The reliability and validity of a manual coding system for identifying emotion

Erin O'Carroll Bantum

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The Reliability and Validity of a Manual Coding System for Identifying Emotion

by

Erin O’Carroll Bantum

A Dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Clinical Psychology

September 2006
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CONTENTS

Approval Page........................................................................................................... iii
Acknowledgments........................................................................................................ iv
List of Tables............................................................................................................. viii
List of Figures ........................................................................................................... ix
Abstract .................................................................................................................... x

Chapter

1. Introduction-Coding of Emotional Expression in the Writing of Breast Cancer Patients........................................................................................................... 1
   Emotional Responses to Cancer ............................................................................. 2
      Emotion and Coping ............................................................................................ 3
      Appraisal and Coping ......................................................................................... 9
   Emotion Regulation ............................................................................................... 12
      Emotional Suppression ....................................................................................... 14
      Emotional Expression ......................................................................................... 17
      Cognition and Emotion ....................................................................................... 19
      Expressive Writing ............................................................................................... 22
      Coding of emotional expression ......................................................................... 34
   Summary .................................................................................................................. 37
      Aim 1 ...................................................................................................................... 39
         Development of a coding system for the identification and classification of emotional expression .......................................................... 39
      Aim 2 ...................................................................................................................... 39
         Accuracy of linguistic inquiry and word count for detection of emotional expression .......................................................... 39
      Aim 3 ...................................................................................................................... 39
         Predictive validity of manual coding system .................................................. 39

2. Materials and Methods ......................................................................................... 40
   Participants ............................................................................................................... 40
   Materials .................................................................................................................. 41
      Health Related Quality of Life ........................................................................... 43
      Cancer Related Trauma ....................................................................................... 43
      Anxiety and Depression ....................................................................................... 43
      Narrative Analysis ................................................................................................. 44
      Additional Content Analysis Program ............................................................... 44
      Procedures ............................................................................................................. 45

3. Results .................................................................................................................. 49
   Characteristics of Coding System .......................................................................... 49
# TABLES

Table

1. Demographic Characteristics of Participants .................................................. 42
2. Inter-Rater Reliability for Emotion Categories .................................................. 50
5. LIWC Sensitivity, Specificity, Positive Predictive Value, and Negative Predictive Value ............................................................... 52
7. Correlations Between Manually Coded Expression and Self-Report Measures ............................................................... 56
8. Results for Hierarchical Regression of Time 2 Depression Scores on Time 1 .................................................................................. 58
9. Results for Hierarchical Regression of Time 2 Anxiety Scores on Time 1 .................................................................................. 58
10. Results for Hierarchical Regression of Time 2 Cancer Related Trauma on Time 1 ........................................................................... 59
11. Results for Hierarchical Regression of Time 2 Quality of Life Scores on Time 1 ........................................................................... 59
12. Results for Hierarchical Regression of Time 2 Health Status Scores on Time 1 .................................................................................. 60
FIGURES

Figure

1. Coping as a Mediator of Emotion .............................................................. 6

2. Theoretical Model of Appraisal and Coping............................................. 10

3. An Emotion Regulation Model of the Effects of Expression Writing on Mental and Physical Health .............................................................. 30
ABSTRACT

The Reliability and Validity of a Manual Coding System for Identifying Emotion

by

Erin O’Carroll Bantum
Doctor of Philosophy

Emotion focused coping and emotional expression have been identified as potential mediators of long-term adjustment to a cancer diagnosis. Tools for measuring emotional expression in text have not been well-validated, although there is an abundance of textual data that is available to help explore emotional expression and the relationship between emotional expression and outcome measures. The purpose of this dissertation was to develop a manual coding system of emotional expression that could be compared with current programs that have been used to evaluate emotional expression. Inter-rater reliability was found to be good with the use of the manually coded system of emotional expression between both trained and blinded coders. Sensitivity and specificity statistics compared the ability of a currently used text analysis program to predict both presence and absence of emotional expression. While excellent specificity and negative predictive value were found, the program demonstrated relatively good sensitivity and poor positive predictive value. There were not many notable differences found between manual coding and computerized coding in predicting change over time in regards to outcome measures. Replicating these findings on another sample is one area of future direction. Assessing the possibility of supplementing current content analysis programs to include the capability of attending to context is another important area of future direction.
Coding of Emotional Expression in the Writing of Breast Cancer Patients

Emotion focused coping and emotional expression have been identified as potential mediators of long-term adjustment to a cancer diagnosis (Stanton et al., 2002). The measurement of emotional expression has been largely relegated to self-report measures. With the large amount of textual data available to researchers, computational linguistics has provided tools that could be useful supplements to the current self-report measures. Tools for measuring emotional expression in text have not been well-validated. The purpose of this dissertation was to develop a manual coding system of emotional expression that could be compared with current programs that have been used to evaluate emotional expression. This was done with the intention of better understanding the construct of emotional expression and how it relates to outcomes measures in breast cancer patients.

When an individual is diagnosed with an illness they are required to cope with that illness. Stress and coping research and theory suggest that the ways in which an individual copes with illness can be thought of as mediating the effects of the illness on emotional regulation (Folkman & Lazarus, 1988). Emotion can effect how an individual copes and coping can also effect how an individual experiences and then expresses emotions. Both emotional expression and suppression are two of the ways in which individuals can regulate their emotions and also cope with an illness (Gross & Levenson, 1993; Lazarus & Folkman, 1984).
The clinical significance of emotional expression has been nicely documented in a series of studies conducted by James Pennebaker. Using the expressive writing paradigm in which individuals are asked to write about their deepest thoughts and feelings, (Pennebaker & Beall, 1986) have linked emotional expression to both physical and mental health benefits (Sloan & Marx, 2004). To better understand the relationship between emotionally expressive writing and improved outcomes, Linguistic Inquiry and Word Count (LIWC) was developed to help identify linguistic patterns, including those associated with emotional expression, exhibited in text samples from the expressive writing paradigm. (Pennebaker, Francis, & Booth, 1992), Understanding how and how well LIWC measures emotional expression is important because emotional expression has been a topic of interest and importance in both clinical and non-clinical populations. Being able to identify emotional expression in a written narrative should lead to a better understanding of how emotional expression in this form is related to outcome measures, such as adjustment.

*Emotional Responses to Cancer*

When presented with a cancer diagnosis there are a wide range of emotions that can be experienced (Buick, 1997). While feelings of sadness and disbelief may be expected an estimated 15% to 25% of people with cancer are affected by depression during the course of treatment (Katon, Wulsin & Spiegel, 2005). When efforts are made to confront emotions it has been suggested that an individual is making an attempt to regulate emotions (Lazarus, 1999). The act of confronting emotions has been labeled emotion focused coping (Stanton, 2004). There is some literature that suggests that active engagement in terms of dealing with the emotions that arise out of a diagnosis of
breast cancer is associated with positive long-term psychological adjustment (Stanton et al., 2002).

**Emotion and Coping**

Emotions have been speculated as being tied to a range of behaviors, including facial expressions (Ekman, 1992) and the tendency to take certain actions (Frijda, 1987). One way to describe emotions is as a valenced reaction to an event, people and actions involved in an event, and an object involved in an event (O’Rorke & Ortony, 1994). There has been debate regarding what constitutes emotion and whether certain types of emotions are experienced universally (Ekman, 1992). Even researchers that do not agree on a basic set of universally experienced emotions suggest that there are emotions that are more “simple” than others (O’Rorke & Ortony, 1992; Ortony, Clore, & Foss, 1987). These researchers suggest that well being emotions of joy and distress are the simplest emotions (O’Rorke & Ortony, 1992) experienced.

When assessing emotional expression with cancer patients it can be helpful to view emotion in the larger domain of coping. Coping refers to both cognitive and behavioral efforts to reduce, master, or tolerate both external and internal demands that are created by a stressful situation (Folkman & Lazarus, 1980; Lazarus & Launier, 1978). More generally, Lazarus (1998) suggested that coping involves the way in which individuals handle conditions in their life that are stressful to them. When looking more specifically at how breast cancer patients cope, it has been found that there are a wide variety of ways in which people cope when diagnosed with breast cancer (Buick, 1997). In her work on mental representations that individuals make regarding breast cancer, Buick (1997) found that while some women will cope with a breast cancer diagnosis by
avoiding thoughts and feelings related to breast cancer, others will attempt to confront the diagnosis. In more recent work (Sears, Stanton, & Danoff-Burg, 2003) it was found that 83% of women with early-stage breast cancer were able to indicate at least one benefit of their experience with cancer. Many of these women engaged in positive reappraisal coping. Research shows that there are many individual differences related to coping with breast cancer and that many individuals do in fact cope through a positive means.

A process view of coping has been more recently suggested by leading researchers in this area (Lazarus & Folkman, 1984). This view explains coping in a dynamic way. The process view suggests that coping is made up of constantly changing behavioral and cognitive efforts to deal with and manage stress. Lazarus (1998) suggests that there are three main themes contained in a process view of coping. The first theme is that there are not any universally effective or ineffective strategies aimed at coping. The ways in which an individual copes are embedded in many different variables. These variables are such things as the type of person engaged in the coping strategy, the other individuals in this person’s environment, and the stage of the stressful encounter (Lazarus, 1998). For instance, if an individual chose to avoid heart pains that would lead to a heart attack, avoidance would not be a beneficial outcome. At a different point in the stage of a stressful encounter, avoidance might be more beneficial. Another included theme in the process view of coping involves the importance of knowing about both the details of coping thoughts and actions (Lazarus, 1998). One of the goals of the process approach is to understand specific details about how individuals cope during different points in the coping process and also in different situations. Folkman and Lazarus developed the Ways of Coping Index (Folkman & Lazarus, 1988c) as a tool to help
demonstrate those differences. The last theme related to the process approach of emotion and coping created by Lazarus and Folkman involves major functions of this approach (Lazarus, 1998). These major functions are both problem and emotion focused (Folkman & Lazarus, 1980).

About fifteen years ago, two different lines of thinking were suggested by leading researchers in the area of coping and emotion as contributing to the way in which this topic has been approached (Folkman & Lazarus, 1988a). These lines of thinking are the animal and ego psychology model. The animal model views emotion and coping as behaviors that are learned out of a necessity for survival (Miller, 1980; Ursin, 1980). This model comes from a behavioral model and differs from the ego psychology model in a substantial way. The ego psychology model came from the psychoanalytic tradition and emphasizes the cognitive components of emotion that relate to coping (Tomkins, 1965; Valliant, 1970). For instance, ego psychologists would look at behaviors such as denial, repression, intellectualization, and suppression as behaviors that are participated in for the purpose of reducing or managing anxiety.

Lazarus and Folkman (1988a; 1988b) suggested that both of these viewpoints did not accurately capture emotion and coping. Research had demonstrated that, unlike these models had suggested, emotion was not unidimensional. Any one encounter could have as the outcome, multiple options for coping (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). It was also suggested that the above theoretical models emphasized a unidirectional pattern of emotion and coping (Lazurs & Folkman, 1988a; 1988b). After devoting a great deal of time to the study of emotion and coping, it had been realized that this could be thought of as a bidirectional process. For this reason,
Folkman and Lazarus (1988a) theorized that coping was a mediator of emotion. Figure 1 gives a pictorial view of what they believed to be the process. Their work will be reviewed in the next sections.

![Diagram of Coping Process](image)

**Figure 1.** Coping as a mediator of emotion. Reprinted from Folkman and Lazarus (1988).

When an individual is presented with something they need to cope with, an appraisal of that situation takes place. The appraisal piece of emotion and coping is
central to this model (Lazarus & Folkman, 1984). Within this model, appraisal is suggested to be a cognitive action (Folkman & Lazarus, 1988b). Primary and secondary appraisals are processes that occur when something that an individual needs to attend to in the environment is presented to them. Primary appraisal can be: (1) irrelevant, (2) benign-positive, and (3) stressful (Lazarus & Folkman, 1984). If an individual is making a decision that they do not feel is significant, the type of appraisal they are making is considered to be irrelevant. Benign positive appraisals occur when the outcome of coping is construed as completely positive. Stress appraisals can be made up of many different types of appraisals. Appraisals that involve harm/loss, challenge, or threat are said to fall in this category (Lazarus & Folkman, 1984). A primary form of appraisal consists of a person asking themselves what they have at stake in any given situation (Lazarus & Folkman, 1988b).

After this takes place, the next question becomes, “What can I do about it” (Lazarus & Folkman, 1988b). When an individual has made a stress appraisal, the next task becomes managing that appraisal (Lazarus & Folkman, 1984). A secondary appraisal and primary appraisal interact in a complex process to create both the degree and content of the emotional reaction (Lazarus & Folkman, 1984). Different types of stress appraisals can be indicative of how much control an individual feels they have over a situation (Lazarus & Folkman, 1984). For example, if an individual is trying to manage pain they are experiencing and they feel confident managing that pain through the use of a relaxation exercise, they might feel that managing pain is a challenge to them. If the individual does not feel they are able to control their pain, through any internal or external means, they might appraise the situation in a threatening way. Control can be
looked at in the sense of how an individual is able to control themselves during a difficult time.

Another component of this model involves the way in which an individual copes. As previously described, coping consists of cognitive as well as behavioral efforts to manage demands within the person or the environment (Lazarus & Folkman, 1988b). Individuals have been found to rely on both problem-focused and emotion-focused forms of coping when presented with something that they need to cope with (Baum & Fleming, 1983; Folkman & Lazarus, 1985). A problem-focused form of coping entails planning and then following through on action to change the person-environment relationship in a direct way by either acting directly on oneself or on the environment (Lazarus, 1991). For example, if someone has breast cancer and seeks the opinion of medical doctors in terms of types of treatment, they are engaging in problem-focused coping (Lazarus, 1999). An emotion-focused type of coping is aimed at regulating the emotions (Lazarus, 1999). In keeping with the previously used example, an individual may chose to emotionally attend to their feelings about cancer, or they may decide to avoid those feelings. People will vary their coping depending on the intensity of their emotion responses, opportunities inherent in the situation for problem solving, and their ability to regulate their coping (Folkman & Greer, 2000). Both problem and emotion focused coping strategies are generally used when coping with an event.

It is necessary to also explain the reappraisal piece indicated in the model (Figure 1) depicting coping as a mediator of emotion. Lazarus researched these concepts for five decades and suggested that when we alter our emotions by constructing a new relational meaning to a stressful situation we are making a reappraisal (Lazarus, 1999). Folkman
and Lazarus (1988b) suggested three pathways by which coping effects emotion. They suggest that coping could effect emotion by: (1) altering cognitive activity that then deploys attention elsewhere, (2) cognitive activity altering the significance or subjective meaning of the encounter for well-being, (3) actions that actually alter the person-environment relationship. There are entire bodies of literature devoted to the many variables briefly examined. The previous description of these variables is intended to provide a basic understanding of the process of coping as a mediator of emotion. In this way emotional outcome can be directly affected by how one copes with the emotional reactions they have.

