

Using Lexical Analysis to Identify Emotional Distress in Psychometric Schizotypy

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Abstract

Through the use of lexical analysis software, researchers have demonstrated a greater frequency of negative affect word use in those with schizophrenia and schizotypy compared to the general population. In addition, those with schizotypy endorse greater emotional distress than healthy controls. In this study, our aim was to expand on previous findings in schizotypy to determine whether negative affect word use could be linked to emotional distress. Schizotypy ($n=33$) and non-schizotypy groups ($n=33$) completed an open-ended, semi-structured interview and negative

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affect word use was analyzed using a validated lexical analysis instrument. Emotional distress was assessed using subjective questionnaires of depression and psychological quality of life (QOL). When groups were compared, those with schizotypy used significantly more negative affect words; endorsed greater depression; and reported lower QOL. Within schizotypy, a trend level association between depression and negative affect word use was observed; QOL and negative affect word use showed a significant inverse association. Our findings offer preliminary evidence of the potential effectiveness of lexical analysis as an objective, behavior-based method for identifying emotional distress throughout the schizophrenia-spectrum. Utilizing lexical analysis in schizotypy offers promise for providing researchers with an assessment capable of objectively detecting emotional distress.

Keywords: Schizophrenia; Depression; Affect; Quality of life; Psychosis; Diagnostic tool; Schizophrenia

1. Introduction

In the past decade, researchers have begun using lexical analysis to examine word use in a variety of settings, including political speeches, musical performances, educational systems and psychological environments (Aggarwal, Vaidyanathan, and Venkatesh, 2009; Bartels et al., 2016; Vera et al., 2016; Houix et al., 2012). In the psychology community, a good proportion of this work has featured Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, and Francis, 2015) – a well-validated computerized lexical analysis tool. LIWC, now in its third

edition, is widely used by social, clinical, health, and cognitive psychologists (Pennebaker, Booth, and Francis, 2015; Tausczik and Pennebaker, 2010). It is designed to classify words from speech and written samples into a number of categories according to valence, referents, parts of speech, or other characteristics (e.g., affect, social, cognitive mechanisms). Word use in LIWC has been shown to provide insight into psychological distress (see Capececiatro et al. 2013; Kahn et al., 2007; Van der Zanden et al., 2014 for examples).

Recently, researchers have expanded work using LIWC to include those on the psychotic-spectrum. Utilizing lexical analysis within the psychosis-spectrum may help us learn more about the emotional distress caused by psychosis — such as depression and low quality of life — and how that distress affects communication. Past research using lexical analysis has demonstrated that people within the schizophrenia-spectrum tend to endorse negative affect words and overall negative affective states more than the general population (Buck, Minor, and Lysaker, 2015a; 2015b; Buck and Penn, 2015; Cohen et al., 2009; Fineberg et al., 2016; Minor et al., 2015; Minor et al., 2016; Najolia, Cohen, and Minor, 2011; St-Hilaire, Cohen, and Docherty, 2008), and also higher use of self-referential pronouns relating to negative states (Buck, Minor, and Lysaker, 2015a; Buck, Minor, and Lysaker, 2015b; Fineberg et al., 2016). Using lexical analysis not only for those with schizophrenia but also for people at increased risk for these disorders may provide further insight into how certain forms of emotional distress are expressed in these populations. Moreover, negative affect word use in particular may provide insight into this emotional distress. As it has been shown that negative affect word use is prevalent throughout the schizophrenia-spectrum (e.g., Minor et al., 2016), the use of such words may better inform us of the overall experience of people at different stages on the schizophrenia-spectrum.

Although a handful of studies concerning word choice have focused on schizophrenia, very few have indeed examined affective word use in people at heightened risk for developing a psychotic disorder. One critical construct in this area is psychometric schizotypy. Schizotypy refers to a presentation in which interactions between genetic and environmental components are thought to place one at increased risk of developing a psychosis-spectrum disorder (Meehl, 1962; Lenzenweger, 2006). Using LIWC, Najolia and colleagues (2011) analyzed speech obtained from participants who had viewed pleasant, unpleasant, and neutral pictures. Those with schizotypy used fewer positive words and more negative words overall and also significantly more negative affect words when discussing positive images. A recent study from Minor and colleagues (2016) examined negative affect word use outside of the laboratory by comparing schizotypy and non-schizotypy groups on word use in their real-world interactions. They found that those with schizotypy used negative affect words at a greater frequency in their daily social interactions. These findings show that those with schizotypy display an increased preference for negative words across affective conditions and in their daily lives. However, conflicting findings have also emerged in laboratory studies (Cohen et al., 2011). This study used a mood-manipulation speech procedure in people with high levels of schizotypy and controls, where the intent was to capture speech in both positive and negative states. Results indicated that people with schizotypy did not significantly differ from controls in either state regarding negative affect words. Despite this conflicting finding found by Cohen and colleagues, it appears that negative affect word use is prevalent in schizotypy. What is not so clear, however, is to what extent negative affect word use is associated with emotional distress in the schizotypy population.

