
More Than Just Words: EMOTAIX-Tropes Examines Linguistic Correlates of Mental Health

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Language gives humans the ability to label an otherwise undefined conglomeration of inner thoughts and feelings and then to process and communicate those feelings in an organized way. Because language is at the center of our daily interactions, it is one channel we use to gain insight into how people experience and make sense of the social world. Past research has revealed links between language and mental health (Mehl, 2006; Weintraub, 1981; Rude, Gortner, & Pennebaker, 2004; Wotschack & Klann-Delius, 2013) and this association has been studied with increased attention over the past decade because of its role in understanding how specific forms of psychopathology are experienced and expressed.

Attempts to quantify the association between language and mental health have taken many forms, including tests to reveal mental and emotional states through the words people use to describe Rorschach's ambiguous inkblots and systems of counting words in speeches or written work, and then linking the counts to an individual's thinking and behavior patterns (Weintraub, 1989). In a 2006 study exploring behavioral patterns among those with sub-clinical depression, Mehl found that depressive symptoms were correlated with an individual's use of words referencing positivity, sadness, self-focus, and causation. Pointedly, depressed people

tended to use more words related to sadness and fewer words related to positive emotions (Mehl, 2006). In studies exploring language use in individuals with high anxiety, Weintraub (1981, 1989) found that an anxious temperament correlates with a high rate of explaining words (e.g., because, since, and so that). As with depressed individuals, those with anxiety tend to show an increase in their use of negative words, although those with depressive symptoms showed a higher rate of words related to death and dying than those expressed by anxious individuals (Rude et al., 2004).

The prevalence of death-related words also occurs in the discourse of those who have experienced trauma and suggests a general sense of mental defeat, a term that refers to an individual's feelings of hopelessness, loss of autonomy and of giving up in response to having experienced an uncontrollable traumatic event (Ehlers, Clark, Dunmore, Jaycox, Meadows, & Foa, 1998). Additionally, experiencing a high level of trauma-related symptoms is correlated with difficulty integrating and organizing the traumatic event into one's current mental state. Because of these difficulties, people with histories of trauma are likely to have language features that reflect disorganization, incoherence, doubt, and self-blame when they speak about a traumatic memory (O'Kearney & Perrott, 2006). For example, a person experiencing distress related to trauma may abruptly shift from one topic to another.

Exploring the correlates of emotional language in persons with alexithymia is particularly relevant because individuals with significant levels of alexithymia have difficulty with both emotional expression and emotional processing (Bagby, Luminet, Rime, & Taylor, 2004). Studying the use of emotion language in this population is challenging because of the limited emotional vocabulary exhibited by individuals with alexithymia. Therefore, the rate and variation of emotion words prove difficult to mea-

sure among those with alexithymia. A more recent study by Wotschack and Klann-Delius (2013) used linguistic analysis to examine the differences in emotional expressiveness between participants with high and low alexithymia. Their results indicated that those who scored high on the alexithymic spectrum used significantly fewer different emotion words as well as significantly fewer total emotion words than those with low alexithymia.

Examining the emotional language use of mothers at high-risk for parenting problems is especially pertinent because risk factors such as maternal depression and anxiety, as well as unresolved histories of attachment with their own primary caregivers, are associated with adverse child outcomes including delayed emotional development, behavioral problems and lower IQ (Bergman, Sarkar, O'Connor, Modi, & Glover, 2007). Additionally, as a trait characterized by difficulties with emotion regulation, alexithymia may be linked with insecure attachment (Lenzi, Trentini, Pantano, Macaluso, Lenzi, & Ammaniti, 2013). The mechanisms that underlie this intergenerational transmission of psychopathology have yet to be identified.

Of particular interest is examining the role that emotion language plays in the transmission process. This is important because children learn about emotions through interactions with their primary caregivers. Secure attachment relationships support children's emotional understanding by promoting mother-child discourse about emotion. Studies have not yet looked at the interplay of psychopathology and emotion language expression that parents use when parenting, especially in caregiving contexts when the attachment system has been activated. More specifically, it is unknown whether the emotions expressed by a mother in reference to her own childhood attachment experiences relate to the way emotions are expressed with her child. Examining the emotion language correlates of mental health represents one step toward gaining a fuller understanding of

emotion language expression and its potential to have an intergenerational impact.

Text-Analysis Programs and EMOTAIX-Tropes

Much of the more recent findings on mental health correlates of language have come about with the development of advanced and efficient computerized text analysis programs. The Linguistic Inquiry and Word Count (LIWC) text analysis program, developed in 2001 by Pennebaker, Francis, and Booth, has gained increasing attention for its ability to identify psychological processes by counting and categorizing the words people use in daily communication. With newer technologies, more refined text analysis programs are being developed that will expand the capabilities of the LIWC system. For example, Piolat and Bannour (2009) created EMOTAIX-Tropes to explore French emotional discourse and writings. Now, however, EMOTAIX-Tropes has been translated for use by English speakers. By design, the EMOTAIX-Tropes program systematically analyzes the complete range of terms used to express emotion. The EMOTAIX dictionary component uses 2,014 emotion word references, comprising 4,921 words and both positive and negative affect terms. For example, words referencing sadness or anger fall within the overarching category of negative emotions, while words referencing joy or patience are considered positive emotions.