Appraisal and Coping

Folkman and Lazarus further examined and then proposed additional variables in their model of coping (Lazarus & Folkman, 1984). This model was first described in detail in 1984 (Lazarus & Folkman, 1984), although it was slightly revised thirteen years later (Folkman, 1997). In order to better understand how an individual copes with a stressful event, the model of appraisal and coping was created. It is helpful to explore this model as a way of considering the process of coping with a stressful event. The model is described pictorially in Figure 2. The majority of these variables have been previously explained, although there are a few meaningful additions to this model. The addition of person characteristics to the model is a crucial piece. While an individual has a full range of opportunities in terms of coping reactions to each stressful encounter, individual characteristics are going to effect how an individual appraises and copes with a given situation. The reappraisal component depicted in Figure 1 is accounted for as a form of meaning-based coping. Meaning-based coping can be used when an individual
has unfavorable event occurs. This type of coping involves a search for meaning (Folkman, 1997). In a study conducted by Folkman (1997) it was found that people engage in four types of meaning based coping. They include positive reappraisal, revised goals, spiritual beliefs, and positive events. Although the model does not include these specific types of meaning based coping, it is believed that this research led to the addition of meaning based coping to the appraisal and coping model. It should be noted that reappraisal is suggested as leading to positive emotion. Overall, Figure 2 helps provide detail as to the many pieces that are involved in the process of appraisal and coping.

![Theoretical model of appraisal and coping](image)

Figure 2. Theoretical model of appraisal and coping. Reprinted from Folkman & Greer, 2000.

The theoretical model described in Figure 2 comes out of the research on stress and coping. In order to better understand the fundamental underpinnings of this model, a
limited amount of attention will now be devoted to stress and how it relates to emotion.
The term stress first became popular during World War II (Lazarus, 1966). One of the first powerful studies on the concept of battle fatigue was conducted by Grinker and Spiegel (1945). These researchers explored psychological and physical reactions in airmen who had been evacuated from combat zones. The term stress was connected with terms such as anxiety, anger, and fear.

Stress has been examined in a number of different ways. The research conducted by Grinker and Spiegel (1945) looked partially at reactions to physical stress, such as combat. While this type of stress undoubtedly has psychological features, one of the ways stress was conceptualized in this research was as physical stress. Janis (1958) examined surgery and the psychological threat of surgery. A significant emphasis was placed on the consequences of the arousal of fear. Another early researcher, Selyve (1956) focused on the medical implications of stress. Many researchers since have cited the work of these individuals when researching stress.

When initially researching stress, Lazarus and colleagues (1952) were seeking to gain information regarding conditions in which stress deteriorated functioning. At the time when this foundational research on stress was being conducted, behaviorism was dominating the field (Lazarus, 1998). Lazarus and colleagues (1952) found in their early research that individual differences were paramount to the study of stress and coping. At that time, people were not as interested in looking at processes that took place largely within an individual. When examining stress and how people cope with stress, emotion had to be considered. Not only was stress found to be very connected with emotion, but coping was found to mediate emotion. The models previously discussed sought out to
describe the reciprocal process of these concepts. It is important to examine emotion within this context to gain a broader perspective of how emotion functions and is changed or controlled within the larger picture of stress and coping.

*Emotion Regulation*

Emotion regulation literature developed out of stress and coping literature (Gross, 1998b). Understanding the larger picture of stress and coping is important in understanding how emotional expression and suppression fit into a larger picture, but having a better understanding of the finer detail of the process related to a specific emotion is also worthwhile. Emotional expression and suppression are ways in which a person can make an attempt to regulate their emotions.

Even before there was a formalized definition of emotion regulation, Freud (1923/1961) considered the concept of how affective impulses are regulated. At that time, it was suggested that psychological health could be dependent in part on the regulation of impulses. A related piece of this tradition focused more specifically on anxiety regulation (Freud, 1926/1959). Freud suggested that there are reality-based (ego) concerns and id and superego based concerns. Reality based concerns were thought to arise when situational demands engulf the ego. Once the ego was overwhelmed, Freud suggested that excessive behavioral avoidance of those reality based situations would be engaged in. The type of anxiety regulation concerning the id and superego, was suggested to arise when an individual had strong impulses that press for expression.

When examining emotion regulation, the process of understanding how an individual will influence which emotions they experience, when they have them, and how they go about both experiencing and expressing them is the topic of examination (Gross,
1993). These processes might be conscious or unconscious, automatic or controlled. A leading researcher in this area has suggested that perhaps the previously mentioned processes should not be distinguished categorically, and instead thought of as falling along a continuum (Gross, 1998b; Gross & John, 1998). For instance, an individual might have some awareness of a given emotion and how they are going to experience and express that awareness without having full awareness of that process. It has been proposed that emotion regulation is one piece falling under the larger umbrella of affect regulation (Gross, 1998b). The other pieces suggested to fall under the same umbrella are coping, mood regulation, and defenses. While emotion regulation is related to these other constructs, it is still a construct in and of itself.

When looking more specifically at what makes up emotion regulation, an antecedent-and response-focused emotion regulation model has been proposed (Gross, 1998a). The model is a constellation of major points of junction from other researchers concerned with emotion. The underlying premise of the model is that emotions may be regulated at the input (antecedent-focused emotion regulation) or output (response-focused emotion regulation) points in the process of emotion regulation (Gross, 1998a). An individual can react at different points along the experience of any given emotion. An example of antecedent-focused emotion regulation is cognitive reappraisal of a potentially emotion-eliciting situation (Lazarus & Alfert, 1964). Here an individual might decide to approach a situation that will have a given emotional impact. They are making the choice before they experience the emotion. An example of response-focused emotion regulation could be a strategy that one employs in order to diminish an emotional experience. Both antecedent and response-focused regulation involve many
factors that can be examined and manipulated. These types of regulation could be conceptualized as occurring before or after coping takes place. Antecedent and response-focused regulation could also be a way of coping with a given situation.

*Emotional Suppression*

One of the components of emotion regulation that has been widely researched is emotional suppression. Emotional suppression is defined as the conscious inhibition of one’s own emotional expressive behavior. Although this construct has been widely researched, there is not universal agreement as to its’ effects, some early researchers (Darwin, 1872; James, 1884) felt that expression of emotion was a crucial aspect involved in experiencing the emotion. Some more recent researchers have suggested that emotional suppression is an essential developmental marker (Kopp, 1989; Thompson, 1991). In the area of positive psychology, some researchers believe that emotional suppression is a much needed defense (Valliant, 2000). For example, if someone is being held at gunpoint and they risk being killed if they say one word, emotional suppression becomes a valued asset. In looking at the combination of both perspectives, it points to the importance of when it may or may not be helpful to suppress emotions.

Emotional suppression has been researched in terms of its relation to both physiological and psychological outcomes (Gross & Levenson, 1993; Gross & Levenson, 1997; Gross & John, 2003; Mendes, Reis, Seery, & Blascovich, 2003; Richards & Gross, 2000). In the literature, the term expressive suppression has been coined to describe conscious efforts to inhibit overt emotion-expressive behavior (Richards & Gross, 2000). This type of clarification seems to be crucial because the term suppression and even emotional suppression can be found as referencing a range of behaviors. Expressive
suppression would fall under the response-focused part of emotion regulation (Gross, 1998a). This means that expressive suppression would be something that an individual would engage in after an emotion has been experienced.

In terms of psychological correlations related to expressive suppression, suppressors versus reappraisers have been found by researchers to experience less positive and more negative emotion (Gross & John, 2003). In this same study expressive suppression was associated with worse interpersonal functioning, while reappraisal was associated with better interpersonal relationships. Reappraisal was identified by series of questions participants answered indicating the behavior of changing the way emotions are thought about and interpreted. Reappraisal seems to represent a cognitive component of emotion regulation and meaning.

Looking more specifically at research findings related to physiological outcomes, while some researchers have demonstrated that expressive suppression is correlated with and increase in sympathetic nervous system activity (Gross & Levenson, 1993), others have found that when an individual engages in expressive suppression, there will be different cardiovascular effects depending on the sex of the person you are suppressing or expressing emotions in front of (Mendes et al., 2003). More specifically, individuals cardiovascular responses demonstrated more of a challenged response when expressive suppression and disclosure occurred with a same sex research assistant, whereas cardiovascular responses were more indicative of a threatened response when a participant was asked to suppress or express their emotions to an opposite sex research assistant (Mendes et al., 2003). It is interesting to note that all of these studies have asked individuals to suppress their own emotions, not emotions that they were artificially asked
to suppress. One of the hypotheses suggested to account for findings such as these state that there is a physiological impact of expressive suppression that grows from an attempt to inhibit against the desire to express emotion (Gross & Levenson, 1997). Perhaps, having a desire to express emotions and then not expressing them leads to a different outcome than not having the desire in the first place.

Some early studies have demonstrated that breast cancer patients may engage in emotional suppression as a mechanism for coping with the distress of diagnosis (Greer & Morris, 1975; Morris, Greer, Pettingale, & Watson, 1981; Wirshing, Stierling, Hoffman, Weber, & Wirshing, 1982; Hoffmann, Stierling, Weber, & Wirshing, 1985). Some of this research has been conducted on patients who had recently been diagnosed as having a breast lump, although they have not yet undergone a biopsy. It has frequently been found in these early studies that women who either have a tendency to suppress their emotions or emotional thoughts are more likely to be patients later identified as having breast cancer (Greer & Morris, 1975, Morris, Greer, Pettingale, & Watson, 1981). In one of the previously cited studies, researchers assessed women who were admitted for a breast biopsy by measuring eight characteristics that had been commonly found in women with cancer. One of these characteristics was the suppression of emotions and feelings. It was found that all of the patients that were later diagnosed as having cancer were identified as suppressing their emotions (Wirshing et al., 1985). It is not appropriate to make the conclusion from this literature that breast cancer patients are causing their cancer. There does seem to be value in noting the findings in these early studies regarding emotional suppression and breast cancer.
Similar results have been found when assessing women who have already been diagnosed with having cancer. It has been found that emotional control is negatively associated with psychological adjustment (Classen, Koopman, Angell, & Spiegel, 1996). Along the same lines, less emotional suppression and greater adoption of a fighting spirit have been found to be associated with lower mood disturbance in participants of breast cancer support groups (Cordova, Giese-Davis, Golant, Kronnenwetter, Chang, McFarlin, & Spiegel). Some research has demonstrated that it is difficult to talk with both family and friends about a debilitating disease, such as breast cancer, if their family and friends have not experienced it themselves (Buick, 1997).

*Emotional Expression*

On the other end of the emotional regulation continuum is emotional expression. When a person is under distress, emotional expression might be thought of as both positive and negative (Kennedy-Moore & Watson, 2001). A chronic expression of emotions might have negative effects in one’s interpersonal relationships (Travis, 1984). On the other hand, emotional expression has been found to be a way to alleviate distress (Stanton, Danoff-Burg, Cameron, & Ellis, 1994; Stanton, Kirk, Cameron, & Danoff-Burg, 2000b). Emotional expression may be appropriate and helpful in certain situations, while it is detrimental in others.

In looking specifically at breast cancer patients and survivors, there is some research suggesting that when women cope with breast cancer by expressing instead of suppressing emotions, there might be some positive benefits (Stanton, Danoff-Burg, Cameron, Bishop, Collins, Sworowski, & Twillmen, 2000; Stanton, Dannoff-Burg, & Huggins, 2002). More specifically, women who cope with breast cancer by expressing
instead of suppressing their emotions have been found to have a better perceived health status and vigor, lower psychological distress, and fewer medical appointments for cancer-related morbidities (Stanton et al., 2000). Active engagement in terms of dealing with breast cancer is also associated with positive adjustment (Stanton et al., 2002). This brief review of the literature demonstrates that while emotional suppression might not be the most adaptive behavior in certain circumstances, when looking at breast cancer patients and survivors, it is suggestive of an adaptive form of emotion regulation. It is also important to think about how both emotional expression and suppression could be useful at different points during a stressful event.

Breast cancer can be thought of as a stressful situation. When presented with breast cancer, an individual might then be forced to appraise the situation they are in. There are a number of different characteristics within an individual that could account for the way in which they appraise their situation. They may decide to cope in a way that is more problem or emotion-focused. Research shows that most people will engage in both types of coping (Lazarus, 1998). Emotional suppression and expression come into play at this point in the cycle. Both emotional suppression and expression can be viewed as a means of regulating affect. The outcome of this regulation and then both expression and suppression are a type of coping that will lead to different outcomes for different people. The process of experiencing breast cancer is unique, and the process of coping with the diagnosis is unique also.

While a great deal of literature suggests that emotional expression can have beneficial physical and psychological outcomes, much of the measurement of emotional expression has been accomplished through the use of self-report measures (de Moor et
al., 2002; Stanton, Danoff-Burg, Cameron, Bishop, Collins, Sworowski, & Twillmen, 2000; Stanton, Danoff-Burg, & Huggins, 2002)). In a review of the larger concept of coping through emotional approach (Austenfield & Stanton, 2004) researchers suggest that the measures they found to be most used when assessing emotion-focused content contain many items contain many items that are arguably measuring differing constructs. For example, the COPE is a measure commonly used to assess emotion focused coping with cancer patients (Carver, Sheier & Weintraub, 1989). In this measure items such as “I get upset and let my emotions out” and “I act as though it hasn’t even happened” both are constructed as measures of emotion focused coping. Aside from the fact that some of the measures used to make associations between emotional expression and outcome measures are not measuring similar aspects of emotional expression, self-report measures are inherently problematic.

*Cognition and Emotion*

The previously detailed model of appraisal and coping is based off of the assumption that cognition is driving these emotional experiencing processes. There are definite differences of opinion on how cognition and affect are related. More specifically, there is a divide in researchers when it comes to whether emotion and cognition are experienced conjointly. Even when individuals agree that both cognitions and emotions are related, there is dispute over which concept is experienced first. Some earlier researchers have suggested that emotion and cognition should be viewed separately (Tomkins, 1981; Zajonc, 1973), others have argued that emotions are experienced before cognitions (Bartlett, 1932; Janis 1969, Osgood, 1962). This work is thought to come out of a behaviorism tradition where the internal workings are not
considered to be of as much importance as measurable behavior (Folkman & Lazarus, 1984).

Many other early theorists working in this area have viewed emotion as being a reaction to cognition (Johnson, Leventhal, & Dabbs, 1971; Lazarus, 1966). Johnson and colleagues (1971) initially thought that through their research on surgery and fear they would find that fear occurred prior to cognition. They found the opposite and ended up viewing cognition as coming before fear prior to surgery. Cognitive mediation is a term created by Lazarus (1991) to explain that all stimuli in our environment, including stressors, first go through a mind that thinks about and evaluates the stimuli before it reacts. In this view, the cognitive process determines the quality and intensity of the emotional reaction (Lazarus, 1998). It is important to keep in mind that from this point emotion can then influence cognition. The key point to remember here is that cognition first led to emotion and then a cyclical process can occur.

At this point, it is appropriate to include a more recent view on this topic. Appraisal is the place in the model on stress and coping that cognition is accounted for. Appraisal has been heavily explored and theories have been created to help explain the concept (Frijda & Zeelenberg, 2001). While it is not appropriate to go into length about this work, it is appropriate to explain the few core assumptions that traditionally are related to appraisal. One assumption of appraisal theory is that appraisal is responsible for the elicitation of emotions (Frijda & Zeelenberg, 2001). The second assumption of appraisal theory relative to this literature review is that appraisal is responsible for the differentiation of emotions. The assumptions are made when examining the work that is at the core of this paper. More recent work by Frijda & Zeelenberg (2001) challenges
these assumptions and instead assumes there are certain emotional states that are not derived out of cognition. These researchers believe that both emotion and cognition can be precursors for the other. While the goal here is not to argue any one viewpoint, it is to better understand the major viewpoints on this topic.

