. https://doi.org/10.1080/15401383.2011.557312

VA researcher tests condensed form of psychotherapy to treat PTSD patients. (2021, January 26). *VAntage Point*. https://blogs.va.gov/VAntage/83784/va-researcher-tests-condensed-form-psychotherapy-treat-ptsd-patients/

Vanheule, S. (2011). *The Subject of Psychosis: A Lacanian Perspective* (1st ed. 2011.). Palgrave Macmillan UK. https://doi.org/10.1057/9780230355873

Wiegersma, S., Nijdam, M. J., van Hessen, A. J., Truong, K. P., Veldkamp, B. P., & Olff, M. (2020). Recognizing hotspots in Brief Eclectic Psychotherapy for PTSD by text and audio mining. *European journal of psychotraumatology*, *11*(1), 1726672. https://doi.org/10.1080/20008198.2020.1726672

Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013).The PTSD Checklist for DSM-5 (PCL-5).

Yehuda, R. (2002). Post-traumatic stress disorder. *The New England Journal of Medicine*, *346*(2), 108–114. https://doi.org/10.1056/NEJMra012941

Zhang, W., Kaldewaij, R., Hashemi, M. M., Koch, S. B. J., Smit, A., van Ast, V. A., Beckmann, C. F., Klumpers, F., & Roelofs, K. (2022). Acute-stress-induced change in salience network coupling prospectively predicts post-trauma symptom development. *Translational Psychiatry*, *12*(1), 1–8. https://doi.org/10.1038/s41398-022-01798-0

Zheng, L., Lu, Q., & Gan, Y. (2019). Effects of expressive writing and use of cognitive words on meaning making and post-traumatic Growth. *Journal of Pacific Rim Psychology*, *13*(Pt 2), 1–6. https://doi.org/10.1017/prp.2018.31

Zięba, M., Wiecheć, K., Biegańska-Banaś, J., & Mieleszczenko-Kowszewicz, W. (2019). Coexistence of Post-traumatic Growth and Post-traumatic Depreciation in the Aftermath of Trauma: Qualitative and Quantitative Narrative Analysis. *Frontiers in Psychology*, *10*. https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00687

Appendix A

Table 1
Linguistic Inquiry and Wordcount Sample Dictionary Category, Content, and Size, Adapted from Liang & Scammon (2018)

Category	Examples	Words in Category
Total Pronouns		
Personal Pronouns	I, them, her	116
1st person singular	I, me, mine	70
1st person plural	We, us, our	12
2nd person	You, your, thou	20
3rd person singular	She, her, him	17
3rd person plural	They, their, they'd	10
Impersonal pronouns	It, its, those	46
Articles	Am, an, the	3
Verbs		
Past tense	Went, ran	145
Present tense	Hear, take	169
Cognitive processes		
Insight	Think, know	195
Causation	Because, effect	108
Discrepancy	Should, would	76
Tentative	Maybe, perhaps	155
Certainty	Always, never	83
Inhibition	Block, constrain	111
Inclusive	And, with, include	18
Exclusive	But, without	17

Appendix B

Table 2
Descriptive Statistics for Demographic Data

Variables	**N**	**%**
Gender		
Male	112	65.5
Female	58	33.9
Non-binary	1	0.6
Total	**171**	**100**
Race		
Asian	2	1.2
Black or African American	4	2.3
Hispanic	7	4.1
Native Hawaiian/Pacific Islander	1	0.6
White	151	88.3
Other	2	1.2
Two or more races	4	2.3
Total	**171**	**100.0**
First Responder Status		
Fire	31	18.1
Police	43	25.1
EMS	20	11.7
Civilian	60	35.1
Other	17	10.0
Total	**171**	**100.0**
Military Veteran		
Yes	16	9.4
No	155	90.6
Total	**171**	**100.0**

Appendix C

Table 3
Participant Scores by Occupational Status

Occupational Category	N	M	Std. Dev	Max	Min
Fire					
ACE	31	1.29	1.53	6	0
PCL-5	31	14.06	13.44	48	0
PTG	31	55.61	26.43	100	3
PCE	31	5.19	1.99	7	0
Police					
ACE	43	1.21	1.67	7	0
PCL-5	43	13.47	11.79	56	0
PTG	43	41.09	29.70	100	0
PCE	43	5.98	1.65	7	0
EMS					
ACE	20	2.25	2.61	8	0
PCL-5	20	17.4	11.95	40	1
PTG	20	45.75	29.32	91	0
PCE	20	4.8	2.42	7	1
Other					
ACE	17	1.71	2.37	8	0
PCL-5	17	16.41	12.83	44	0
PTG	17	55.53	32.55	105	4
PCE	17	4.82	2.04	7	1
Civilian					
ACE	60	2.62	2.12	8	0
PCL-5	60	19.28	14.48	58	0
PTG	60	58.60	27.91	101	2
PCE	60	5	2.11	7	0