One benefit of the EMOTAIX-Tropes program is its ability to allow a detailed analysis of emotion words by providing the researcher with information regarding how each term is used. In addition to counting the emotional items within a given text, EMOTAIX-Tropes classifies the word items according to valence (positive or negative), context (literal or figurative) and nature (semantic category). Categories of emotion terms are thematically organized into three hierarchical levels with positive and

negative emotion words making up the highest and broadest level of the structure. The next level of emotion-related themes includes six categories (i.e., malevolence, ill being, anxiety, benevolence, well-being, and composure), each containing a relevant set of subcategories, in order to account for the entire emotional vocabulary.

Figure 1 presents the organization of the EMOTAIX dictionary according to valence and the specified emotion categories. The figure is arranged with negative emotions displayed on the left and positive emotions on the right. Within each of these two sections, there are three hierarchical levels with the broadest level on the outside. Benevolence, for example, falls in the broadest level of positive emotion words and includes the next level of terms which reference affection and kindness. The subcategory of affection is further broken down into more detailed categories and includes terms referencing love, desire, admiration, and attraction. The number accompanying each of the subcategories in the chart indicates the number of word references contained in each category. For example, there are 55 words in the EMOTAIX dictionary that express love. Further, there are 128 words referencing love, desire, and admiration that together make up the broader category of affection.

In addition to the six overarching themes within positive and negative emotions, three emotional categories—surprise, unspecified, and impassiveness—have valences that are ambiguous or must be assigned by the researcher based on the context of the term within the text. The neutral category of *surprise* allows the researcher to decide the positive or negative valence based on the verbal context of each term. The category of unspecified emotions includes terms such as emotion, feeling, and mood that, in themselves, lack a positive or negative charge. In instances where there is no additional contextual information, the term remains in the *unspecified* category. The final category of *impassiveness* includes terms that

Figure 1: EMOTAIX categories organized into three hierarchical levels on either side of a hedonic axis (positive and negative valence) (Piolat & Bannour, 2009).

<u>NEGATIVE EMOTIONS</u>			<u>POSITIVE EMOTIONS</u>		
MALEVOLENCE [365]	HATE [227]	<i>Resentment [50]</i>	<i>Love [55]</i>	AFFECTION [128]	BENEVOLENCE [183]
		<i>Disgust [51]</i>	<i>Desire [24]</i>		
		<i>Disdain [48]</i>	<i>Admiration [18]</i>		
		<i>Irritation [78]</i>	<i>Attraction [31]</i>		
	AGRESSIVENESS [138]	<i>Inhumanity [36]</i>	<i>Goodness [33]</i>	KINDNESS [55]	
		<i>Rage [41]</i>	<i>Gentleness [17]</i>		
<i>Anger [55]</i>		<i>Patience [2]</i>			
ILL-BEING [772]	SUFFERING [131]	<i>Pride [26]</i>	<i>Humility [3]</i>	HAPPINESS [51]	WELL-BEING [279]
		<i>Tragedy [12]</i>	<i>Bliss [7]</i>		
		<i>Pain [112]</i>	<i>Joy [21]</i>		
	MADNESS [76]	<i>Crying [7]</i>	<i>Laughter [23]</i>	LUCIDITY [17]	
		<i>Mental Illness [36]</i>	<i>Mental Health [10]</i>		
	DEPRESSION [295]	<i>Rambling [40]</i>	<i>Common Sense [7]</i>	SPIRIT [91]	
<i>Sadness [63]</i>		<i>Gaiety [20]</i>			
<i>Weariness [174]</i>		<i>Vivacity [62]</i>			
<i>Torpor [56]</i>		<i>Arousal [9]</i>			
DISORDER [142]		<i>Trouble [119]</i>	<i>Appeasement [37]</i>		RELIEF [59]
	<i>Remorse [23]</i>	<i>Release [22]</i>			
ANXIETY [114]	FRUSTRATION [130]	<i>Humiliation [57]</i>	<i>Esteem [10]</i>	SATASFACTION [63]	COMPOSURE [73]
		<i>Dissatisfaction [17]</i>	<i>Fulfillment [13]</i>		
		<i>Displeasure [40]</i>	<i>Pleasure [26]</i>		
	FEAR [61]	<i>Repression [16]</i>	<i>Catharsis [12]</i>	COURAGE [31]	
		<i>Terror [10]</i>	<i>Boldness [16]</i>		
		<i>Apprehension [37]</i>	<i>Self-Confidence [10]</i>		
TENSION [53]	<i>Shyness [14]</i>	<i>Ease [5]</i>	CALM [42]		
	<i>Panic [4]</i>	<i>Serenity [14]</i>			
	<i>Distress [18]</i>	<i>Tranquility [16]</i>			
		<i>Concern [31]</i>	<i>Relaxation [12]</i>		
SURPRISE [55]		UNSPECIFIED EMOTIONS [144]		IMPASSIVENESS [29]	

express an absence of emotion (Piolat & Bannour, 2009), such as fearless, apathetic, and detached. Because these terms refer to states lacking in affect, they remain in a valence-free category.