While the above information may at first seem trivial, it is fairly important. For example, when interpreting the models by Lazarus and Folkman (1988; 2000) it is crucial to understand that the concept of appraisal is thought of as a cognitive form of appraisal. While they believe that emotion can lead to cognitive appraisal, the initiator to that emotion is said to be cognition. When exploring the concepts in this paper, knowing this bias helps the reader explore the process of stress and coping. Knowing that there are different viewpoints on this topic is also paramount. Here cognition will be suggested in keeping with the ideas from Lazarus (1998). This suggests that cognition is initially experienced before emotion, while still accounting for the fact that out of an emotional experience one can then have cognitions.

Keeping one's emotions and thoughts internal would plausibly be connected, although the connection has not been illuminated. An individual might hold back the emotion of a situation while still talking about their thoughts and feelings related to that emotion. This could be seen when an individual is emotionally expressive in a given situation, although that expressed emotion does not truly correspond to the event that they are expressive about. It is difficult to identify the correlation of these two constructs. There is a lack of clarity seen in these bodies of literature as to the relation of these constructs. The lack of clarity also extends to the labels of the behaviors (Greenberg, Wortman, & Stone, 1996). For instance, thought suppression might be referred to as
cognitive inhibition or cognitive avoidance. These things make it difficult to examine how these processes work together and are connected.

Expressive Writing

Emotional expression can take place in many forms. One of the forms of emotional expression is self-disclosure (Mendes, Reis, Seery, & Blascovich, 2003). Self-disclosure can also occur in a variety of ways. In therapy, it has been suggested that when individuals selectively or habitually avoid experiencing emotion in therapy, they create a burden for themselves in terms of making sense out of the events (Wiser & Arnow, 1999). One of the ways in which an attempt has been made to help individuals express their thoughts and emotions is through a written narrative (Petrie, Booth, & Pennebaker, 1998). Leading researchers in this area have suggested that the act of constructing stories is a natural human process that helps individuals organize events, while they integrate relevant thoughts and feelings that they have about a certain topic (Pennebaker & Segal, 1999). Once an experience has structure and meaning, it might become more manageable and predictable.

In order to help individuals express their thoughts and feelings, an expressive writing paradigm has been implemented in many studies. Participants are typically instructed to write about either a traumatic or benign event for three to five days, writing between fifteen and thirty minutes per day (Pennebaker, 1997). Usually, people have been asked to write in a laboratory, without any feedback. Both health and psychological measures have been assessed (Greenberg et al., 1996; King & Miner, 2000; Pennebaker, 1992; Pennebaker, 1997; Pennebaker, Barger, & Tiebout 1989; Pennebaker & Seagel, 1999; Seufield & Pennebaker, 1997; Sloan & Marx, 2004; Smyth, 1998; Smyth, Stone,
Hurewitz, & Kaell, 1999; Stanton et al., 2002). This type of writing has been associated with many significant health benefits, such as fewer visits to the physician for up to 1.4 years (Greenberg et al., 1996; King & Miner, 2000; Pennebaker et al, 1989; Sloan & Marx, 2004; Smyth et al., 1999). Other positive outcomes include physiological markers, such as liver enzyme levels (Francis & Pennebaker, 1992), and behavioral markers, such as grade point average, (Cameron & Nicholls, 1996). A couple of studies have only included participants who have already indicated they had experienced a traumatic event (Greenberg et al., 1996; Sloan & Marx, 2004). In both of these studies psychological benefits were found in the experimental group when they were asked to write about the traumatic events they had experienced.

In a fairly recent review by Sloan and Marx (2004), they found that a few published studies showed that expressive writing did not impact physical and/or psychological health in either the treatment or control condition (Batten et al., 2002; Stroebe et al., 2002; Walker et al., 1999). One study actually demonstrated that written emotional disclosure increased symptoms related to posttraumatic stress disorder (Gidron et al., 1996). While this research demonstrated that the expressive writing paradigm is not always linked to positive physical and health benefits, there are many more studies indicating that expressive writing may have benefits for certain individuals.

One of the ways in which expressive writing has had different outcomes is in the magnitude of effect of expressive writing. Smyth reviewed research on expressive writing (1998) and found that males were more likely to benefit from expressive writing than females. Others have found that people high in hostility and the trait of alexithymia benefit more from expressive writing than did those low in hostility and low in the trait of
alexithymia (Christensen & Smith, 1994; Paez, Velasco, and Gonzalez, 1999). In a more recent article on psychological, social, and health consequences of disclosing emotion (Pennebaker et al., 2001), the authors suggest that this writing paradigm seems to be the most helpful for individuals who have a difficult time opening up. This helps give some insight as to what individual differences might be important when conducting an expressive writing study. It also demonstrates that considering individual differences when looking at and conducting studies on expressive writing is crucial. The focus is turning more towards examining for whom and when an expressive writing paradigm is helpful.

When assessing the effectiveness of expressive writing when the sample is a medical sample, there is not as much available data, although more and more expressive writing studies are being conducted with medical samples. Benefits have been found for individuals who have asthma and rheumatoid arthritis in terms of pain (Smyth, Stone, & Hurewitz, 1999) in one study, but not in another (Kelley, Lumley, & Leisen, 1997). Expressive writing was initially conducted on healthier college samples, but health benefits lead researchers to explore the effects expressive writing might have on medical populations. There is still not an equivalent body of literature on the topic, although that piece of the field is expanding.

When looking more specifically at a breast cancer population, there have been a few studies conducted assessing expressive writing and its relation to both physical and psychological symptoms (de Moor et al., 2002; Stanton et al., 1999; Stanton et al., 2002; Walker, Nail, & Croyle, 1999; Zakowski et al., 2004). While in one study expressive writing was not associated with differences in positive affect, negative affect, intrusive
thoughts, or avoidance (Walker et al., 1999), in the other three studies better sleep (de Moor et al., 2002) and fewer physical symptoms (Stanton et al., 1999; Stanton et al., 2002) were found in participants who were either asked to write about their feelings regarding breast cancer or the positive outcome of their experience with breast cancer. Although not all of the studies conducted with breast cancer patients have resulted in positive outcomes for the group asked to write about their feeling related to breast cancer, most of the few studies that have been conducted speak to benefits associated with the expressive writing paradigm.

After a number of studies were conducted and the above mentioned findings were noted researchers began looking for a theory that helped explain the effects of having individuals put emotional thoughts into words. Three ideas have repeatedly been suggested to be driving change when people expressively write. The cathartic method (Breuer & Freud, 1895/1966; Freud, 1904/1954) was one of the first theories suggested to mediate expressive writing and the benefits of expressive writing. Here, links are stressed between cognition and affect surrounding a threatening experience or event. It was suggested that when individuals write about a traumatic event, the act of simply expressing emotion was accounting for the outcomes (Pennebaker & Beall, 1986). This became known as the emotional inhibition explanation for the effects of expressive writing (Pennebaker, Hughes, & O’Heeron, 1987). They suggested that keeping thoughts and feelings inside requires work for both the body and the mind. Based off of the work by Selyve (1950, 1976), the above researchers suggested that the attempt to actively inhibit thoughts and feelings had a negative effect on the immune system by requiring the body to continually work to keep thoughts and feelings internal. The theory suggested
that by releasing these thoughts and feelings, stress was being taken off of the body. This reduction in stress was said to account for the positive health benefits (Pennebaker et al., 1987). In more recent years, this hypothesis has been discredited by means of not accounting for enough of the process of what is happening when an individual expressively writes (Pennebaker & Graybeal, 2001). In one study, people who reported that writing served as a cathartic function actually had poorer health than other writers (Pennebaker, 1989). A theory taking into consideration emotion change, in the sense of emotional expression, might not capture enough of the process of what is taking place when some individuals expressively write. In a recent study with early stage breast cancer patients, Culver (2003) found that cognitive change along with emotional expression was linked to better psychological and physical well-being.

Another hypothesis that has been suggested as the driving force behind the effects of expressive writing is related processing or meaning making. It has been suggested that when people are forced to write about traumatic events, they have the opportunity to view the event in a different light (Pennebaker, 2004). As previously mentioned, using this writing paradigm, individuals are typically asked to write about the same event for three to five days. Having the opportunity to repeatedly see and interpret what is being thought and then written about could help facilitate better outcomes. Some have said that this hypothesis has its roots in exposure therapy (Sloan & Marx, 2004). Within this theory, behavior therapists have attempted to expose an individual to their fear in a situation that is not threatening as a way for them to see that avoidance of their fear is not necessary (Mowrer, 1960). Some expressive writing researchers have suggested that asking
individuals to expressively write forces them to be exposed to stimuli that they have been avoiding (Sloan & Marx, 2004).

When testing the emotional processing hypothesis, results have been mixed. A reduction in avoidance would be expected as an outcome if this hypothesis is in effect. While two studies have shown that avoidance decreased after expressive writing (Klein & Boals, 2001; Schoutroup et al., 2002), researchers in three studies have found an increase in avoidance symptoms (Gidron et. al., 1992; Greenberg et al., 1996; Smyth et al., 2001). This research suggests that expressive writing might not reduce avoidance symptoms, at least right after an individual has participated in expressive writing. Smyth and colleagues (1998) found that individuals have higher levels of intrusive thinking right after expressive writing. Overall, there has not been clear evidence in support of the emotion process/meaning making hypothesis (Sloan & Marx, 2004).

Another theoretical hypothesis suggested to account for the positive benefits that have fairly consistently been found when individuals expressively write has to do with cognitive changes. It has been suggested that the act of expressive writing is similar to creating a piece of one’s life story (Pennebaker & Segal, 1999). Horowitz (1986) suggests that when confronted with a traumatic event, people seek to resolve the incongruence between the information related to the trauma and their “inner models.” Expressive writing could be a vehicle individuals use as an attempt to make that resolution. Pennebaker and Seagal (1999) propose that asking individuals to consistently write about the same topic may give them an opportunity to add meaning to the traumatic experience while creating their own, personal “story.” It has been hypothesized that
helping individual to organize and structure their thoughts through expressive writing may promote insight that helps with cognitive assimilation.

One way in which this hypothesis has been tested is by examining the expressive writing narratives on a word by word basis (Pennebaker & Francis, 1996). When examining the writing narratives of individuals who have participated in these studies, it has been found that those individuals who have used more causal and insight words as they progress from the first to the last day of the writing assignment have evidenced better physical and mental health outcomes (Pennebaker, 1997; Pennebaker & Graybeal, 2001). While examining expressive writing on a word by word basis gives insight into what types of words individuals are using when they write, suggesting that a change in the use of words equals a change in cognitive processing could be making a leap.

Overall, researchers have been trying to find out what is driving the powerful effects that many expressive writing studies have ascertained. Ideas such as inhibition, emotional processing, and cognitive adaptation have all been suggested, researched, and found to be incomplete (Pennebaker, 2004; Sloan & Marx, 2004). The creator of the writing paradigm, James Pennebaker proposed that the writing paradigm effects individuals on many different levels (Pennebaker, 2004). In the comprehensive review conducted by Sloan and Marx (2004) they suggest that pieces of these theories might be working in combination. Although research in support of any one of the frequently cited mechanisms for beneficial expressive writing outcomes has not been conclusive, it has still provided some insight into possible mechanisms or pieces of mechanisms that are driving change in outcomes after one expressively writes.
One theoretical model that has not been previously critiqued and is the most relevant to this topic is a theoretical model proposed by Lepore and colleagues (2002). The theory explains how expressive writing effects emotion regulation, leading to better mental and physical outcomes. In creating this theory, Lepore and colleagues presuppose that emotion regulation should be viewed on a continuum. As previously mentioned while examining emotion regulation, the anchors of this continuum are under-regulated, optimally regulated, and overregulated. The authors suggest that the optimal place to be is somewhere in the middle of the continuum. They do not advocate for being extremely emotionally controlled or extremely expressive. Within this theoretical model, emotion regulation in the form of emotional suppression is not always thought of as being negative. The goal is to create balance between being under and overregulated.
EXPRESSIVE WRITING

Regulatory Processes
- Attention
- Habituation
- Cognitive Restructuring

Regulatory Outcomes in Emotional Systems
- subjective-experiential
- neurophysiological-biochemical
- behavioral-expressive

MENTAL & PHYSICAL HEALTH

Figure 3. An emotion regulation model of the effects of expressive writing on mental and physical health. Reprinted from Lepore, Greenberg, Bruno, Smyth (2002).

These authors suggest that one of the major components in the regulatory process is attention. An individual needs to attend to the stressful or traumatic event before controlling it (Lepore, Greenberg, Bruno, & Smyth, 2002). When Fritz Perls (1951) spoke on emotion he suggested that awareness was the key to being able to interpret and then deal with emotion. These researchers have incorporated a similar component into their emotion regulation model of the effects of expressive writing. Writing instructions, in and of themselves can direct attention to certain aspects of an emotional or traumatic event (Lepore et al., 2002).
Following the lead of some previously mentioned researchers, Lepore and colleagues bring habituation into their model, suggesting that expressive writing habituates individuals to the feared stimulus. They use the work of Watson and Marks (1972) as a foundation for this piece of their model. Watson and Marks (1972) suggested two different types of habituation could be seen when exposing individuals to a feared stimuli: stimulus-related habituation and response-related habituation. Stimulus-related habituation is defined decreased emotional reactivity to specific fear-provoking stimuli that is a consequence of prolonged exposure to those same stimuli (Lepore et al., 2002). Response related habituation is a decreased emotional reactivity to specific fear-provoking stimuli as a consequence of intense or prolonged exposure to fear response provoked by any stimulus (Lepore et al., 2002). During an expressive writing assignment, people are asked to write about a particular experience. Through this type of writing an individual may experience stimulus-related habituation. Expressive writing might also evoke other emotions. If this is the case, expressive writing could be beneficial by both stimulus and response-related habituation. Adding these subtypes of habituation provides different ways in which habituation may be working.

Cognitive restructuring is the third mechanism through which expressive writing may lead to beneficial physical and mental health outcomes. While this mechanism has been suggested singularly, these researchers are the first to combine cognitive restructuring with other pathways. By changing the ways in which people view either themselves or their situation individuals could better regulate their emotions (Lepore et al., 2002). While content analysis is one way in which cognitive restructuring can be measured, measuring intrusive thinking has been suggested as another way to measure
cognitive restructuring (Lepore et al., 2002). In an earlier study, Lepore and colleagues (1997) suggested that intrusive thinking represents incomplete cognitive processing. It should be recalled that in another study examining the effects of talking these researchers suggest that when an individual has not fully made sense out of an event they will have more intrusive thoughts.

The cited research on the outcomes of expressive writing indicate that expressive writing may be benefiting people through three self-regulatory outcomes. These include subjective-experiential outcomes, neurophysiological-biochemical outcomes and behavioral-expressive outcomes. While it is not necessary to recount previous literature demonstrating the areas in which expressive writing has proven to be effective, it is appropriate to point to the fact that expressive writing has been beneficial in these different arenas. It is still unclear as to whether self-regulation is the driving force for these changes.

After gaining an understanding of the process of emotion and coping, there is another possible mechanism that accounts for why expressive writing may be beneficial. The most recent model on stress and coping (Folkman & Greer, 2000) suggests that meaning-based coping is an additional form of coping that provides another opportunity for an individual to cope with a stressful situation. Research in emotion regulation has demonstrated that reappraisal versus expressive suppression is linked to better interpersonal functioning and more positive emotion (Gross & John, 2003). In that research, the ability of an individual to reappraise was dependent upon a change in the way in which emotion was thought about. When examining expressive writing, an emotion regulation model of the effects of expressive writing has been proposed.
Perhaps adding the concept of reappraisal into this model provides a good fit. While this has not previously been proposed, the work on stress and coping theory, emotion regulation, and expressive writing all demonstrate that a change in a cognitive component of emotions and emotion regulation may be related to benefits. Reappraisal as a function of meaning-based coping through expressive writing about traumatic events may be another mechanism to be explored while attempting to identify mechanisms driving change through expressive writing.