Appendix D

Table 4

Descriptive Statistics for Adverse Childhood Experiences, Trauma Symptom Severity, Posttraumatic Growth, and Positive Childhood Experiences

Variables	N	M	Std. Dev
ACE	171	1.89	2.08
PCL-5	171	16.37	13.29
PTG	171	72.85	29.34
PCE	171	23.98	6.20
PCE (Dichotomized)	171	5.22	2.03

Appendix E

PE-PC Questions

1. Why do you think this event happened to you?
2. What caused it to happen?
3. How has this event changed with you think about yourself?
4. How has this event changed how you think about others?
5. How has this even changed how you think about the world?
6. What new, different, or important information did you notice when you wrote and reviewed your memory?

Appendix F

Positive Childhood Experiences Questions

How much or how often during your childhood did you…

1. Feel able to talk to your family about feelings
2. Feel your family stood by you during difficult times
3. Enjoy participating in community traditions
4. Feel a sense of belonging in high school
5. Feel supported by friends
6. Have at least two non-parent adults who took genuine interest in you
7. Feel safe and protected by an adult in your home

Appendix G

PTSD Checklist for DSM-5 (PCL-5)

Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

0-Not at all 1-A little bit 2-Moderately 3- Quite a bit 4- Extremely

1. Repeated, disturbing, and unwanted memories of the stressful experience?

2. Repeated, disturbing dreams of the stressful experience?

3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?

4. Feeling very upset when something reminded you of the stressful experience?

5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?

6. Avoiding memories, thoughts, or feelings related to the stressful experience?

7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?

8. Trouble remembering important parts of the stressful experience?

9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?

10. Blaming yourself or someone else for the stressful experience or what happened after it?

11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?

12. Loss of interest in activities that you used to enjoy?

13. Feeling distant or cut off from other people?

14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?