The EMOTAIX-Tropes program categorizes a person's emotion language according to the hierarchy of emotion themes and subcategories illustrated in the graph. It also provides numerical data such as the number of emotion words in each category that an individual uses. This numerical data gives the user a feel of the specific words the speaker uses most frequently as well as detailed insight into the speaker's emotional experience. The program's output enables the user to view each emotional term it identifies on the screen in its verbal context. This is an important feature, as many words naturally have double meanings. The term "blocked," for example, can be used in the expression, "I was feeling emotionally blocked," or the term can refer to distance as in, "I live just one block away." In the first example, the term is used to express an emotional experience or lack of emotions. The second example does not fit in the context of the emotional repertoire and would, therefore, be rejected by the user from the final emotion word count.

Current Study

Previous studies that focused on emotion words and content-laden words in general have failed to produce consistent results about how well those words reflect actual psychological states. Examining the association between mental health symptoms and emotion language has proven particularly challenging because less than 5% of the words people use in daily discourse can be labeled as emotional (Pennebaker, Mehl, & Miederhoffer 2003). This makes sense given that we live and interact in a fast-paced society with interactions often brief and emotional conversations not always welcome or even appropriate. Additionally, the available tools used to ac-

curately measure and examine emotion language fall short in their ability to reveal precise and detailed analyses of emotion words and take context into consideration. For example, the LIWC program ignores factors such as irony, sarcasm, and context (Tausczik & Pennebaker, 2010). Therefore, the LIWC classifies the word “crazy” as a term that fits into the category of madness. However, if a person were to say “I was crazy about him,” it would be inappropriate to categorize the word as reflecting madness because it is not being used in its literal context. Without taking context into consideration, the meaning of statements could be ascribed and categorized incorrectly. Ignoring context is problematic when trying to get an accurate picture of what individuals are saying.

The current study investigated the association between symptoms of depression, anxiety, trauma, and alexithymia and participants’ use of emotion words in a high-risk sample of primiparous women. In the present study, the Adult Attachment Interview (AAI; George, Kaplan & Main, 1984, 1985, 1996) was used to elicit women’s current state of mind with respect to their attachment history. Because the AAI asks respondents to reflect on emotionally significant interactions with their primary caregivers, it provides a rich context for exploring the associations between a person’s use of emotion words and their current mental health. To determine whether associations between women’s emotion language during the AAI and their mental health symptoms might be better explained by other factors, demographic variables were also assessed as possible moderators of an association between emotion language and symptomatology. Because this study sought to investigate an expectant women’s emotion language while her attachment system was activated (through the AAI), its results may add to a growing understanding of how emotional distress is transmitted from one generation to the next. Specifically, understanding how an expectant woman expresses herself emotionally when her attachment system is activated may provide insights into the experiences of her children.

We hypothesized that the emotion language of participants would be correlated with self-reported symptoms of depression, anxiety, and trauma, so that those with higher levels of symptomatology would use significantly higher rates of negative affect terms and significantly lower rates of positive affect terms than women reporting lower levels of symptomatology. Additionally, because alexithymia is marked by difficulties in both identifying and expressing emotions, we predicted that expectant women reporting higher levels of alexithymia symptoms would use fewer emotion words in their responses on the AAI. Based on previous studies that link low socioeconomic status with increased instances of psychopathology, we hypothesized that participant's socioeconomic status would moderate the association between women's mental health symptomatology and their emotional discourse.

Method

Participants

Participants were drawn from a larger project called *From Pregnancy to Parenting Your First Baby*, a longitudinal study that assessed 105 women at risk for parenting problems and their infants. The women in this study were a sample of low socioeconomic status, primiparous mothers from the Eugene-Springfield area of Oregon. All participants have histories of elevated depression symptomatology (as measured by the CES-D) and were recruited through hospitals and agencies within Lane County, Oregon. At enrollment, the women's mean age was 24 years ($SD = 4.5$); 80% of the women were English speaking European Americans with an average annual household income of \$9,634, placing the majority of the sample below the official US poverty level. The current study uses data from 46 of these women during their third trimester of pregnancy (see results section for demographic data specific to this subsample).

Procedure

The women visited the Developmental Sociobiology Laboratory during their third trimester of pregnancy as part of a larger assessment designed to explore the psychosocial processes related to the transition to parenthood. Prior to and during their visit to the lab, women completed different self-report questionnaires to assess their levels of depression symptomatology (CESD; Radloff, 1977), anxiety (BAI; Beck, Brown, Epstein, & Steer, 1998), trauma history (TSC; Elliot & Briere, 1992), and alexithymia (TAS; Bagby, Parker, & Taylor, 1994). During the lab visit, the women also participated in the Adult Attachment Interview, which includes questions about early childhood experiences with primary caregivers. The AAI was used because of the nature of the emotional responses the questions elicit from an individual. Each AAI was recorded using both audio and video formats and then transcribed verbatim by trained AAI transcribers. The interviewer's statements were marked in the texts, and the transcripts were formulated so that only the participant's words were analyzed in accordance with the requirements of the EMOTAIX-Tropes program. The emotion words that each woman used were counted and categorized within the nine overarching emotion categories of the EMOTAIX dictionary. Analyses were run to examine correlations between participants' self-reported measures of symptomatology and their emotion language patterns during the AAIs.

Measures

EMOTAIX-Tropes.