In exploring emotional expression and suppression as a form of coping and expressive writing as a tool for expression, a major theme consistently appears regarding individual differences. Whether looking at person characteristics in the Folkman and Greer (2000) appraisal and coping model or examining individual differences in terms of whom expressive writing is most beneficial for, individual differences are an aspect of these constructs that must be taken seriously. If expressive writing does become used as an intervention, it is important to understand who it will be most helpful for.

*Coding of emotional expression.* One of the tools that has been used to understand how expressive writing influences psychological and health outcomes is Linguistic Inquiry and Word Count (Pennebaker & Francis, 1992). Pennebaker and Francis devised a tool to analyze text on a word by word basis. The LIWC computer program assesses text by picking out words that fall into different categories. There are over 80 word categories, although the examples used in this literature review were assessed on only four dimensions. Two of the four categories were emotion dimensions and the other two were cognitive dimensions. Pennebaker has found that four factors have been correlated with the largest amount of health benefits (1997). These include
more positive emotion words used, a moderate number of negative emotion words used, and an increasing amount of causal and insight words used over the course of writing. These words could be indicative of both emotional expression and creating meaning when repeatedly writing about the same trauma.

LIWC has been used to assess language and emotion in many different populations. While some of the studies that have used LIWC to analyze data have been with clinical populations (Lieberman & Goldstein, 2006; Smith, S., Anderson-Hanley, C., Langrock, A., & Compas, B. 2005), others have included non-clinical samples (Cohn, Mehl, & Pennebaker, 2004; Pennebaker & Lay, 2002; Slatcher & Pennebaker, In Press; Stone & Pennebaker, 2002). Examples include changes in emotion word use surrounding September 11, 2001 (Cohn, Mehl, & Pennebaker, 2004), to an exploration of what types of emotions are used in the text of people who are in a long term relationships (Slatcher & Pennebaker, In Press).

Although LIWC identifies emotion words there is a question as to whether emotional expression in slightly different than the use of emotion words. While having an understanding of what types of words people use is beneficial in many ways, focusing specifically on the topic of emotional expression could also be useful. Emotional expression and suppression has received some attention in breast cancer research. It could be helpful to better identify emotional expression in writing. One place to start doing this is by comparing qualitatively coded emotional expression to measures that identify emotion words. It is also helpful to compare the coding with outcome measures. This could help demonstrate how qualitatively coded emotional expression and lack of expression are related to outcome measures.
LIWC was initially validated for content and construct validity by the creators of the program (Pennebaker & Francis, 1997; Pennebaker, Francis, & Booth, 2001). Interrater reliability discrimination of category word elements has been found to range from 86% to 100%, depending on the dimension being assessed (Pennebaker et al., 2001), suggesting content validity. In order to assess construct validity four judges rated 210 essays on several LIWC dimensions (Pennebaker & Francis, 1997). Moderate correlations were found for most emotion categories (Pennebaker & Francis, 1997).

Context is not taken into consideration as the LIWC performs a search for words to fit in a number of different categories. The creator of this program has suggested that traditionally computer programs, such as LIWC, do not do an adequate job assessing different meanings of the same word (Chung & Pennebaker, in press). Some of these categories are emotion categories, so LIWC finds emotion words, although the program was not designed to directly identify the construct of emotional expression. Very little work regarding psychometric properties has been done outside of the research conducted by those who developed LIWC. In one known study assessing psychometric properties of LIWC with breast cancer patients, researchers analyzed text for overall valence in a number of different categories (Alpers et al., 2004). Here low to moderate correlations were found between manual codes and LIWC codes (Alpers et al., 2004), although the sample size was small (n=9) and words were not coded individually, rather the text at large was coded for a number of different dimensions.

There are a number of studies in which oncology patients have been asked to participate in activities aside from the traditional expressive writing paradigm and LIWC has been used (Graves et al., 2005; Lieberman & Goldstein, 2006; Smith, Anderson-
Hanley, Langrock, & Compas; 2005). Examples include unstructured journaling for women with newly diagnosed breast cancer (Smith, Anderson-Hanley, Langrock, & Compas, 2005), online support groups (Lieberman & Goldstein, 2006), and face-to-face support groups (Graves et al., 2005). While all of these designs provide avenues for better understanding linguistic variables, participants are asked to engage in tasks that are unique and could influence the words they use. In the traditional writing paradigm participants are told that their writing may or may not be viewed by another person (Pennebaker, 1997). An online support group and face-to-face support group will naturally contain elements of social exchange that an individual writing without the consequences of others response would not experience.

When assessing the psychosocial needs of oncology patients online support services are one avenue for intervention. Online support services are a feasible option for many breast cancer patients (Lieberman et al., 2003). In this study during the course of a facilitated online support group depression and reactions to pain decreased for the sample of breast cancer patient included. Online support services provide feasibility to patients who many not have the energy to come in for treatment. They also provide anonymity for patients who would prefer to not be completely identified. In addition to the benefits that are present for cancer patients, online support services also provide researchers with a wealth of text that can be analyzed to acquire information regarding potential mechanism of benefit with expressive writing.

In analyzing the large volume of text that is produced in traditional expressive writing studies as well as online support service studies computational linguistics can be a beneficial. While the LIWC has been used to analyze data from both expressive writing
and online support services studies, context is not taken into consideration when data is analyzed (Chung & Pennebaker, in press). When context is not taken into consideration much of the richness that is inherent in textual data is stripped away (Ayres, Kavanaugh, & Knafl, 2003). In order to fully understand emotional expression in text and how it is connected to outcome measures a more in depth analysis of the data is necessary.

Summary

Emotional expression is a construct that can effectively be viewed in relation to coping. A stress and coping model initiated by Lazarus (1966) has been used as a comprehensive way of better understanding the process of coping and emotion. There can be a range of emotional responses to a breast cancer diagnosis and treatment. For this reason, breast cancer and the cognitions and emotions that follow a diagnosis and treatment for breast cancer are something that individuals must cope with. Two of the ways in which they might cope with breast cancer is by expressing or suppressing their thoughts and emotions. As previously mentioned, both of these methods of coping may be beneficial at different times and to different individuals.

Expressive writing has been fairly widely used as a tool for helping individuals express their thoughts and feelings. It has been found to correlate with both physical and mental health benefits. Mechanisms such as cognitive adaptation, emotion processing, and habituation have been suggested to account for these benefits. None of the tested mechanisms have provided any substantial conclusions. While providing some leads in this area, none of the suggestions have been successfully determined as a means of driving the benefits previously discussed. Although related to other suggested mechanisms, reappraisal as a property of meaning-based coping through expressive
writing about traumatic events has been suggested here as a possible mechanism driving physical and mental health benefits. The reappraisal concept has been discussed in both coping and emotion regulation literature. A similar concept could account for the benefits being found in expressive writing research.

Emotion regulation literature developed out of stress and coping literature and can be thought of as a way in which individuals cope. Individuals may regulate their emotions through many different means. Two ways in which emotions may be regulated are through emotional expression and emotional suppression. It has been demonstrated that emotional suppression is a form of response-focused coping that can have negative effects on people from many different populations. Cognitive reappraisal and the expression of emotional thoughts have been linked with many positive physical and psychological health components in breast cancer patients and survivors. One of the ways in which researchers have attempted to provide a platform for individuals to express their thoughts and emotions is through an expressive writing paradigm. This writing paradigm has been associated with both psychological and physical health benefits. One of the suggestions as to why this paradigm is beneficial is regarding meaning making. In both emotion regulation literature and expressive writing literature cognitive reorganization has been hypothesized as one of the driving factors in positive outcomes. Being able to examine emotional expression in writing could be beneficial in terms leading to a more objective way of identifying constructs that have been recognized as being related to both mental and physical health.

For the above mentioned reasons, data collected by Owen et al. (2005) was analyzed with the goal of comparing qualitatively coded expression with emotion coded
via two computer programs, one of which has been used a great deal to identify emotional expression.

Aim 1

Development of a coding system for the identification and classification of emotional expression. It was hypothesized that high inter-rater reliability would be demonstrated between both trained and blinded coders. It was also hypothesized that construct validity would be demonstrated through high correlations with coder impression ratings.

Aim 2

Accuracy of Linguistic Inquiry and Word Count for detection of emotional expression. This second goal involved evaluating the validity of computerized coding systems for identifying emotional expression in text. Here it was hypothesized that manual codes of emotional expression would be more highly correlated with coders' overall impression ratings than with LIWC. It was also hypothesized that LIWC would be sensitive in terms of identifying emotional expression, but it would not be specific in terms of identifying the lack of emotional expression. A final hypothesis was that high levels of emotional expression in online support group entries (as measured by the hand coding system) would be associated with self-reported quality of life, overall health status, and cancer related trauma.

Aim 3

Predictive validity of manual coding system. The final goal of the study was to evaluate whether outcomes of different coding systems as well as time 1 measures were predictive of follow-up measures. It was hypothesized that manual coding would be
more predictive of outcome measures than the Linguistic Inquiry and Word Count Program and PCAD.
Method

Participants

Breast cancer patients with stage 1 or 2 breast cancer were recruited to participate in a randomized pilot for a self-guided internet coping group. Participants in the initial study were sixty-two women with stage 1 or 2 breast cancer recruited from a Hematology/Oncology outpatient clinic at a large academic medical center in the Southwestern United States. Participants were not excluded dependant upon time since diagnosis or medical treatment. They were recruited to participate in a randomized 12-week clinical trial internet-based support group. Participants who expressed interest after talking with Dr Owen completed a baseline assessment ($n = 62$) and were then randomized into a wait list control group ($n = 30$) or an internet-based support group ($n = 32$). More details regarding participant demographics and study details can be found in the below table as well as in Owen et al. (2005).
Table 1. Demographic characteristics of participants.

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<th>Control Group ((n = 30))</th>
<th>Treatment Group ((n = 32))</th>
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</tr>
<tr>
<td>Modified Radical Mastectomy (%)</td>
<td>60.0</td>
<td>63.9</td>
</tr>
<tr>
<td>Treated with Radiation (%)</td>
<td>53.3</td>
<td>47.1</td>
</tr>
<tr>
<td>Treated with Chemotherapy (%)</td>
<td>63.3</td>
<td>85.3*</td>
</tr>
<tr>
<td>Clinical State of Disease (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ductual Carcinoma In Situ</td>
<td>0.0</td>
<td>5.7</td>
</tr>
<tr>
<td>Stage I</td>
<td>33.3</td>
<td>28.6</td>
</tr>
<tr>
<td>Stage II</td>
<td>40.0</td>
<td>45.7</td>
</tr>
<tr>
<td>Stage III</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Positive Lymph Nodes Outside of Breast (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Positive Nodes</td>
<td>53.6</td>
<td>48.5</td>
</tr>
<tr>
<td>1 or More Positive Nodes</td>
<td>46.4</td>
<td>51.5</td>
</tr>
<tr>
<td>Use of Complimentary or Alternative Medicines (%)</td>
<td>20.0</td>
<td>11.4</td>
</tr>
</tbody>
</table>

*Significant between group difference, \(p < .05\).
Materials

Health-Related Quality of Life. The Functional Assessment of Cancer Therapy-Breast Cancer Form (FACT-B) is a 27-item questionnaire that was used as a measure of perceived quality of life, quality in physical, social, relationship with doctors, emotional, and functional domains (Cella, 1997). This instrument has adequate internal consistency and good concurrent validity with ECOG performance status (Brady et al., 1997). The FACT-B has also been sensitive to change over time in persons with cancer. Participants were also asked to rate their overall health on a 0-100 scale. This scale is called the EuroQuol 5-D (Brooks, 1996). On this scale 0 should be thought of as the “least desirable state of health you can imagine” and 100 as being “perfect health” (Llach et al., 1999).

Cancer Related Trauma. The Impact of Events Scale (IES) was used to assess psychological well-being. It is a 22-item Likert-type scale created to assess intrusiveness and avoidance of cancer-related thoughts and stimuli (Horowitz, Wilner, & Alvarez, 1979). This instrument has been demonstrated to have good internal consistency and has been shown to be sensitive to effects of psychological intervention (Edgar, Rosberger, & Nowlis, 1992).

Anxiety and Depression. The Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety and depression. It is a 14-item measure that provides summary scores for depression and anxiety. This is a self-report measure that was created to be used in medical populations in that the scale does not overestimate for a mood disorder based on somatic symptoms. It was found to have good inter-rater reliability and good construct validity for distinguishing between patients with and without mood
disorder (Zigmond & Snaith, 1983). This measure is also sensitive to the effects of adjuvant psychotherapy treatment (Greer, Moorey, & Baruch, 1992).

*Narrative analysis.* The LIWC computer program analyzes written text on a word by word basis. This tool was developed by a process in which many groups of judges reviewed 2,000 words or word stems and decided how the reviewed words related to dozens of categories (e.g., list a few of the emotion and non-emotion categories here; Pennebaker & Francis, 1996). A piece of writing is put into the form of a text file and the program analyzes the piece of writing. Every word is then compared with “dictionaries” of 82 dimensions. The dimensions include: a) standard linguistic dimensions; such as words per sentence, b) psychological constructs; such as positive emotions, c) dimensions related to “relativity;” such as past tense verbs, and d) personal concern categories; such as the use of job or work related words. A word might fit and be placed into more than one category.

*Additional Content Analysis Program.* The Psychiatric Content Analysis and Diagnosis (PCAD) program was used to analyze text. PCAD came out of the Gottschalk-Gleser scales (1995) in which verbal output was transferred into text and analyzed on a number of different facets, most of which are geared towards psychiatric diagnoses. Adequate construct validity and reliability have been established for all of the scales (Gottschalk, 1995). In this study the following scales were used: death anxiety, mutilation anxiety, separation anxiety, guilt anxiety, shame, diffuse anxiety, hostility inward, hopelessness, separation depression, death and mutilation depression, and hope.
Procedures

After recruitment and randomization participants assigned to the experimental group were contacted and given a password for secure access to a website in which they were invited to participate in both structured coping exercises and a more open bulletin board. Participants also had the opportunity to access a dictionary of medical terminology and Web sites containing information about breast cancer resources. Thirty-nine prompts were given to participants during the course of the group. These prompts summarized coping-skills exercises and encouraged participants to post a message describing their experience with a given exercise. These prompts were sent to participants via e-mail. See Owen et al. (2005) for additional details regarding procedures in the initial study.

All of the text obtained in the initial study was analyzed in the current study. Developing a set of manual coding rules designed to identify emotional expression in text was a primary goal of the study and was completed at the outset of the current study. In order to create inclusion criteria when coding for emotional expression, literature providing theory and guidance regarding what constitutes emotional expression was explored (Clore, Ortony, & Foss, 1987; Ekman, 1992; Mergenthaler, 1996; Ortony & Turner, 1996; Ortony, Clore, & Foss, 1987; O’Rourke & Ortony, 1994). During the early stages of creating the manual coding system for emotional expression literature by Ortony and colleagues listed dictionaries of emotion words, which provided a format to evaluate the appropriateness of words and context for inclusion into the manual coding system (Clore, Ortony, & Foss, 1987; Ortony, Clore, & Foss, 1987; O’Rourke & Ortony, 1994). Their work on the affective lexicon provided a framework for considering
different properties of emotion words and whether they should be included. An example of this was making the decision as to whether emotion used in reference to both internal feeling states and external feeling states would be considered emotion in current manual coding system (Clore, Ortony, & Foss, 1987).