A greater inclination toward negative affect words is not strictly a byproduct of the schizophrenia-spectrum. Past studies have used lexical analysis to examine speech and

depression in other groups (see Capececiatro et al., 2013; Liu et al., 2012; Vanheule, Desmet and Meganck, 2009). Consistently, the results have shown that depressed people use more negative affect words, fewer positive words, and increased self-referential words than the general population (Rude, Gortner, and Pennebaker, 2004) – similar to findings observed in the schizophrenia-spectrum. Vanheule and colleagues (2009) found that depressive symptoms were significantly linked to affective word use, with negative affect words showing correlations with greater depression, and positive affect words being associated with reduced depression.

Further, depression in schizophrenia has been well documented (Fonseca-Pedrero et al., 2010), with up to 60% of those with schizophrenia exhibiting signs of clinical depression (Gozdziak-Zelazny, Borecki, and Pokorski, 2011). Typically, both depressive symptoms and schizotypy traits are assessed using self-report methodology; however, there may be factors that limit this approach. One limitation is the lack of insight often found within these populations, as some people suffering from emotional distress are unable to recognize symptoms (see Peralta and Cuesta, 1998; Simon et al., 2007; Zhou et al., 2015). This lack of insight may play a role in emotional distress not being accurately reported. A second limitation is the tendency for people to respond to subjective questionnaires in ways that cede accuracy and exaggerate positive characteristics; these social desirability biases have been observed across a wide variety of populations (Strosahl, Linehan and Chiles, 1984; van de Mortel and Thea, 2008). To address these limitations, lexical analysis offers an objective, behaviorally-based method of measuring emotional distress without the caveats that often accompany self-report instruments. Emotional distress—and more specifically depression—has been shown to be a strong predictor to psychosis transition in clinical high risk populations (Amminger et al., 2006; Yung et al., 2007). By using lexical analysis to examine the way people with schizotypy communicate, we will be

able to better determine whether negative affect word use and emotional distress are linked at this ‘healthier’ end of the schizophrenia-spectrum.

The present study utilized lexical analysis to examine whether affect word use could be connected to emotional distress in a schizotypy population. Further, while we dichotomized schizotypy into low and high groups, we also explored whether specific schizotypal traits (i.e., positive, negative, disorganized) were associated with affective word use, depression, and quality of life. Emotional distress was measured by assessing depression and psychological quality of life (QOL) — which is also diminished throughout the schizophrenia-spectrum (Cohen and Davis, 2009; Galuppi et al., 2010). Speech was analyzed using a long-form, semi-structured interview in which participants had freedom to discuss positive, negative, or neutral content. Previous schizotypy studies have examined speech and affective states in short, semi-structured conditions. No previous schizotypy study has examined speech using a more natural, open-ended form. Compared to a non-schizotypy group, we expected those with schizotypy to use more negative affect words and report greater emotional distress. When examining relationships between word use and emotional distress, we expected that emotional distress would be significantly related to the amount of negative affect words used within the schizotypy group.

2. Methods

2.1. Participants

Nine hundred and four undergraduates responded to an initial standardized schizotypy questionnaire. Those who scored at or above the 95th percentile on at least one of the three subscales (positive, negative, disorganized) were recruited for the schizotypy group and invited to the laboratory for further testing. For the non-schizotypy group, those who scored below the overall mean on the schizotypy questionnaire were invited to the laboratory phase (see Luther et

al., 2016 for more information). Additional exclusionary criteria included no self-reported history of a psychotic disorder (n excluded = 2) and subjects could not be under the influence of alcohol or any other substance during the laboratory phase (n excluded = 1). All standardized scores from the questionnaire were analyzed using means controlling for sex and ethnicity. While in the lab, the two groups met with a trained undergraduate or graduate research assistant blinded to group. The final sample consisted of 66 total participants (schizotypy $n = 33$; non-schizotypy $n = 33$). This is a subsample of participants from a previous study (Luther et al., 2016); the current study only includes those participants who completed an interview where they discussed their life story (see Measures). The university Institutional Review Board approved study procedures and informed consent was obtained from all participants prior to the onset of the study.

2.2. Measures

The screening measure for this study was the Schizotypal Personality Questionnaire (SPQ), a 74 question self-report scale that is used to determine schizotypal personality traits (e.g., magical ideation, ideas of reference, constricted affect, odd speech). Past research pertaining to the SPQ has shown it to have high internal reliability, test-retest reliability, convergent validity, and high criterion validity relating to schizotypy traits (Raine, 1991). In addition, those who endorse greater schizotypal traits on validated questionnaires have exhibited heightened risk for both psychotic and other psychiatric disorders (Cohen and Najolia, 2011; Kwapil et al., 1997). For this study, the SPQ was utilized to focus on the three most commonly used subscales of the full-version SPQ: positive, negative, and disorganized (Raine et al., 1994). All questions were administered using a 5 point Likert-type scale with higher scores indicating greater severity of traits.