Participants' use of emotion words was analyzed using the EMOTAIX-Tropes (Piolat & Bannour, 2009) software. Each individual's emotion words were counted and categorized using the six emotion-related themes within the broader structure of either negative or positive emo-

tions. Words that did not fit the rubric of positive or negative emotions were organized using one of the three valence-free emotion word categories. Positive emotions were organized within the three subcategories of *benevolence*, *well-being*, and *coolness/calm*. Negative emotion words were organized into the three subcategories of *malevolence*, *ill being*, and *anxiety*. Each emotion word was viewed and its category verified or discounted by the researcher based on the context of the situation in which the word was spoken. Emotion words that did not fit within the spectrum of positive and negative were categorized under the headings of *surprise* (e.g., jumped, amazed, wondering) or *unspecified* if a reference was made to emotions without a specified valence (e.g., “I was very emotional”). Each word labeled as *unspecified* was individually assessed within the context of the situation it referenced. If the context provided sufficient information regarding the valence of the unspecified reference, the word was then categorized according to its appropriate categorical theme. In an effort to avoid misattributing valence or category to an unspecified term, most often the terms categorized as unspecified stayed within that category. After the emotion words were categorized according to valence and semantic category, emotion word tallies were computed for each individual transcript. The tallies were then correlated with each of our four mental health measures.

Depression.

Depressive symptoms were assessed using the Center for Epidemiological Studies-Depression Scale (CESD; Radloff, 1977). The CESD is a 20-item self-report scale used for measuring depression in the general population. It asks how often a person has experienced a symptom in the past week and provides a four point scale that ranges from 0 (Rarely/less than 1 day) to 3 (Most of the time/5-7 days). Examples of prompts include, “I felt lonely” and “I thought my life had been a failure.” Scores on the

scale range from 0 to 36; someone with a score of 16 or above is considered depressed.

Anxiety.

Anxiety was assessed using the BECK Anxiety Inventory (BAI; Beck, Brown, Epstein, & Steer, 1988). The BAI is a 21-item self-report inventory for measuring the severity of an individual's anxiety symptoms during the past week using a four point scale that ranges from 0 (Not at all) to 3 (Severe/I could barely stand it). The questionnaire covers a wide range of anxiety symptoms, such as fear of the worst happening, nervousness, shakiness, and an inability to relax. Total scores range from 0 to 63 with a score of 0 to 7 indicating minimal anxiety, a score of 8 to 15 indicating mild anxiety, a score of 16 to 25 indicating moderate anxiety, and a score over 26 indicating very high levels of anxiety.

Trauma History.

Trauma-related symptomatology was measured using the Trauma Symptom Checklist (TSC; Elliot & Briere, 1992). The TSC is a 40-item self-report questionnaire that examines current adult symptomatology related to having had childhood or adult traumatic experiences. Each symptom is rated according to how frequently it has been experienced over the past two months and uses a four point scale that ranges from 0 (Never) to 3 (Often). The TSC-40 consists of an overall score and scores on six subscales: Anxiety, Depression, Dissociation, Sexual Abuse Trauma Index (SATI), Sexual Problems, and Sleep Disturbance. For our analysis thus far, we have used only the overall score as a measure of total trauma symptomatology.

Alexithymia.

Participants completed a questionnaire using the Toronto Alexithymia

Scale (TAS; Bagby, Parker, & Taylor, 1994) to determine levels of alexithymia. The TAS is a 20-item self-report scale used to measure alexithymia, a term used to describe individuals who have difficulty identifying and describing emotion and who tend to minimize emotional experiences. The TAS has three subscales aimed at assessing difficulty in describing feelings, difficulty identifying feelings and externally-oriented thinking as well as a total score. We used the total score as the measure of alexithymia in our analysis.

Attachment state of mind.

The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984, 1985, 1996) is a formatted interview designed to reveal an individual's current state of mind about attachment experiences with primary caregivers. The interviewer asks questions about early interactions with caregivers as well as instances of loss and trauma. The questions also probe for information regarding the reactions and behavior of both the interviewee and the primary caregiver. The results of each AAI are traditionally coded and classified into three main categories: autonomous, preoccupied, and dismissing (Main & Goldwyn, 1998). For the purposes of this study, however, the AAI was not used in the traditional sense but rather as a tool to elicit emotional responses. The interviews were conducted by five graduate students and varied in length from 45 to 90 minutes. The AAIs were recorded and transcribed verbatim and then assessed for the use of emotion language.

Results

Preliminary Analysis

Before running the main analysis, descriptive demographics for the sample of 46 participants were evaluated. As displayed in Table 1, over

Table 1: Descriptive demographic information for sample

Variables	number	% of sample
Ethnicity		
Black or African American	1	2.2
White, not of Hispanic origin	38	82.6
Mexican American, Chicano, Mexicano	2	4.3
Other Hispanic	2	4.3
American Indian	2	4.3
Asian or Pacific Islander	1	2.2
Total	46	100.0
Education		
Less than High school	1	2.2
Some High School	3	6.7
High School Diploma or GED	19	42.2
Some College or 2-year degree	20	44.4
4-year degree College	1	2.2
Some school beyond College	1	2.2
Education level not reported	1	2.2
Total	46	100.0
Total Household Income		
Less than \$4,999	9	20
\$4,999 - \$9,999	3	6.7
\$10,000 - \$20,000	15	33.3
\$21,000 - \$40,000	14	31.1
\$41,000 - \$60,000	3	6.7
Don't know, live with mom	1	2.2
Income not reported	1	2.2
Total	46	100.0

80% were European-American. On average, the women had earned high school diplomas or had attended some college. The average household income was approximately \$10,000 annually.