When assessing the text for emotional expression the initial decision to be made was regarding the presence of emotional expression. If it was determined that emotional expression was present, the decision was then made regarding the type of emotional expression. As a way of making decisions about both the presence of emotional expression and then the type of emotion that was expressed, it was decided that coders would follow rules designed to classify the words being coded into one of the following categories: positive feelings, optimism, anxiety, anger, sadness, other positive emotion, other negative emotion, and not indicative of emotional expression (other). These categories are very similar to the LIWC categories. This was done intentionally with the goal of being able to compare manually coded emotional expression with the LIWC codes. See Appendix A for finalized coding rules.

Definitions for coding emotion were discussed, debated, and then initial decisions were made regarding coding rules. More specific coding rules were developed throughout manual coding of the initial 90 pages of text. After the first 90 pages of coding were finished the process of developing additional rules was discontinued and the rest of the text was coded with then agreed upon rules. The initial 90 pages of text was coded again with coders using the finalized coding rules (see Appendix A for finalized coding rules).
LIWC dictionaries were used to develop a Practical Extraction and Report Language (PERL) program. Coders were blind to the codes that LIWC gave, although ** was placed before each word LIWC did identify as being indicative of emotional expression, which indicated to trained coders that they needed to code that particular word. The entire text was initially evaluated by coding words that were indicative of emotion according to LIWC. The trained coders independently coded the text and then reconvened to assess the congruency in codes that were independently assigned to words LIWC deemed as being indicative of emotional expression. Discrepancies in coding were handled by coders describing the reasons they coded a word in a particular fashion and then a consensus was made regarding the code that should be given for an individual word.

The entire text was read through a second time with the goal of identifying words that LIWC did not identify as emotion. The two trained coders independently read through the entire text and an attempt was made to code words within the context of the larger text for emotional expression. The trained coders then reviewed the words they independently coded as being indicative of emotional expression and a consensus was reached as to whether these words would be coded as emotion expression.

One third of the text was coded a third time to assess the valence of the words that were coded by LIWC as being indicative of emotion. A general set of guidelines for assigning valence to these words was created (see Appendix B). Trained coders were asked to give a code within a range of no emotional expression to "expression that would be expected during a job interview." On the other end of the continuum words that would be expected to be "expressed between close friends" would be given the highest
possible valence codes. The reliability between the two coders for the valence codes was very low, so was decided that this process would be discontinued until more accurate and sophisticated coding methods could be created.

Two blinded coders were also trained to each code one third of the sample. Both of the trained coders were first year clinical psychology doctoral students at Loma Linda University. Coders were blind to hypotheses of study. Training took place on three occasions. The first session was a three hour session and the following sessions were each approximately two hours. They were each paid $250 for the time that they spent coding. See Appendix C for the three power point slide shows that were used during training sessions. Blinded coders completed practice codes during each session and after the first ten pages of coding reliabilities were assessed. This was used to gauge effectiveness of training based off of ability of coders to accurately follow coding rules. Feedback regarding expectations for kappa scores as well as continued teaching based off of areas coders felt were unclear was given. Each blinded coder’s responses were compared with the consensus codes made from the two trained coders. After they had completed their respective pieces of the coding blinded coders met with one of the trained coders to provide feedback regarding aspects of the process that were both helpful and unhelpful.
Results

*Characteristics of the Coding System*

The sample consisted of transcripts from 63 participants equaling 278 pages of text (12 point font). There were a total of 165,754 words in the sample with a mean of 2,631 words per subject ($SD = 2,868$). It was hypothesized that high inter-rater reliability would be demonstrated between both trained and blinded coders. This hypothesis was confirmed. Of the 165,754 words in the sample LIWC identified in the above section, inter-rater reliability between the two trained coders was very good (kappa = .80). This kappa score represents the inter-rater reliability for the entire sample. The highest level of agreement between the two trained raters was found when coding anxiety. Reliability for blinded coders was also good (kappa = .69). Inter-rater reliability for each of the emotion dimensions separately can be found in the table below.
Table 2. Inter-rater Reliability for Emotion Categories

<table>
<thead>
<tr>
<th>Emotion Category</th>
<th>Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>.80</td>
</tr>
<tr>
<td>Positive Feelings</td>
<td>.81</td>
</tr>
<tr>
<td>Optimism</td>
<td>.56</td>
</tr>
<tr>
<td>Other Positive Emotion</td>
<td>.28</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.90</td>
</tr>
<tr>
<td>Anger</td>
<td>.84</td>
</tr>
<tr>
<td>Sadness</td>
<td>.83</td>
</tr>
<tr>
<td>Other Negative Emotion</td>
<td>.55</td>
</tr>
</tbody>
</table>

Trained raters agreed the least when coding positive emotion other than positive feelings and optimism. The highest level of agreement between the two trained raters was found when coding anxiety.

In the first aim and second hypothesis it was stated that construct validity would be demonstrated through high correlations with coder impression ratings. This hypothesis was not established. It was found that inter-rater reliability between trained coders when assessing valence was very low after analyzing the first third of the text (kappa = .22). Demonstrating construct validity through high correlations with coder impression ratings did not occur. Deciding not to fully analyze the text with the current valence coding system resulted in the inability to analyze the first hypothesis of the second aim: manual codes of emotional expression will be more highly correlated with
coders’ overall impression ratings than with LIWC impression ratings. A more sophisticated and reliable coding system needs to be developed before this task can be completed.

*Test Characteristics of Linguistic Inquiry and Word Count*

Statistics measuring sensitivity and specificity were used to assess the second hypothesis of the second aim. It was hypothesized that LIWC would be sensitive in terms of identifying emotional expression, but would not be specific in terms of identify the lack of emotional expression. Here sensitivity is the probability a word that is actually representative of emotional expression will be characterized by LIWC as an emotion word (Portney & Watkins, 2000). Specificity is the probability a word that is not indicative of emotional expression will be characterized by LIWC as a non emotion word (Portney & Watkins, 2000). Positive and negative predictive values were also analyzed to assess the validity of LIWC, although it is important to note that predictive power can be heavily influenced by base rates. Here positive predictive value is the probability that a word characterized by LIWC as an emotion word is truly representative of an emotion word, and negative predictive value is the probability that a word characterized as not being indicative of emotional expression by LIWC in fact is absent of emotional expression (Portney & Watkins, 2000). While automated coding is an attractive option due to the time it saves, coding by a human rater is generally accepted as being more accurate than automated coding systems. A human rater has the advantage of considering words in context. Table 3 displays the sensitivity, specificity, positive, and negative predictive value of LIWC for correctly identifying emotional expression in text.
Table 3. LIWC sensitivity, specificity, positive, and negative predictive value for identifying emotional expression in text

<table>
<thead>
<tr>
<th>Emotional Expression</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive Predictive Power</th>
<th>Negative Predictive Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Positive Emotion</td>
<td>.46</td>
<td>.98</td>
<td>.25</td>
<td>.995</td>
</tr>
<tr>
<td>Positive Feelings</td>
<td>.43</td>
<td>.993</td>
<td>.81</td>
<td>.995</td>
</tr>
<tr>
<td>Optimism</td>
<td>.64</td>
<td>.993</td>
<td>.03</td>
<td>.999</td>
</tr>
<tr>
<td>Other Positive Emotion</td>
<td>.45</td>
<td>.991</td>
<td>.02</td>
<td>.999</td>
</tr>
<tr>
<td>Total Negative Emotion</td>
<td>.70</td>
<td>.990</td>
<td>.41</td>
<td>.997</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.79</td>
<td>.998</td>
<td>.59</td>
<td>.999</td>
</tr>
<tr>
<td>Anger</td>
<td>.60</td>
<td>.998</td>
<td>.32</td>
<td>.999</td>
</tr>
<tr>
<td>Sadness</td>
<td>.64</td>
<td>.998</td>
<td>.37</td>
<td>.999</td>
</tr>
<tr>
<td>Other Negative Emotion</td>
<td>.23</td>
<td>.995</td>
<td>.10</td>
<td>.998</td>
</tr>
</tbody>
</table>

Sensitivity (the correct classification of emotional expression on the part of LIWC) was 83% and specificity (the correct classification of the absence of emotional expression) was 96%. There was a 32% chance that words classified as being indicative of emotion by LIWC were later found to be indicative of emotional expression when using the created manual coding system. There was a 99.6% chance that words classified as not being emotion words by LIWC were actually not indicative of emotional expression as classified by the created manual coding system.

In looking at the more specific categories of emotional expression coded here, LIWC was most sensitive when identifying anxiety. LIWC demonstrated sensitivity of
79% and specificity of 99.8% when classifying for positive emotion. There was an 81% chance that words indicative of positive emotion by LIWC actually were indicative of emotional expression and a 99.3% chance that words classified as not being indicative of positive emotion were not.

LIWC did the poorest job when identifying other positive emotion (emotion that did not qualify as positive feelings or optimism) and other negative emotion (emotion that did not qualify as anxiety, anger, or sadness). When identifying other positive emotion LIWC was found to have sensitivity of 45% and specificity of 99.1%. In this category there was a 2% chance that words LIWC classified as positive emotion other than positive feelings and optimism were in fact indicative of other positive emotion. There was a 99.6% chance that words classified as not being indicative of positive emotion other than positive feelings and optimism were in fact words that were not representative of this type of emotion.

When looking at other negative emotion LIWC was found to have a sensitivity of 23% and specificity of 99.9%. There was a 10% chance that words LIWC classified as negative emotion other than anxiety, anger, and sadness were in fact indicative of other negative emotion. There was a 99.8% chance that the words classified as not being indicative of other types of negative emotion were in words that appropriately fit into that category. The details of how well LIWC performed in terms of sensitivity, specificity, positive and negative predictive value in the other emotion categories that were measured can be gleaned from Table 3.
Characteristics Between Observed and Self-Reported Emotion

It was proposed that manual coding would be more highly correlated with self-reported outcome measures of quality of life, health status, and cancer related trauma than two different programs that have been used to code emotional expression. The two other measures used in this comparison were LIWC and PCAD. In this analysis three coding systems (manual coding, LIWC, and PCAD) were correlated with each other and with Time 1 outcome measures. Here two scales were created: one to represent self-reported positive emotion and one to represent self-reported negative emotion. Individual items were taken from measures used in the initial study (Owen et al., 2005). The items were standardized and Cronbach’s alphas were assessed and found to be pretty good for both self-reported positive emotion (Cronbach’s alpha = .75) and negative emotion (Cronbach’s alpha = .88). Coding systems were compared with self-report negative and positive emotion. Coding systems were broken down into positive and negative emotional expression and then used separately for the Pearson product-moment correlations. As a way of examining intercorrelations between coding systems types of emotional expression (positive and negative) and self-report outcome measures a multi-trait multi-method matrix was used to display these correlations. Results of this analysis are displayed in Table 4.
Table 4. Multi-trait Multi-Method Matrix Correlating Coding Systems and Emotion Categories (n = 56).

<table>
<thead>
<tr>
<th>Coding Systems, Emotion Categories</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rater Positive Emotion</td>
<td>---</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2. Rater Negative Emotion</td>
<td>.91**</td>
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<tr>
<td>3. LIWC Positive Emotion</td>
<td>-.08</td>
<td>-.39**</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. LIWC Negative Emotion</td>
<td>-.31**</td>
<td>-.19</td>
<td>.09</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PCAD Positive Emotion</td>
<td>-.92**</td>
<td>-.98**</td>
<td>.39**</td>
<td>.32*</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. PCAD Negative Emotion</td>
<td>-.29*</td>
<td>-.38**</td>
<td>.34**</td>
<td>.05</td>
<td>.42**</td>
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<tr>
<td>7. Self-Report Positive Emotion</td>
<td>-.04</td>
<td>-.04</td>
<td>.24</td>
<td>-.17</td>
<td>-.11</td>
<td>.16</td>
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<tr>
<td>8. Self-Report Negative Emotion</td>
<td>.05</td>
<td>-.11</td>
<td>-.06</td>
<td>-.28*</td>
<td>-.07</td>
<td>.03</td>
<td>-.84**</td>
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</tr>
</tbody>
</table>

Note. * p < .05. ** p < .01

While rater coded positive emotion was highly correlated with rater coded negative emotion (r = .90; p < .01), rater coding was not much more correlated with the self-report outcome measures than the other coding systems. PCAD positive and negative emotion was highly negatively correlated with both rater positive and negative emotion (r = -.92; p < .01 and r = -.98; p < .01), whereas PCAD positive and negative emotion were somewhat correlated with LIWC positive and negative emotion coding (r = .39; p < .01 and r = .32; p < .05). Self-reported negative and positive emotion were highly negatively correlated (r = -.84; p < .01). It was hypothesized that manually coded emotional expression would be more highly correlated with self-reported measures than the computer analysis systems. Self-reported emotion and the other coding systems were not significantly correlated.

In order to assess the relationship between different types of emotion coded by raters and self-report measures, Pearson product-moment correlations were run. Details of the findings are listed in the below table (Table 5).
Table 5. Correlations Between Manually Coded Expression and Self-Report Measures (n = 56)

<table>
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<th></th>
<th>1</th>
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<td>3</td>
<td>-.31*</td>
<td>-.56**</td>
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<td>.76**</td>
<td>.56**</td>
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<td>.51**</td>
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<td>10</td>
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<td>.91**</td>
<td>.14</td>
<td>.99**</td>
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<td>.31*</td>
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<td>13</td>
<td>.26*</td>
<td>.10</td>
<td>-.20</td>
<td>.31*</td>
<td>-.15</td>
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<td>-.03</td>
<td>.28*</td>
<td>-.06</td>
<td>.33*</td>
<td>.22</td>
<td>.34*</td>
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<tr>
<td>14</td>
<td>-.17</td>
<td>-.26</td>
<td>-.03</td>
<td>-.03</td>
<td>.08</td>
<td>-.19</td>
<td>-.14</td>
<td>-.08</td>
<td>.07</td>
<td>-.08</td>
<td>.06</td>
<td>.03</td>
<td>-.03</td>
<td>...</td>
</tr>
</tbody>
</table>

Note. 1 = Hospital Anxiety and Depression Scale - Anxiety; 2 = Hospital Anxiety and Depression Scale - Depression; 3 = EuroQol-5D (health status); 4 = Impact of Events Scale; 5 = Functional Assessment of Cancer Therapy-Breast Cancer Form; 6 = Rater Overall Positive Emotion; 7 = Rater Positive Feelings; 8 = Rater Optimism; 9 = Rater Other Positive Emotion; 10 = Rater Overall Negative Emotion; 11 = Rater Anxiety; 12 = Rater Anger; 13 = Rater Sadness; 14 = Rater Other Negative Emotion

While some of the rater emotion categories were highly correlated with other rater coded emotion categories, there were only moderate correlations observed between rater emotion codes and self-reported outcome measures. Self-reported anxiety was moderately correlated with rater coded anxiety (r = .38; p < .01). Self-reported depression was also moderately correlated with rater coded anxiety (r = .31; p < .05). Rater coded anxiety was moderately negatively correlated with cancer related quality of life (r = -.40; p < .01). Rater coded sadness was moderately correlated with both self-
reported anxiety \((r = .26; \ p < .05)\) and increase in and avoidance of cancer related thoughts \((r = .31; \ p < .01)\).