15. Irritable behavior, angry outbursts, or acting aggressively?

16. Taking too many risks or doing things that could cause you harm?

17. Being “superalert” or watchful or on guard?

18. Feeling jumpy or easily startled?

19. Having difficulty concentrating?

20. Trouble falling or staying asleep?

Appendix H

Posttraumatic Growth Inventory

1. I changed my priorities about what is important in life.

2. I have a greater appreciation for the value of my own life.

3. I have developed new interests.

4. I have a greater feeling of self-reliance.

5. I have a better understanding of spiritual matters.

6. I more clearly see that I can count on people in times of trouble.

7. I established a new path for my life.

8. I have a greater sense of closeness with others.

9. I am more willing to express my emotions.

10. I know that I can handle difficulties.

11. I can do better things with my life.

12. I am better able to accept the way things work out.

13. I can better appreciate each day.

14. New opportunities are available which wouldn't have been otherwise.

15. I have more compassion for others.

16. I put more effort into my relationships.

17. I am more likely to try to change things that need changing.

18. I have stronger religious faith.

19. I discovered that I'm stronger than I thought I was.

20. I learned a great deal about how wonderful people are.

21. I better accept needing others.

Appendix I

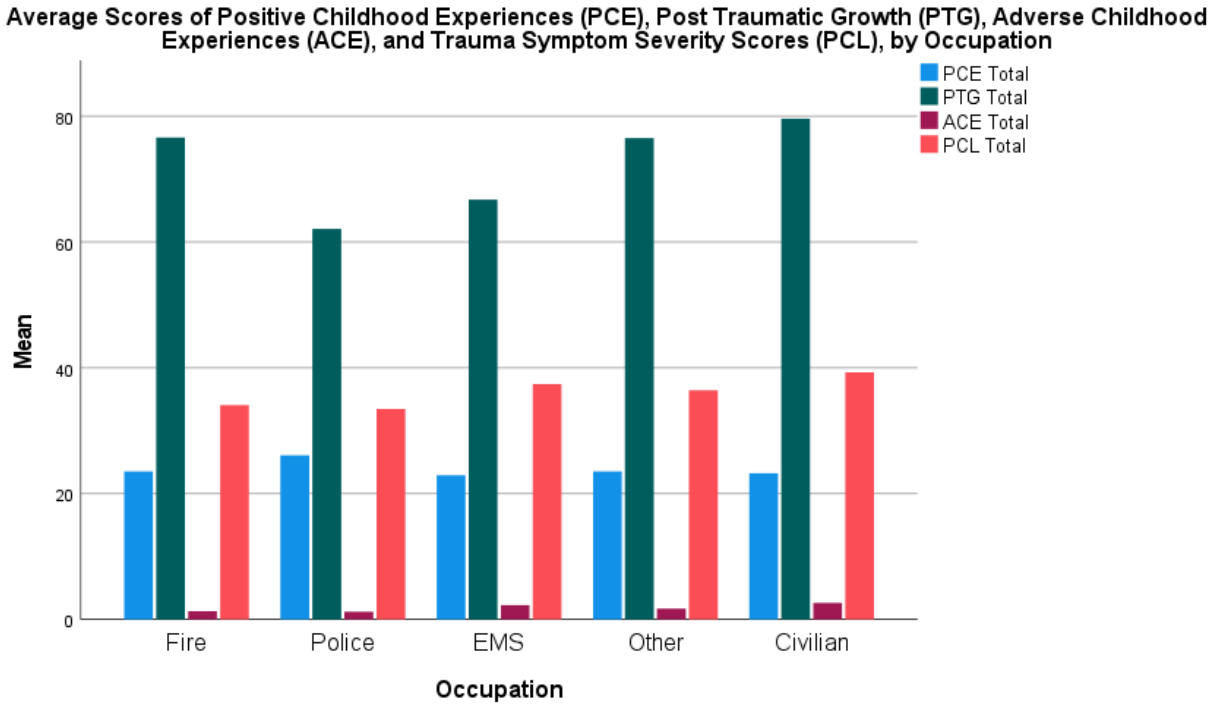

Figure 1 Mean ACE, PTG, PCE, and PCL Scores by Occupation

Appendix J

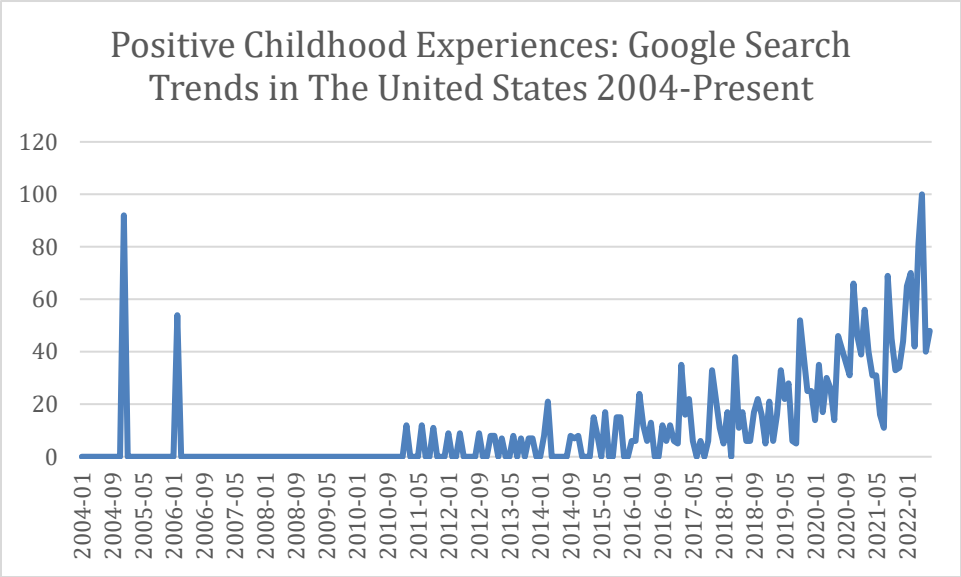

Figure 2 Google Trends Report for "Positive Childhood Experiences" from 2004 to Present

Appendix K

Table 5

Bivariate Spearman's Correlation of PCL, PCE, ACE, and PTG

	N	Y_1	X_2	X_3	X_4
PCL Scores (Trauma Level) (Y_1)	171	1			
Positive Childhood Experiences (X_2)	171	-.302**	1		
Adverse Childhood Experiences (X_3)	171	.224**	-.500**	1	
Posttraumatic Growth (X_4)	171	.283**	.052	-.001	1

Table 1 Note: p < .05 p < .01***