To control for the above demographic data, associations between the women's demographic characteristics and both their emotion word and symptomatology scores were evaluated first. There was no significant association between a woman's educational level, household income, or ethnicity and her use of positive or negative emotion words ($p > .10$). Income and education also proved to be unrelated to women's symptomatology and their alexithymia score ($p > .10$). Although ethnicity was unrelated to alexithymia scores ($p > .10$), ethnicity was significantly related to their self-reported symptoms of depression, anxiety, and trauma, $F(5, 39) = 5.69, p < .001$. Specifically, women of Caucasian decent reported significantly lower levels of mental health symptomatology than did the non-Caucasian women in the sample. Because of this finding, we controlled for women's ethnicity in our primary analyses.

Central Analyses

Table 2 provides a summary of the sample level statistics for the emotion word categories (both negative and positive) employed. Means and standard deviations are expressed in terms of the ratio of words used within the given category to the total amount of words (emotional and non-emotional) spoken by the participant during the entire interview. The ratios were calculated in this way to account for the length of the interview, as some individuals naturally speak more than others. Overall, women used significantly more negative than positive words during discourse on the AAI, $t(45) = -2.01, p = .05$.

Figure 2 presents an example of one individual's responses on the AAI within the category of negative emotions. This graphical representa-

Table 2: Descriptive Statistics for emotion word categories and subcategories

Variables	Mean	SD	Min.	Max.
Positive Emotions	0.83	0.43	0.37	2.29
Benevolence	0.38	0.16	0.14	0.96
Affection	0.35	0.15	0.12	0.95
Well Being	0.33	0.17	0.12	0.84
Happiness	0.1	0.1	0.0	0.51
Relief	0.16	0.1	0.03	0.5
Negative Emotions	0.98	0.31	0.4	1.65
Malevolence	0.13	0.09	0.0	0.44
Ill Being	0.69	0.25	0.26	1.34
Anxiety	0.15	0.08	0.02	0.37
Fear	0.09	0.07	0.0	0.26
Doubt	0.33	0.2	0.06	1.05
Total Emotion Words	2.17	0.69	0.02	3.5

tion of the woman’s emotion words displays the categories in the form of green or blue spheres with their size proportional to the number of words they contain. The distance between spheres (categories) correlates with the number of relations connecting them. Additionally, the graph is oriented so that the spheres (word categories) on the left are spoken before the central category, and the spheres (categories) on the right come after it. In this specific graph, for example, it appears that the individual made reference to crying both before and after referencing a negative emotion. For the purposes of the current study, the only information used from Figure 2 was the quantity of emotion words spoken in the transcript. The information displayed in this graph, however, speaks both to the ability of the EMOTAIX software to analyze the given data in many formats and its potential to inform future studies.

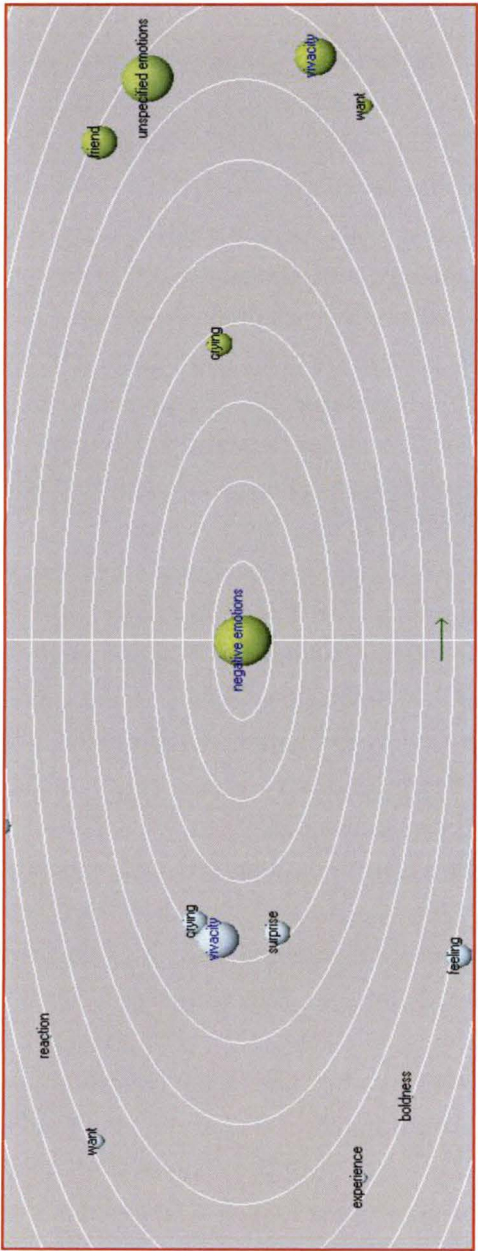


Figure 2: Graphical representation of an individual's emotion word use (Tropes, 8.4)

Table 3 displays descriptive statistics for each measure of mental health symptomatology. On average, women's depression scores ($M = 15.52$) were close to the clinical cutoff score of 16. Also, mean anxiety score for the sample indicates that the women reported, on average, moderate levels of anxiety during the time of assessment.