In looking at specific emotion categories optimism was highly correlated with overall positive emotion \((r = .92; \ p < .01)\). Overall negative emotion was also highly correlated with overall positive emotion \((r = .91; \ p < .01)\) and optimism \((r = .99; \ p < .01)\). This suggests that participants who expressed more negative emotion also expressed more positive emotion in their online submissions.

*Ability of Coding Systems to Predict Change over Time*

In order to assess the ability of the various coding systems to predict change over time, hierarchical multiple regressions were run, such that time two outcome measures were used as the dependant measure. Time 1 outcomes on each corresponding measure were entered in the first block and different types of coding systems were entered on the second block. Three regressions were run on each dependant variable. The results are detailed below.
Table 6. Results for the Hierarchical Regression of Time 2 Depression scores on Time 1 (N = 39)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>β</th>
<th>95% Confidence Interval for b</th>
<th>F (For Full Model)</th>
<th>p-value</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Depression</td>
<td>.78</td>
<td>(.58, 1.02)</td>
<td>55.84</td>
<td>.000</td>
<td>.59</td>
</tr>
<tr>
<td>Step 2, Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIWC Neg Emo</td>
<td>.01</td>
<td>(-1.68, 1.81)</td>
<td>18.75</td>
<td>.94</td>
<td>.58</td>
</tr>
<tr>
<td>LIWC Pos Emo</td>
<td>.12</td>
<td>(-.51, 1.65)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCAD Neg Emo</td>
<td>-.11</td>
<td>(-.43, .17)</td>
<td>19.70</td>
<td>.39</td>
<td>.60</td>
</tr>
<tr>
<td>PCAD Pos Emo</td>
<td>.20</td>
<td>(-.06, .45)</td>
<td></td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Neg Emo</td>
<td>-.47</td>
<td>(-2.05, .48)</td>
<td>19.73</td>
<td>.36</td>
<td>.60</td>
</tr>
<tr>
<td>Manual Pos Emo</td>
<td>.35</td>
<td>(-1.21, 3.28)</td>
<td></td>
<td>.22</td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Results for the Hierarchical Regression of Time 2 Anxiety scores on Time 1 (N = 39)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>β</th>
<th>95% Confidence Interval for b</th>
<th>F (For Full Model)</th>
<th>p-value</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Anxiety</td>
<td>.62</td>
<td>(35, .85)</td>
<td>23.12</td>
<td>.000</td>
<td>.37</td>
</tr>
<tr>
<td>Step 2, Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIWC Neg Emo</td>
<td>-.05</td>
<td>(-1.44, 1.06)</td>
<td>7.50</td>
<td>.76</td>
<td>.34</td>
</tr>
<tr>
<td>LIWC Pos Emo</td>
<td>.09</td>
<td>(-.55, 1.08)</td>
<td></td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCAD Neg Emo</td>
<td>-.08</td>
<td>(-.29, .18)</td>
<td>7.74</td>
<td>.62</td>
<td>.35</td>
</tr>
<tr>
<td>PCAD Pos Emo</td>
<td>-.06</td>
<td>(-.23, .16)</td>
<td></td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Neg Emo</td>
<td>-.74</td>
<td>(1.76, .24)</td>
<td>9.46</td>
<td>.13</td>
<td>.40</td>
</tr>
<tr>
<td>Manual Pos Emo</td>
<td>.90</td>
<td>(-.18, 3.45)</td>
<td></td>
<td>.08</td>
<td></td>
</tr>
</tbody>
</table>
Table 8. Results for the Hierarchical Regression of Time 2 Cancer Related Trauma scores on Time 1 ($N = 39$)

<table>
<thead>
<tr>
<th>Step</th>
<th>β</th>
<th>95% Confidence Interval for b</th>
<th>F (For Full Model)</th>
<th>p-value</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 Cancer</td>
<td>.77</td>
<td>(.32, .71)</td>
<td>52.14</td>
<td>.000</td>
<td>.57</td>
</tr>
<tr>
<td>Step 2, Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIWC Neg Emo</td>
<td>-.02</td>
<td>(-4.60, 4.93)</td>
<td>20.71</td>
<td>.88</td>
<td>.61</td>
</tr>
<tr>
<td>LIWC Pos Emo</td>
<td>.23</td>
<td>(-5.62, .50)</td>
<td></td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCAD Neg Emo</td>
<td>.32</td>
<td>(-.17, 1.53)</td>
<td>22.19</td>
<td>.51</td>
<td>.63</td>
</tr>
<tr>
<td>PCAD Pos Emo</td>
<td>-.12</td>
<td>(-1.45, -.01)</td>
<td></td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Neg Emo</td>
<td>-.82</td>
<td>(-.46, 7.27)</td>
<td>24.00</td>
<td>.03</td>
<td>.65</td>
</tr>
<tr>
<td>Manual Pos Emo</td>
<td>.57</td>
<td>(-11.95, 1.92)</td>
<td></td>
<td>.11</td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Results for the Hierarchical Regression of Time 2 Quality of Life scores on Time 1 ($N = 39$)

<table>
<thead>
<tr>
<th>Step</th>
<th>β</th>
<th>95% Confidence Interval for b</th>
<th>F (For Full Model)</th>
<th>p-value</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 Quality Of Life</td>
<td>.66</td>
<td>(.54, .96)</td>
<td>28.40</td>
<td>.000</td>
<td>.42</td>
</tr>
<tr>
<td>Step 2, Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIWC Neg Emo</td>
<td>.01</td>
<td>(-.25, .21)</td>
<td>10.80</td>
<td>.94</td>
<td>.46</td>
</tr>
<tr>
<td>LIWC Pos Emo</td>
<td>-.22</td>
<td>(.01, .32)</td>
<td></td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCAD Neg Emo</td>
<td>.24</td>
<td>(-.06, .02)</td>
<td>11.64</td>
<td>.11</td>
<td>.45</td>
</tr>
<tr>
<td>PCAD Pos Emo</td>
<td>-.30</td>
<td>(.01, .08)</td>
<td></td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Neg Emo</td>
<td>.82</td>
<td>(-.37, -.03)</td>
<td>11.41</td>
<td>.08</td>
<td>.45</td>
</tr>
<tr>
<td>Manual Pos Emo</td>
<td>-.69</td>
<td>(-.05, .54)</td>
<td></td>
<td>.15</td>
<td></td>
</tr>
</tbody>
</table>
Table 10. Results for the Hierarchical Regression of Time 2 Health Status scores on Time 1 (N = 39)

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>95% Confidence Interval for b</th>
<th>F (For Full Model)</th>
<th>p-value</th>
<th>Adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 Health</td>
<td>.29</td>
<td>(-.02, .43)</td>
<td>3.42</td>
<td>.07</td>
<td>.06</td>
</tr>
<tr>
<td>Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIWC Neg Emo</td>
<td>.09</td>
<td>(-5.16, 8.74)</td>
<td>1.37</td>
<td>.60</td>
<td>.03</td>
</tr>
<tr>
<td>LIWC Pos Emo</td>
<td>-.14</td>
<td>(-6.64, 2.78)</td>
<td></td>
<td>.41</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCAD Neg Emo</td>
<td>.13</td>
<td>(-.91, 1.78)</td>
<td>1.32</td>
<td>.51</td>
<td>.02</td>
</tr>
<tr>
<td>PCAD Pos Emo</td>
<td>-.14</td>
<td>(-1.57, .72)</td>
<td></td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Step 2, Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Neg Emo</td>
<td>.60</td>
<td>(-2.88, 8.82)</td>
<td>1.50</td>
<td>.31</td>
<td>.04</td>
</tr>
<tr>
<td>Manual Pos Emo</td>
<td>-.55</td>
<td>(15.27, 5.72)</td>
<td></td>
<td>.36</td>
<td></td>
</tr>
</tbody>
</table>

In Table 6 it can be seen that time 1 depression scores on the HADS-Depression inventory were highly predictive of time 2 depression scores on the HADS-Depression inventory (β = .78, F = 55.84, p < .001, Adjusted R² = .59). When looking at the predictive ability of the other coding systems none have a statistically significant impact on time 2 depression scores. Results were similar for the ability of manual coding systems to predict time 2 anxiety scores on the HADS-Anxiety inventory. While time 1 anxiety scores were statistically significant in terms of predicting time 2 anxiety scores (β = .62, F = 23.12, p < .001, Adjusted R² = .37), the addition of the coding systems did not equate to much additional predictive power.

In looking at the ability of manual coding to predict time 2 cancer related trauma (as measured by the IES), manually coded negative emotion was statistically significant of with lower time 2 cancer related trauma (β = -.82, F = 24.00, p < .05, Adjusted R² = .65), such that more negative emotion as scored by raters was associated with lower time...
cancer related trauma. LIWC positive emotion was statistically significant of time 2 cancer related trauma ($\beta = .23$, $F = 20.71$, $p < .05$, Adjusted $R^2 = .61$). Here, the greater the positive emotion as coded by LIWC the higher the time 2 cancer related trauma score. When looking at Table 10 it can be seen that neither time 1 health status nor any of the coding methods were predictive of time 2 health status scores. This was unique in comparison to all of the other dependant variables used in the regression analyses.
Discussion

In the last ten years there has been a reasonable amount of published research demonstrating that expressing emotions can be beneficial for people who are diagnosed with cancer. While there are numerous ways in which people express their emotions, an online support group is one potential avenue for emotional expression. As a way of better understanding emotional expression in text a manual coding system for evaluating emotional expression was created. In order to create this manual coding system it was decided that emotion categories similar to LIWC emotion categories would be created. The emotion categories included positive feelings, optimism, anxiety, anger, sadness, a category for positive emotion words that did not fall under positive feelings and optimism, and a category for negative emotion words that did not fall under anxiety, anger, or sadness.

The entire text was coded twice by two trained raters. On both occasions trained coders individually coded for emotional expression and then met to go over their codes. Words that were coded with different codes by the two trained raters were debated and then a consensus was made regarding the way in which codes would be handled. The text was initially assessed by coding words that LIWC found to be emotion words. Coders were blind to the codes LIWC gave the words when coding. The text was then analyzed for emotional expression that LIWC missed. Here, trained coders read through the text again in its entirety and underlined words they felt demonstrated emotional expression. Trained coders were found to demonstrate good inter-rater reliability when coding for emotional expression. When looking at the reliability of coding for specific emotion categories, trained coders were most consistent when coding anxiety. Trained
coders had a difficult time coding emotion that fit into the category of other positive emotion. This means that trained coders had the most difficult time coding emotion other than positive feelings and optimism. It appears that there are certain categories of emotion, such as positive emotion aside from positive feelings and optimism that may be more difficult for trained coders identify.

Trained coders then coded one third of the text for intensity of emotional expression. Reliability for trained coders on this venture was very low, so this process was discontinued. The coding system was then taught to two graduate students who were blind to hypotheses and purposes of the study. Training consisted of three training sessions and a debriefing session. During all three sessions coding mistakes were discussed and efforts were made to ensure that the coders understood the coding rules they were being asked to apply. Reliability between blinded coders and consensus codes of trained coders was also good. This demonstrates that the created training system was reliably taught to blinded coders. It is possible to create rules for coding emotional expression that both trained and blinded coders can consistently follow.

The consensus codes of the trained coders were then compared to a coding system that has been used to assess for emotional expression in text (LIWC). While this computer program has been used to assess for emotion in text it was not designed to identify emotional expression in the context of the words surrounding emotion words. Overall LIWC demonstrated fair sensitivity in the majority of categories. There was a fairly large range in sensitivity when subcategories of emotion are examined, although overall this suggests that LIWC did an adequate job identifying the presence of emotional expression in the text of this online support group in many of the emotion categories.
explored. LIWC did an excellent job determining that words coded as not being representative of emotional expression did in fact not contain emotional expression. LIWC also did an excellent job correctly identifying words that were indicated as not being indicative of emotional expression by the manual coding system. This means LIWC demonstrated excellent negative predictive value. In terms of positive predictive value LIWC fell short by classifying many more words as being indicative of emotional expression than was actually the case.

In exploring explanations for these results, as previously mentioned LIWC identifies emotion words, although it does not apply any sort of rules in regards to looking for emotion in a larger context. While LIWC has been used to assess for emotion in text it was not designed to assess for the larger construct of emotional expression. The following are examples of ways in which LIWC inaccurately captures emotional expression. It is difficult to assess for this inaccuracies unless one is examining the text on a more micro level. These examples were directly taken from the text of participants in the study:

1. We have been accepted as camp counselors at camp smile-a-mile. In this example the word *smile* would be coded by LIWC as being indicative of emotional expression.

2. I have never *liked* to talk about my problems. In this example the word *liked* is coded by LIWC as being indicative of positive feelings.

3. I have no *complaints*. I am a survivor. In this example the word *complaints* would be coded as negative emotion.
4. The technician came in and wanted to take me to a different kind of machine. In this example the word kind would be coded as positive feelings.

LIWC demonstrated the highest sensitivity in the overall emotion category. In order for LIWC to correctly classify an emotion word in this category it does not have to correctly identify the type of emotion. Example 2 depicts how LIWC could be incorrectly classifying something as positive emotion but it would still be captured under the overall emotion category.

When looking at a sample of text there are a very small percentage of words that are emotion words. LIWC did a nice job determining that many of the words in the text were not emotion words. In everyday language people will use a word that can be thought of as a depiction of emotion in a certain context, although used in many other contexts does not in fact represent emotion. Example 4 above depicts this type of error.

When comparing manual codes of emotional expression to LIWC codes one finds that LIWC consistently makes these types of errors because the program does not take context into consideration.

When assessing for the relationships between different types of coding methods used to assess for positive and negative emotion, as well as self-reported positive and negative emotion correlations were lower than initially anticipated. While rater coded positive and negative emotion were highly correlated, rater coded emotion was not highly correlated with self-reported negative and positive emotion. There could be many factors driving these low correlations. Emotional expression identified in text could be a different construct than emotional expression identified by self-report measures. Self-
report measures are assessing for an individual's perception of their own behavior. The self-report measures used in the initial study are assessing for emotion in regards to other larger constructs, such as cancer related trauma and anxiety. The participants in the study may not have been in much distress at the time of the study, while their textual data revealed either past distress related to diagnosis or more subtle emotional expression.

Another interesting finding to explore is the relationship between PCAD codes and manual codes. Surprisingly PCAD positive emotion was highly negatively correlated with both rater positive and negative emotion. PCAD negative emotion was also moderately negatively correlated with rater positive and negative emotion. One would expect that both PCAD positive and negative emotion would be at a minimum moderately correlated with corresponding rater categories. These findings speak to the importance of comparing PCAD to manual codes in a more systematic way, similar to what was done in this study with manual codes and LIWC.

When looking at how specific categories of emotion are correlated both with each other and with self-report measures some notable correlations were demonstrated. Self-reported depression and self-reported anxiety were moderately correlated with manually coded anxiety. Manually coded anxiety was negatively correlated with quality of life scores, and rater coded sadness was moderately correlated with both self-reported anxiety and an increase in and avoidance of cancer-related thoughts. There were not as many correlations between categories of emotion and self-reported measures as originally anticipated, although anxiety appears to the category of emotion that is most correlated with outcome measures. It is interesting to note that reliability between trained coders was highest when coding anxiety. This could suggest that anxiety was more accurately
captured while coding, which might help impact these findings. This also suggests that anxiety is more highly correlated with the outcome measures mentioned than other types of emotion.