The Trauma Symptom Checklist (TSC-40), our measure of trauma symptomatology, was designed as a research tool and, therefore, has no clinical cutoff scores. The sample's average trauma score ($M = 24.7$) is suggestive of mild to moderate levels of trauma symptoms among the women. Compared to average TSC score ($M = 63.18$) from clinical pop-

ulation of 28 women with co-occurring PTSD and substance-dependence (Searcy, V. & Lipps, A, 2012), the women in our sample had substantially lower trauma scores.

Because of the high degree of inter-correlation among depression, anxiety, and trauma symptoms (r -values = 0.818 – 0.828, $p < .01$), and because a Principal Components Analysis (PCA) supported the utility of a single global measure of symptomatology, we calculated a total symptomatology score by summing women's scores on each of the symptom scales. This new measure, *psychopathology total*, includes depression, anxiety, and trauma and is displayed in Table 3. Because alexithymia was weakly correlated with women's reports of depression, anxiety, and trauma (r -values = 0.16, 0.25, 0.35), respectively, and because it did not load on the primary PCA factors, alexithymia was retained as its own score.

Table 3 also presents descriptive information regarding women's alexithymia scores. The average alexithymia score ($M = 46.4$, $SD = 10.57$) falls into the range of possible alexithymia, with the TAS scoring cutoffs as follows: scores less than or equal to 51 indicate non-alexithymia; scores greater than or equal to 61 indicate alexithymia; and scores between 52 and 60 indicate possible alexithymia (Bagby, Parker, & Taylor, 1994). A categorical measure of alexithymia was created with 73.3% of women ($n = 33$) falling into the subthreshold group (scores considered non-alexithymic) and 26.7% of women ($n = 12$) falling into the at-risk or above threshold range (scores indicating both possible and actual alexithymia). Relative to this categorical measure of alexithymia, we found no significant difference in women's depression scores, $F(1,43) = 1.05$, $p = .31$, or their anxiety scores, $F(1,43) = 2.45$, $p = .13$, as a function of alexithymia grouping. However, there was a significant difference in their reported trauma symptomatology, $F(1, 43) = 5.14$, $p = .03$, such that women in the high alexithymia group reported significantly higher trauma symptomatology.

Table 3: Descriptive Statistics for self-reported symptomatology

Measures	Min.	Max.	Mean	SD
CESD score (depression)	2	57	15.52	9.94
BAS score (anxiety)	0	55	13.67	10.29
TSC score (trauma)	2	82	24.7	15.65
Psychopathology Total (includes depression, anxiety and trauma symptoms)	5	194	53.89	33.74
TAS score (alexithymia)	29	80	46.4	10.57
Subthreshold (non-alexithymia)	$N = 33$	73.30%		
High-risk (possible alexithymia and alexithymia)	$N = 12$	26.70%		

Table 4 presents the correlations between symptomatology of depression, anxiety and trauma (Psychopathology Total) and the number of words produced on the AAI within each emotion word category. Analysis revealed that only one of the assessed emotion word categories proved to be significantly associated with women’s symptomatology. Consistent with our hypothesis, women’s total symptomatology score was significantly and positively correlated with use of words belonging to the malevolence category (i.e., words denoting hatred and aggression), so that as symptomatology related to depression, anxiety and trauma increased, women tended to use significantly more words during the AAI that connoted malevolence. Also, there was a moderately significant positive association between women’s total symptomatology score and the use of negative emotion words grouped in the subcategories of *Malevolence*, *Ill-Being*, and *Anxiety*.

Contrary to our hypothesis, women’s total symptomatology score

Table 4: Frequency of word use within each category

Psychopathology Total	r	p-value
Positive Emotions	0.054	.724
Benevolence	-0.034	.823
Affection	0.022	.885
Well Being	0.271	.069
Happiness	-0.035	.816
Relief	-0.085	.573
Negative Emotions	0.283	.057
Malevolence	0.582**	<.01
Ill Being	0.111	.463
Anxiety	0.087	.567
Fear	0.128	.396
Doubt	0.003	.985
Total Emotion Words	0.148	.325

**Correlation is significant at the 0.01 level

was not significantly correlated with the use of negative emotion words, nor was there a statistically significant association with any of the individual negative emotion subcategories of *Ill-Being*, *Anxiety*, and *Doubt*. Additionally, women's total symptomatology scores were not correlated with their use of total positive emotion words, specifically, words used in the subcategories of *Benevolence*, *Affection*, *Well-Being*, *Happiness*, and *Relief*. Finally, the total symptomatology scores were not correlated with their use of total emotion words.

Table 5 presents the correlations between our continuous measure of alexithymia symptomatology and the number of words used within each emotion category. Three emotion word categories proved to be significantly associated with women's symptoms of alexithymia. Despite our ex-

Table 5: Frequency of word use within each category

TAS (alexithymia)	r	p
Positive Emotions	-0.442**	< .01**
Benevolence	0.16	.3
Affection	0.18	.24
Well Being	0.4*	.01*
Happiness	0.16	.29
Relief	0.134	.38
Negative Emotions	0.26	.08
Malevolence	0.05	.75
Ill Being	0.27	.07
Anxiety	0.12	.43
Fear	0.1	.5
Doubt	0.11	.47
Total Emotion Words	0.49*	< .01**

*Correlation is significant at the 0.05 level.

**Correlation is significant at the 0.01 level.

pectation that alexithymia symptoms would be inversely associated with negative emotion words, alexithymia symptomatology was not significantly correlated with the total amount of negative emotion words used, nor with any of the negative subcategories. However, there was an unexpected significant positive correlation between alexithymia and use of positive emotion words. As alexithymia symptomatology increased, the use of positive emotion words also increased. In particular, alexithymia symptom scores were significantly and positively correlated with the women's use of words within the subcategory of *Well-Being*. Alexithymia was not significantly correlated, however, with any of the other four sub-

categories of positive emotions, namely, *Affection*, *Benevolence*, *Happiness* and *Relief*. Further, there was not a significant association between alexithymia symptomatology and the subcategories of *Ill-Being*, *Anxiety*, *Fear*, or *Doubt*.

Lastly, there was a significant positive association between alexithymia and the amount of total emotion words used, reflecting that higher levels of alexithymia symptomatology corresponded positively and significantly with emotion words in general. This finding is especially thought provoking, as previous research has noted a decrease in emotion words among individuals with alexithymia. This association, however, does not account for the variety of emotion words used, suggesting the possibility of an individual using the same emotion words repeatedly.

As a final test of alexithymia data, women's use of emotion words was examined in relation to their alexithymia grouping (i.e., subthreshold alexithymia, and clinically elevated alexithymia symptomatology). Means testing revealed that women in the clinically elevated alexithymia group used moderately more positive emotion words, $F(1, 43) = 3.33, p = .08$, significantly more negative emotion words, $F(1, 43) = 7.16, p = .01$, and significantly more total emotion words, $F(1, 43) = 8.26, p = .01$, than women in the subthreshold alexithymia group. These results indicate that women with clinically elevated alexithymia symptomatology generally used more emotion words, including both positive and negative words, than women reporting low levels of alexithymia symptomatology. Interestingly, the increase in emotion words by those with higher reported alexithymia symptoms suggests these women may have been overcompensating for their difficulty in identifying and describing emotions by producing emotion words that may not be reflective of their actual emotional experience. As women with high alexithymia scores also reported higher trauma symptomatology, we would expect them to use more negative than posi-

tive emotion words when describing early childhood experiences. Paired sample t-tests further revealed that women both at-risk for alexithymia and those with clinically elevated alexithymia scores generally used more negative than positive emotion words. In both cases, these differences did not reach statistically significant levels, $t(11) = -0.83$ and $t(11) = -1.68$, respectively, $p = .10$. These results are most likely due to the size of the subsample.

Discussion

This study sought to explain how psychopathology impacts how emotion is verbally expressed. The finding that, overall, the women in the study used significantly more negative than positive words was unsurprising. Because these women reported high levels of depressive, anxious, and trauma related symptomatology, it makes sense that their lexical choices would reveal thoughts related to negative emotional experiences.

The first hypothesis of maternal psychopathology as a predictor of both negative and positive affect word use was partially supported. While an increase in symptomatology (symptoms of depression, anxiety, and trauma) was not significantly related to the he number of negative emotion words used, it was significantly correlated with the use of words reflecting hatred and aggression (malevolence category). More specifically, the mothers who reported higher symptoms of depression, anxiety, and trauma also used more words reflecting hatred and aggression than their less symptomatic counterparts. This finding suggests that hateful and aggressive speech during the AAI is linked with psychopathology.

When looking at the data more descriptively, it appears that the use of words reflecting hostility and harsh parenting styles were the most prevalent terms used within the category of Malevolence (see Figure 3 for a breakdown of specific words used within this category). The terms used

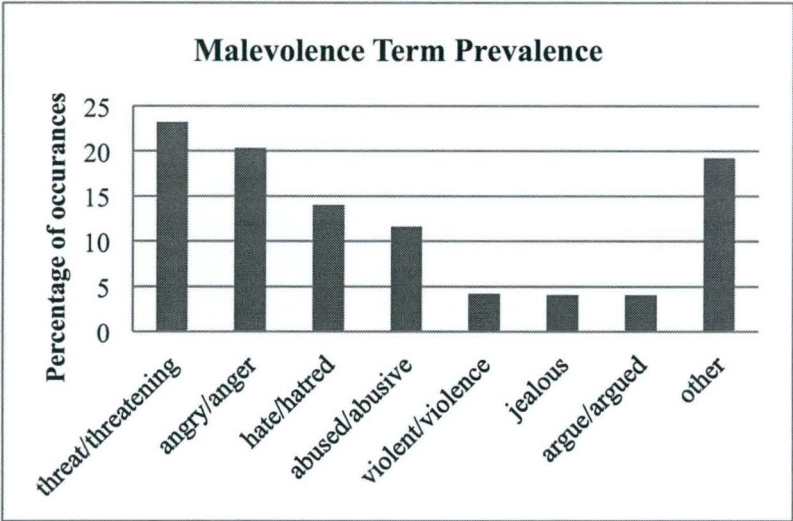


Figure 3: Prevalence of specific words used reflecting hatred and aggression. (“Other” refers to individual terms used less than 3% of the time).

most often by the women within the malevolence category were threatened/threatening (23.2%), angry/anger (20.3%), hate/hated/hatred (14%), and abuse/abusive (11.6%). These words suggest a substantial amount of either interpersonal or intrapersonal conflict around early attachment relationships among those who reported high levels of symptomatology.