When assessing the correlations between specific categories of emotion there were both some anticipated and unanticipated correlations. Optimism was highly correlated with overall positive emotion, which is a correlation that was expected. Negative emotion was also highly correlated with positive emotion and optimism. This is a correlation that would be unexpected, although again demonstrated that individuals who were more likely to display negative emotion in their online text were also more likely to display positive emotion, specifically optimism. This provides some support for the fact that people may be more likely to either be emotionally expressive with a wide range of emotions or not to be emotionally expressive at all.

In looking at the ability of the coding systems to predict change over time, there were only three instances in which coding systems predicted changes in time 2 scores on self-report measures. Manually coded negative emotion was predictive of time 2 measures of cancer related trauma, such that more negative emotion as scored by manual coding was indicative of lower levels of intrusive and avoidant thoughts related to cancer. The greater the positive emotion as assessed by both LIWC and PCAD the higher the time 2 cancer related trauma score. In terms of self-report measures, time 1 health status was the only measure that was not predictive of its corresponding outcome measure. These results are fairly consistent with the results from the correlations analyses suggesting that the correlations initially expected between coding systems and self-report measures were not entirely established.
Clinical Relevance

In an effort to provide the best care to patients, many clinicians incorporate findings from research studies into their practice. While this demonstrates effort on the part of the clinician to provide empirically supported interventions and treatment, it also brings attention to the need for researchers to be certain about the suggestions and power of the suggestions they make in reporting their results. Making sure that constructs initially set out to be measured are in fact measured is not only important to the integrity of scientific endeavor. It is also crucial in the sense that much of this work becomes implemented in clinical practice. When using computer programs to analyze data and then make suggestions in terms of benefits for patients we must look at what we are actually measuring. By using a program such as LIWC to measure emotional expression we must ensure the reader (and clinician) that we are in fact measuring emotional expression. It could be argued that measuring emotion words is a much different process than measuring emotional expression. Looking at the errors LIWC makes speaks to problem of making the logical leap when suggesting that a computer program used to count emotion words is assessing for emotional expression. The construct of emotional expression is more complicated that this and deserves thorough study because of the impact this can have on the clinical community.

Along the same lines further analyzing text to better understand processes that are taking place (e.g., social support and cognitive processes, such as reframing) is important in terms of clinical relevance and another avenue to assess relative to outcome measures. A more detailed study of text should elucidate what not only transpires in the writing but what behaviors are being engaged in by participants. Once it is consistently found that
either certain behaviors or certain processes in writing are linked with outcome measures clinical relevance can be established. By analyzing text in a qualitative fashion clinicians can then put into place some of the suggestion found by researchers as being related to positive outcomes. The continued pursuit of these endeavors should highlight these relationships.

*Recommendations for Future Researchers*

When implementing similar studies it is critical for researchers to explore what specifically they are trying to measure when running these types of studies. LIWC is a program that analyzes text to provide word counts for a number of different categories. It is not going to assess for underlying processes. If a researcher wants to better understand pure frequencies of word usage LIWC may be a program that could be beneficial to use. LIWC will provide a researcher with a cursory view of raw frequencies. If a researcher is attempting to gain a better understanding of processes, such as the emotional experience of a breast cancer diagnosis, LIWC may not be an appropriate fit.

In looking at how well LIWC coded anxiety relative to the manual coding system LIWC did fairly well. Anxiety was also coded most consistently by the trained coders. This would suggest that anxiety is a specific type of emotion that is fairly easy to code. This may also suggest that a researcher could feel somewhat confident using LIWC to assess for anxiety. That being said, caution should still be used when taking the frequencies at face value because LIWC still will not be assessing for negatives (e.g., “I was not worried at all.”).
Limitations

One limitation of the study is the small sample size used in the hierarchical multiple regressions. Time 2 data was not available for the entire sample, which led to a smaller sample size in all of the analyses assessing time 2 outcome measures. Another limitation of the study was the low reliability in assessing valence of emotional expression. Intensity of emotional expression could be an important variable when looking at how emotional expression is related to outcome measures, so being unable to speak to these correlations is a major limitation of the current project.

Future Directions

Developing a more sophisticated coding system for examining the intensity of emotional expression is a goal for future projects. Assessing how sheer emotional expression versus intensity of emotional expression is related to outcome measures is an area for future direction. As previously mentioned, researchers fairly consistently find that when people participate in expressive writing studies beneficial outcomes are correlated with their participation. Gaining insight as to how sheer emotional expression versus intensity is related to outcomes measures should help researchers explore what is driving these results. Dr Owen is currently using another type of method to code intensity or valence of emotional expression and has found higher inter-rater reliability scores. A copy of the instructions used in this analysis to code intensity of emotional expression is attached in Appendix D.

It would also be helpful to replicate these findings, perhaps in a traditional expressive writing study as a way of better understanding how expressive writing and online studies are both similar and unique in terms of their relation to outcome measures.
As previously mentioned, much of the work on emotional expression and the relationships between expression and outcome measures have been completed with the use of the traditional expressive writing paradigm. It is likely that people communicate differently when participating in an expressive writing study than they would in an online support group. Generally, participation in an online support group is longer in duration than one would participate in an expressive writing study. It is likely that these different types of participation could have an impact on outcomes. Continuing to explore how outcomes differ when using online support service delivery methods is important while still gaining insight as to how the created coding system would perform in a traditional expressive writing study.

Creating a system for manually coding emotional expression and then manually coding the data in this sample was a fairly lengthy process. When examining the codes LIWC gave to certain words it is apparent that on many occasions it was over predicting the likelihood of the existence of emotional expression. In terms of how manual codes differ in comparison to LIWC codes when assessing for the correlation between outcome measures and coding systems there were not remarkable differences between the correlations of manually coded emotional expression and LIWC, as well as PCAD coded emotional expression. The same was true when assessing predictive validity. Exploring ways in which additions can be made to current content analysis computer programs, such as LIWC, is a possible way in which the study of emotional expression in text could ensue. Finding a way to include rules that account for context into these time efficient content analysis programs could prove to make the accuracy for identifying emotional expression in text stronger. It could also make the arduous task of manually coding
emotional expression more time efficient, while using a more accurate method of manually coding emotional expression.
References


Appendix A

Directions for Coding Emotional Expression

I. Does this word and/or associated phrase contain emotion?

Emotion is defined as a surge of feeling, which could include a number of different feelings or a single feeling; such as fear, sorrow, joy, or love. A clear behavioral manifestation of an emotional state should also be considered emotion. Code external references (e.g., discussion of others' emotional states) the same as you would a reference to a personal, internal feeling state.

If your answer is YES- apply one of the following codes
If your answer is NO- code “OTHER”
If your answer is MAYBE- rate the word/phrase using the following scale:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VAGUELY EMOTIONALLY EXPRESSIVE</td>
<td>It is nice to be outdoors.</td>
</tr>
<tr>
<td>2</td>
<td>SOMEWHAT EMOTIONALLY EXPRESSIVE</td>
<td>I love being outdoors.</td>
</tr>
<tr>
<td>3</td>
<td>MODERATELY EMOTIONALLY EXPRESSIVE</td>
<td>I feel happy when I'm outdoors</td>
</tr>
<tr>
<td>4</td>
<td>HIGHLY EMOTIONALLY EXPRESSIVE</td>
<td>I feel a great deal of pleasure when I am outdoors</td>
</tr>
<tr>
<td>5</td>
<td>EXTREMELY EMOTIONALLY EXPRESSIVE</td>
<td>I am overwhelmed by feelings of joy when I'm outdoors</td>
</tr>
</tbody>
</table>

If you rated the word/phrase as 1 on this scale, code as OTHER
If you rated the word/phrase as 2-5, assign one of the following codes.

If so, first code as positive or negative emotion. Then, if the word fits into one of the five, more specific categories code positive feelings, optimism and energy, anxiety or fear, anger, and sadness or depression. The five coding options fit into one of two overarching categories (positive and negative emotion). You are asked to first code as positive or negative emotion and then as one of the five more specific categories, if appropriate.

a. Does the word or phrase express positive emotion? Positive emotion words and/or associated phrases contain, express, or are characterized by
b. or displaying certainty, acceptance, or affirmation. If the word and/or associated phrase fits into this category code make the following determination:

- Does the word CLEARLY fit into one of the following categories? If YES, go ahead and code. If NO, code “POSOTHER.” If MAYBE, go ahead and code, using the code that you think best fits the word/phrase.

i. **Posfeel** if the word and/or associated phrase contains, expresses, or is characterized by acceptance, or a state of happiness or well-being; a sense of pride, laughter, or enjoyment; feeling at ease or peaceful; being grateful for one’s condition (but in a thoughtful way, not just saying a colloquial “thanks” or “thank you”); sharing of one’s self with another (including kindness, caring, or giving) or letting another in on your internal personal experience; a feeling of amazement or awe that is not better explained as a cognitive experience; a sense of pride; laughter or enjoyment; being or feeling grateful or fortunate.

ii. **Optim** if the word and/or associated phrase indicates the tendency to expect the best possible outcome or the feeling that something is going to turn out well and/or expresses vigor; power; and the vitality and intensity of expression.

iii. If the word/phrase does not fit one of the above categories, code as **Posother**.

c. Does the word or phrase express negative emotion? **Negative emotion** words and/or phrases contain, express, or consist of negation, denial or opposition. If the word and/or associated phrase fits into this category code make the following determination:

- Does the word CLEARLY fit into one of the following categories? If YES, go ahead and code. If NO, code “NEGOTHER.” If MAYBE, go ahead and code, using the code that you think best fits the word/phrase.
i. **Anx** if the word or phrase suggests a state of uneasiness and apprehension, which could be about future uncertainties, stress or tension, a relatively permanent state of anxiety occurring in a variety of mental disorders and/or suggests a feeling of hyper arousal and anxiety caused by the presence or imminence of danger; feeling out of control or vulnerable.

ii. **Anger** if word and/or associated phrase indicates a feeling of displeasure or hostility, or frustration - an expression of dissatisfaction/discrepancy between ideal and actual outcome; to offend or be offended.

iii. **Sad** if the word and/or associated phrase is either characterized by or causes sorrow or unhappiness and/or indicates the mental state characterized by a pessimistic sense of inadequacy and despondent lack of activity; disappointment; tears or crying, unless the tears are clearly tears of joy; grieving a loss; feeling of being regretful; being sorry or having sorrow (except when used only colloquially).

iv. If the word/phrase does not fit one of the above categories, code as **Negother**.

**Problem Words**

- **GOOD** or **NICE** or **WONDERFUL**. Code as “OTHER” unless used in a phrase that is clearly emotionally expressive. This is generally true of general adjectives or descriptors that have only vague emotional tone.

- **THANK YOU**. Code as “OTHER” unless used in a phrase that is clearly emotionally expressive.

- **SORRY**. Code as “OTHER” unless used in a phrase that is clearly emotionally expressive.

- **SYMPTOMS**. Words that indicate an experience of symptoms that may or may not have an emotional component should be coded as
“OTHER”. Examples include: pain, hurt, fatigue, nauseous, exhausted, sick, uncomfortable/comfortable, sluggish, ill. Use of symptom-related word in a clear psychological or emotional context should be coded as emotion. For example, “it’s painful to see my daughter” should be coded as “SAD” or another negative emotion, depending on the context.

- HOPE. Generally code as “OTHER” unless used to express the feeling of hopefulness (code as “OPTIM”). Usually when hope is used as a verb/adverb it should not be coded as emotion.

- Sign off or goodbye. Ex). Love and Hope, Judy-Code as “OTHER”.

- FAITH, TRUST. These words are generally more cognitive than emotional (code as “OTHER”).

**Problem Phrase**

- Negatives or opposites. If the word being used is indicative of positive emotion but the phrase is actually conveying negative emotion, code the word in one of the negative emotion categories and vice versa. For example, “I don’t enjoy talking about my problems” should be coded as “NEGOTHER.” If the emotional intent of the phrase somewhat negates the general intent of the word but is still ambiguous still code the opposite valence of the emotion word. For example, “I’m not worried at all” should be coded as “POSFEEL.” If the phrase is oppositely or negatively worded but seems to display a clear lack of emotional expression code as other.

- Discussing a possibility or potential that did not happen, e.g., “it would have been a relief if my husband had been more accepting than he was”- should be coded as negative emotion

- The identified word is NOT indicative of emotional expression, but an adjoining word IS indicative of emotional expression. Code as “OTHER” but code the missed phrase for emotional content.

- The identified word seems to be indicative of emotional expression, but the adjoining phrase IS NOT or is only VAGUELY indicative of
emotional expression. Code as “OTHER.” Example: “I **hope** we get home early from our vacation.”

- If the emotional intent of the phrase is ambiguous (i.e., not clear if the context is positive or negative) but the identified words almost certainly represent emotional expression, then code the valence of the words and not the phrase.

- Sentences that contain more than one phrase, each of which expresses different emotions. For example, “I am **thankful** (POSFEEL) for my husband, when I feel **depressed** (SAD).” Be certain to code each phrase separately.
Appendix B

Valence Coding

For each subject, please indicate the intensity of emotional expression exhibited for the below listed dimensions. A score of 0 (no emotional expression) should be given when the intensity of emotional expression is equivalent to what would be expected to occur during a job interview. A score of 10 (intense emotional expression) would be indicated for an intensity of emotional expression that we might expect to occur between very close friends.

<table>
<thead>
<tr>
<th>Overall Emotional Expression</th>
<th>0 No emotional expression</th>
<th>2 Mild emotional expression</th>
<th>4 Moderate Emotional Expression</th>
<th>6 Strong Emotional Expression</th>
<th>8 Very Strong Emotional Expression</th>
<th>10 Intense Emotional Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expression of Positive Emotions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Positive feelings</td>
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<tr>
<td>• Optimism</td>
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<td>Expression of Negative Emotions</td>
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<tr>
<td>• Anxiety</td>
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<tr>
<td>• Anger</td>
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<tr>
<td>• Sadness</td>
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</tbody>
</table>
Appendix C

Select Training Session Slides

Powerpoint slides for all three training sessions follow
Plan
What is emotion
What isn't emotion
Coding emotion
Plenty of examples
Trial Run
Next Steps

Emotion
Difficult to define
A response by a whole organism, involving 1) physical arousal, 2) expressive behaviors, and 3) conscious experience
( )
Allowing us in to their internal feeling states

Emotion cont.
Both internal and external conditions
Ex. He was really angry
Behavioral manifestations
Ex. Crying, laughing

What isn't emotion?
Words representing physical or symptom states
Examples: Painful, tired, dizzy, hurt, fatigue, nauseous, exhausted, sick, uncomfortable/comfortable, sluggish, ill
Now it's your turn
How about the word relaxation?

How is Emotion Different from Cognition?
Cognition vs. Emotion
Projection-Look for primary connotation
Ex. Confident, certain, trust, interest—would imply emotion, but we would be making too much of a projection
Now it's your turn
How about the word courage?
Coding-3 pieces
You will be coding the words that are highlighted by a *** on either side of the word.
You are asked to code the word in the context of the surrounding phrases.
You will code other words or phrases that are not highlighted but represent emotional expression.
You will be asked to underline these words or phrases.
You will also be asked to rate the valence of different emotion categories after you have completed reading the text for each subject.