Given that problems identifying and verbalizing emotions make up fundamental aspects of the alexithymia construct, we expected that women reporting elevations in alexithymia symptoms would show a marked decrease in their use of emotional language. This pattern did not unfold with the women in this sample. In fact, an opposite pattern emerged. As the women’s alexithymia scores increased, the amount of both positive emotion words and total emotion words used also increased. This increase in positive emotion word use may suggest a dismissive style of attachment among those with alexithymia. On the AAI, dismissing adults tend

to play down the effects of early distress related to attachment experiences and often describe caregivers in idealized terms (Borelli, David, Rifkin-Graboi, Sbarra, Mehl, & Mayes, 2012). It is possible that the women with high alexithymia scores increased their positive word use in an effort to downplay the impact of early trauma. This possibility aligns with previous findings that point to alexithymia being firmly linked with the avoidant-dismissing category of insecure attachment (Scheidt, Waller, Schnock, Becker-Stoll, Zimmermann, Lücking, & Wirsching, 1999; Taylor, 2000; Verhaeghe, 2004). Another theory behind the significant correlation between alexithymia and positive emotion words is the idea that positive emotion words are more socially acceptable. Negative emotions can often be more difficult to talk about, making the use of positive emotion words feel less vulnerable. Interestingly, the positive emotion words the women tended to use came from the *Well-Being* category and were more superficial by nature (e.g., “I’m fine” and “It was good”). These words generally do not elicit follow-up questions or emotional responses from the listener and consequently protect the speaker from being asked to further divulge about their emotional experience.

The increase in total emotion words (both negative and positive) corresponding to higher alexithymia scores suggests overcompensation as a possible behavioral strategy employed by participants to counteract their inability to recognize and communicate emotional experiences. Perhaps, in this case, the emotion words they used were an attempt to fill in the gaps with any emotion term they could think of regardless of whether the terms accurately represented their emotional experience.

When the women were broken into two groups according to their alexithymia score (a subthreshold group and a high-risk group), some marked differences emerged. For the women in the high-risk group, there was a significant increase in negative emotion language as alexithymia scores

increased. This was not the case for the women in the subthreshold group. Although the total emotion words increased for both groups, only those women classified as high-risk had a significant increase in negative emotion language. This pattern suggests that compensation may be occurring at all levels of the alexithymic spectrum, but that those with the highest alexithymia scores and, consequently, higher trauma symptomatology may have a more accurate expression of emotional experiences than those who report fewer trauma symptoms. In other words, trauma symptomatology at high levels may overshadow the impact that alexithymia has on how emotion language is expressed. Specifically, even if in the midst of compensatory behaviors, it appears that those with clinically elevated alexithymia scores have a tendency to overcompensate with negative affect terminology. Considering that the women in the high-risk alexithymia group also had significantly high trauma symptom scores, it makes sense that they would use more negative than positive words when referencing early childhood experiences.

Limitations and Future Directions

An area for future analysis involves the representation of symptomatology. Maternal distress was calculated based on total scores drawn from measures of depression (CESD; Radloff, 1977), anxiety (BAI; Beck, Brown, Epstein, & Steer, 1988), trauma (TSC; Elliot & Briere, 1992), and alexithymia (TAS; Bagby, Parker, & Taylor, 1994). However, both the TAS and TSC include subscales of specific symptoms that can be examined and scored separately within the total symptom score. While the total score of each measure provides an overview of associated symptomatology, the individual subscales were not taken into account. Future analyses should utilize these subscales in order to obtain a more precise understanding of women's specific forms of symptomatology because it may reveal

different lexical choices based on specific clusters of symptoms.

A second area for future study involves the use of the Adult Attachment Interview (AAI) as a tool for examining emotional discourse. Because the AAI prompts the speaker to give descriptions of both early childhood experiences and their emotional reactions to those experiences, it provides a rich framework for examining emotional processing related to an attachment state of mind. Within the AAI, there are some questions that specifically target emotionally distressing experiences, such as instances of loss or abuse. Future analyses using EMOTAIX-Tropes to examine emotion language patterns corresponding to individual questions on the AAI may reflect differences in patterns of emotional expression representative of traumatic experiences and those that correspond to a more general attachment state of mind.

Finally, because this study examined emotional discourse limited to the AAI, the results are not necessarily a reflection of emotional language expression in other contexts. Therefore, a number of questions remain unanswered. For example, does the language used on the AAI parallel emotional discourse during interactions with one's own child? If that is the case, how might the use of aggressive language in mother-child discourse impact the intergenerational transmission of attachment? Additional studies looking at the correlation between the use of emotional language on the AAI, and verbal emotional expression during parent-child interactions are needed to determine whether emotional discourse on the AAI more accurately reflects discourse in other social contexts.

Conclusion

Taken together, the findings of this study support the notion that maternal distress impacts an attachment state of mind and, consequently, emotional discourse related to early attachment experiences. A thorough

examination of the emotional lexicon reveals distinct patterns in the sub-categories of the emotional repertoire. Detailed analyses suggest a link between symptoms of depression, anxiety, and trauma and the use of aggressive and hateful emotional terminology. Additionally, patterns in emotional expression emerged specific to the construct of alexithymia. Not only did the use of emotion words increase with alexithymia scores, but also trauma symptomatology played a mediating role in how emotion words were expressed, showing that those with clinically elevated alexithymia and trauma scores used significantly more negative affect words.

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