Coding Rules
- Does the word and/or associated phrase contain emotion?
  Definition of emotion
  If the word, in context, is not indicative of emotional expression code as OTH, for other

If you’re not sure, go through the following mental exercise
1. Vaguely emotionally expressive
   Ex. It is nice to be outdoors
2. Somewhat emotionally expressive
   I love being outdoors
3. Moderately expressive
   I feel happy when I’m outdoors
4. Highly expressive
   I feel a great deal of pleasure when I’m outdoors
5. Extremely expressive
   I am overwhelmed by feelings of joy when I’m outdoors
   If you rated the word as 1- do not code as other.
   2-5, assign an emotion code

Coding Emotion
If the word, in context, is indicative of emotional expression apply one of the following codes:
- POSFRIJ—For positive emotion
- OTHM—For optimism
- POSOTHER—For positive emotion that does not fit in one of the above categories
- ANX—For anxiety
- ANG—For anger
- SAD—For sadness
- NEGOTHER—For negative emotion that does not fit in one of the above categories

Coding Positive Emotion—Examples
- Vaguely: It’s good to be on vacation
- Somewhat: I enjoy being on vacation
- Moderately: I feel happy when I’m on vacation
- Highly: Being on vacation makes me feel terrific
- Extremely: I’m overcome with happiness when I’m on vacation
Example 1

I am ***happy*** POSFEEL that things went well for you.
I am ***happy*** POSFEEL that things went well for you.

Example 2

I'm just ***glad*** POSFEEL that the chemo is over with. ***Thanks*** POSFEEL Angela, for asking.
I'm just ***glad*** POSFEEL that the chemo is over with. ***Thanks*** POSFEEL Angela, for asking.

Example 3

I ***care*** POSFEEL and want to ***share*** POSFEEL with you in any way I can.
I ***care*** POSFEEL and want to ***share*** POSFEEL with you in any way I can.

Example 4

Dr. Sawyer said everything looks ***good*** POSFEEL. ***Thanks*** POSFEEL for the information.
Dr. Sawyer said everything looks ***good*** POSFEEL. ***Thanks*** POSFEEL for the information.

Example 5

That's interesting information. I'll write more when I can. ***Love*** POSFEEL and ***peace*** POSFEEL, Judy.
That's interesting information. I'll write more when I can. ***Love*** POSFEEL and ***peace*** POSFEEL, Judy.

Example 6

I get ***upset*** NEGOTH thinking, "What if I am not around to ***enjoy*** POSFEEL him?
I get ***upset*** NEGOTH thinking. "What if I am not around to ***enjoy*** POSFEEL him?"
Coding Optimism

OPTIM-word and/or associated phrase indicates the tendency to expect the best possible outcome or the feeling that something is going to turn out well and/or expresses vigor, power, and the vitality and intensity of expression.

Coding Optimism-Examples

Vaguely-He feels like things might turn out good.
Somewhat-I’m hopeful that things will turn out well.
Moderately-I feel a renewed sense of hope that I will beat this.
Highly-After meeting with my doctor, I have a tremendous feeling of encouragement.
Extremely-I feel extremely optimistic that I will never experience cancer again.

Example 1

I was still ***optimistic*** or ***hopeful*** that the mass was ***benign***.
I was still ***optimistic*** OPTIM or ***hopeful*** OPTIM that the mass was ***benign*** OTHER.

Example 2

I ***hope*** to be able to get into the swing of things.
I ***hope*** OTHER to be able to get into the swing of things.

Example 3

After ***encouragement*** from my Dr. to get the mammogram, I went in to have it done.
After ***encouragement*** OTHER from my Dr. to get the mammogram, I went in to have it done.

Example 4

After talking with my doctor, I feel ***encouraged*** about my prognosis.
After talking with my doctor, I feel ***encouraged*** OPTIM about my prognosis.
**Coding Other Positive Emotion**

POSOTHER - If the word does not fit into one of the above categories, code as POSOTHER.

Some examples:
- Exciting
- Feel positive
- Overwhelmed - In a positive way

These words and/or phrases let us know that positive emotion exists, but we are not sure the emotion is best represented by POSFEEL or OPTIM.

---

**Example 1**

I am ***excited*** about this group.
I am ***excited*** POSOTH about this group.

---

**Example 2**

Emotionally I already feel ***better***.
Emotionally I already feel ***better*** POSOTH.

---

**Example 3**

The pain has really gone down- I'm feeling much ***better***.
The pain has really gone down - I'm feeling much ***better*** OTHER.

---

**Example 4**

He is absolutely ***wonderful***.
He is absolutely ***wonderful*** OTHER.
**Coding Anxiety**

ANX-word and/or associated phrase suggests a state of uneasiness and apprehension, which could be about future uncertainties, stress or tension; suggests feeling of hyper-arousal and anxiety caused by the presence of imminence of danger; feeling out of control or vulnerable

**Coding Anxiety-Examples**

Vaguely-I’m not sure if he was anxious
Somewhat-She was fairly worried about the future
Moderately-I felt worried about my son
Highly-Fear took over my mind and body
Extremely-I was so worried I paced back and forth all night

**Example 1**

I’m really **worried** for my daughters.
I’m really **worried**ANX for my daughters.

**Example 2**

He has no idea that I am **terrified** about our future.
He has no idea that I am **terrified**ANX about our future.

**Example 3**

These last few days have been very **stressful**, and I haven’t been able to **relax** at all.
These last few days have been very **stressful**ANX and I haven’t been able to **relax**ANX at all.

**Example 4**

My husband and I went to the beach last weekend and just **relaxed**.
My husband and I went to the beach last weekend and just **relaxed**OTHER.
I am ***hoping*** to conquer many of my ***fears***.
I am ***hoping*** OTHER to conquer many of my ***fears*** ANX.

I am not ***scared*** for the here and now but of later.
I am not ***scared*** OTHER for the here and now but of later.

**Coding Anger**

ANG-word and/or associated phrase indicated a feeling of displeasure or hostility; frustration—an expression of dissatisfaction/discrepancy between ideal and actual outcomes; to offend or be offended

**Coding Anger-Examples**

Vaguely-He might have been irritated
Somewhat-I think I felt some anger towards my doctor
Moderately-I was annoyed with her arrogance
Highly-It really frustrated me to have to keep explaining my situation
Extremely-I was so angry I yelled at him for hours

I'm really ***angry*** with my dr. for not telling me about these side-effects.
I'm really ***angry*** ANGER with my dr. for not telling me about these side-effects.

I need help NOW and forget waiting for him to see it in your eyes. It ***sucks***.
I need help NOW and forget waiting for him to see it in your eyes. It ***sucks*** ANGER.
Example 3

I feel a ***resentment*** ANGER that I don't know will ever go away.

Example 4

It's really ***disappointing*** SAD to me that my sister didn't call more often.

Coding Sadness

SAD-word and/or associated phrase is either characterized by or causes sorrow or unhappiness and/or indication the mental state characterized by a pessimistic sense of inadequacy and despondent lack of activity; disappointment; tears or crying, unless the tears are clearly tears of joy; grieving a loss; feeling of being regretful; being sorry or having sorrow (except when used colloquially).

Coding Sadness-Examples

Vaguely-It was hard to tell if she was sad
Somewhat-I don't feel as disappointed as I used to
Moderately-I was sad and didn't know how to deal with it
Highly-I cried for days after my diagnosis
Extremely-My sadness feels as if someone pulled my heart out of my chest

Example 1

I ***miss*** hearing from you.
I ***miss*** SAD hearing from you.

Example 2

He is already ***homesick***
He is already ***homesick*** SAD.
Do any of you get really ***depressed*** and have no ***energy***? Do any of you get really ***depressed*** SAD and have no ***energy*** OTHER?

**Coding Other Negative Emotion**

NEGOTHER-if the word and/or phrase does not fit one of the above negative emotion categories

Examples
- Guilt
- General Distress
- Overwhelmed
- General upset

I am so ***sorry*** to hear about the ***loss*** of your husband. I am so ***sorry*** SAD to hear about the ***loss*** SAD of your husband.

It's ***irritating*** to have to wait for an hour before seeing my dr. It's ***irritating*** ANGER to have to wait for an hour before seeing my dr.

I didn't ***enjoy*** having to rehash the details everyday. I don't ***enjoy*** NEGOTH having to rehash the details everyday.

I had some friends who were ***sorry*** they couldn't be there, but they were ***scared*** for me and just did not or could not watch me go through it all.

I had some friends who were ***sorry*** NEGOTH they couldn't be there, but they were ***scared***ANX for me and just did not or could not watch me go through it all.
Problem Words
GOOD or NICE or WONDERFUL.
Code as OTHER unless used in a phrase that is clearly emotionally expressive. Usually true of general adjectives or descriptors that have only vague emotional tone.

THANK YOU.
Example: “Thank you so much Sally for your love and support.”

SORRY.
Example: “I am so sorry that I hurt you.”

Problem Words cont
THANK YOU. Code as OTHER unless it is used in a phrase that is clearly emotionally expressive.

Example: “Thank you so much Sally for your love and support.”

SORRY. Code as OTHER unless used in a phrase that is emotionally expressive.

Example: “I am so sorry that I hurt you.”

Problem Words cont
SYMPTOMS. If the symptom-related word is used in a clear psychological or emotional context it should be coded as emotion.

Example: “It’s painful to see my daughter upset.” Should be coded as SAD.

HOPE. Generally code as OTHER unless used to express the feeling of hopefulness (code as OPTIM). Usually when hope is used as a verb/adverb it should not be coded as emotion.

Example: “I hope he comes to visit sometime soon.”

Problem Words
FAITH, TRUST. These words are generally more cognitive than emotional (code as OTHER).

Problem Phrases
Negatives or opposites. For example, if the word is indicative of positive emotion but the phrase is conveying negative emotion code the word in one of the negative emotion categories.

Example: “I don’t enjoy talking about my problems” should be coded as NR-GOT-REX.

If the emotional intent of the phrase somewhat negates the general intent of the word but is ambiguous, still code the opposite valence of the emotion word.

Example: “I’m not happy at all” should be coded as NR-GOT-REX.

If this phrase is opposite in emotional content it should be classified as NEG-PART.

Example: “I’m not happy at all” should be coded as NR-GOT-REX.

Problem Phrases cont
Discussing a possibility or potential that did not happen.

Example: “It would have been a relief if my husband had been more accepting than he was” should be coded in one of the negative emotion categories.

The identified word is NOT indicative of emotional expression, but an adjoining word is indicative of emotional expression code as OTHER, but code the missed phrase for emotional content.
Problem Phrases cont

The identified word seems to be indicative of emotional expression, but the adjoining phrase is NOT or is only VAGUELY indicative of emotional expression-code as OTHER.
Example: "I **hope** we get home early from our vacation."

Underlining Emotional Expression

After you have coded the highlighted words, we would like you to also underlie any other words or phrases that are indicative emotional expression.
Example: The death of my mother has left a huge hole in my heart, and I haven't left the house in days.

Problem Phrases cont

Emotional intent of the phrase is ambiguous (i.e., not clear if the context is positive or negative) but the identified words almost certainly represent emotional expression-code valence of the words and not the phrase.
Sentences that contain more than one phrase, each of which expresses different emotions.
Example: "I am **thankful** (POSFEEL) for my husband, when I feel **depressed** (SAD)." Be certain to code each phrase or word separately.

Coding Valence of Emotion

For your final task, you will be asked to code each subject in terms of the overall expressiveness in five categories:
Positive feelings, optimism, anger, sadness, and anxiety
You will be asked to rate each subject on a scale of 0-5, with 0 being not expressive at all and 5 being extremely expressive.

Practice Run

Go over codes for subject
1104

Next Steps

1. Code 10 pages, meet to discuss on Monday, July 11
2. Review codes
3. Code next 30 or so pages, meet to discuss on Friday, July 15
4. Code remaining 30 or so pages, meet for a debriefing, Friday, July 22
Manual Coding of Emotional Expression

Examples of challenging words and phrases

It was a very ***difficult*** time, but my husband was there for me.

It was a very ***difficult*** NETOTHER time, but my husband was there for me.

I am the one who can’t make my family feel better. I feel quite ***useless*** at times.

I am the one who can’t make my family feel better. I feel quite ***useless*** at times.

Plus Mother’s Day is so hard for me as my Mom died 8/13/99 and the entire week is a very ***emotional*** week for me.

I am the one who can’t make my family feel better. I feel quite ***useless*** SAD at times.
Plus Mother's Day is so hard for me as my Mom died 8/13/99 and the entire week is a very ***emotional*** NETOTHER week for me.

Your message on your coping exercise ***kind*** OTHER of made me ***laugh*** the part about "zoning out."

Your message on your coping exercise ***kind*** OTHER of made me ***laugh*** POSFEEL the part about "zoning out."

Mary, so ***glad*** POSFEEL you ***shared*** POSFEEL your ***happiness*** POSFEEL at the charity event.

Mary, so ***glad*** you ***shared*** your ***happiness*** at the charity event.

I feel that we will all be ***stronger*** in several ways because we had an experience with a ***dreadful*** disease and we overcame it.
I feel that we will all be ***stronger*** OTHER in several ways because we had an experience with a ***dreadful*** NEGOTHER disease and we overcame it.

Miracles abound and sometimes we are all ***lucky*** POSFEEL enough to witness them. Being ***thankful*** POSFEEL for EACH day is one of the ***blessings*** POSFEEL of facing cancer.

Miracles abound and sometimes we are all ***lucky*** POSFEEL enough to witness them. Being ***thankful*** POSFEEL for EACH day is one of the ***blessings*** POSFEEL of facing cancer.

How can my brain become lazy with this ***energetic*** POSFEEL Jason behind me? ***Grin*** POSFEEL.

Thanks for all of your help! You’re doing a great job!
***love*** and hugs to all of you, Sara.

***love*** and hugs to all of you, Sara.

The sun is out and it's ***beautiful*** today.
The sun is out and it's ***beautiful*** today.

I ***thank*** God for being able to keep my sense of ***humor***.
I ***thank*** God for being able to keep my sense of ***humor***.

I’m not ***afraid*** of dying.
I’m not ***afraid*** of dying.
I’m ***sorry*** I’ve been ***terrible*** about responding lately. I will ***miss*** this group when the study is over.
I’m ***sorry*** I’ve been ***terrible*** about responding lately. I will ***miss*** this group when the study is over.
I have a best friend who I can share all my feelings with and of course I can share all with my husband too, but sometimes I don’t because it makes him feel bad.
I have a best friend who I can share all my feelings with and of course I can share all with my husband too, but sometimes I don’t because it makes him feel bad.

***Thanks*** for being out there, Sue.

***Thanks*** for being out there, Sue.

I am happy that things went well for you.
I am happy that things went well for you.

I am happy that things went well for you.
I am happy that things went well for you.
Option for Coding Valence

<table>
<thead>
<tr>
<th>Degree of Expression</th>
<th>None</th>
<th>Extremely Low</th>
<th>Very Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very High</th>
<th>Extremely High</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Degree of Expression</td>
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<td>(&lt;5%)</td>
<td>(5-10%)</td>
<td>(10-25%)</td>
<td>(-50%)</td>
<td>(60-75%)</td>
<td>(75-90%)</td>
<td>(&gt;90%)</td>
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Positive Emotion

Negative Emotion

Increase in Health

Concerns for Health

Positive Social Support/Growth of Social Relationships

Negative Social Support/Concerns about Social Relationships

Growth in Religiosity/Spirituality

Challenges to Religiosity/Spirituality

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<th>Overall Depth of Expression</th>
<th>None</th>
<th>Extremely Low</th>
<th>Very Low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very High</th>
<th>Extremely High</th>
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<td>4</td>
<td>5</td>
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<td>7</td>
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</table>

Overall Level of Intensity

Overall Level of Insight