To obtain transcripts for lexical analysis, participants were interviewed using the Indiana Psychiatric Illness Interview (IPII; Lysaker et al., 2002), an instrument used to examine life story narratives typically of individuals with chronic illnesses. The version employed in the current study is modified to focus specifically on perceptions of experiences of distress. The IPII requires participants to 1) tell their life story, beginning with their earliest memory, 2) describe a time of crisis or hardship in the last two years that has caused emotional distress, 3) explain what during this period changed or stayed the same, 4) describe the degree to which this hardship influenced or controlled one's life, and 5) speculate on the future. The IPII was chosen due to its semi-structured nature, allowing greater flexibility and ecological validity.

Trained graduate students conducted IPII interviews; interviews were recorded in session and later transcribed by undergraduate research assistants. The next step was to examine the completed, transcribed interviews with LIWC software (LIWC2015; Pennebaker, Booth, and Francis, 2015). LIWC is a computerized lexical analysis measure that evaluates speech content using a dictionary that contains over 6400 words/word stems across more than 90 categories. LIWC calculates percentage scores for each category in order to account for total words spoken in a sample. LIWC has been shown to be a useful and valid tool in measuring one's positive and negative expressions (Khan et al., 2007). LIWC has also been used in schizotypy (Minor et al., under review; Najolia et al., 2011) and schizophrenia samples to illustrate differences in language compared to healthy controls (Bonfils et al., 2016; Cohen et al., 2009; Hong et al., 2015). For this study, we focused on positive and negative affect categories, as well as the three subcategories (anxiety, anger, sadness) of negative affect words.

Emotional distress was assessed using subjective questionnaires measuring depression and QOL. Depression was assessed using the Brief Symptom Inventory-18 (BSI-18; Derogatis,

2000) — an abbreviated version of the 53-item BSI that has demonstrated good internal validity (Anser-Self, Schreiber, and Marotta, 2006). The BSI-18 is a self-report scale that is based on level of distress present in the past seven days. The 18 statements are divided equally among three domains: somatization, anxiety, and depression. For this study, we focused on the depression dimension. QOL was measured using the psychological domain of the World Health Organization Quality of Life-Brief (WHOQOL Group, 1994). Past research has shown the WHOQOL-BRIEF has good to excellent reliability and validity (Skevington, Lofty and O'Connell, 2004).

2.3. Analyses

Analyses were conducted in three parts. First, chi-square analyses and independent *t*-tests were employed to compare demographic variables between the two groups. Second, we used independent *t*-tests to determine any significant group differences in negative affect word use, depression, and QOL. When appropriate, we relied on 'equal variance not assumed' results in place of conventional *t*-tests. Finally, within-group correlations were applied within the two groups to measure any associations between affective word use, depression and QOL; we also used within-group correlations to examine associations with specific schizotypal traits, affective words use, depression and QOL. Outliers were examined for primary constructs; any data point > 3 SDs from the mean were reduced to prevent outliers for causing undue influence on analyses.

3. Results

When potential group differences were examined, mean age between the schizotypy (20.09 years [1.96]) and non-schizotypy group (19.36 [1.30]) did not significantly differ, $t(65) = -1.78, p = 0.08$). The two groups also did not differ in sex, $X^2(2, N = 66) = 0.87, p = 0.65$, or

ethnicity, $X^2(2, N = 66) = 0.48, p = 0.79$. As expected, significant differences were observed for z -scores on the SPQ in positive (Schizotypy: 1.28 [1.13], Non-schizotypy: -0.54 [0.42]), $t(40.61) = -8.70, p < 0.001$, negative, (Schizotypy: 1.37 [1.04], Non-schizotypy: -0.50 [0.40]), $t(41.31) = -9.63, p < 0.001$, disorganized, (Schizotypy: 1.41 [0.87], Non-schizotypy: -0.61 [0.47]), $t(49.55) = -11.80, p < 0.001$, and total schizotypy, (Schizotypy: 1.55 [0.75], Non-schizotypy: -0.61 [0.36]), $t(45.70) = -14.92, p < 0.001$). The schizotypy group were also more likely to have been in therapy previously, $\chi^2(1, n = 66) = 5.66, p = 0.017$, taken medication in the past for a psychiatric issue, $\chi^2(1, n = 66) = 4.23, p = 0.040$, and have a history of one or more psychiatric diagnoses, $\chi^2(1, n = 66) = 7.76, p = 0.005$.

Group comparisons were conducted to test hypotheses that the schizotypy group would exhibit a higher frequency of negative affect words, greater depression, and lower QOL than the non-schizotypy group (Table 1). In line with our hypotheses, we observed that participants in the schizotypy sample used significantly more negative affect words, $t(64) = -2.61, p < 0.05, d = 0.65$, exhibited greater depression, $t(46.45) = -7.43, p < 0.01, d = 1.84$, and reported lower QOL, $t(55.97) = 4.81, p < 0.01, d = 1.20$, compared to the non-schizotypy group (see Table 1). No significant group differences were found within the subcategories of negative affect word use (anxiety, anger, sadness). These findings supported our hypotheses that the schizotypy group would use a higher frequency of negative affect words compared to controls, and that they also would exhibit greater emotional distress than those without schizotypy.

Within schizotypy and non-schizotypy groups, we examined whether depression or QOL was associated with affective word use. In schizotypy, we observed a trend level association

between depression and overall negative affect words (Table 2). Concerning QOL, there was a significant inverse association shown between negative affect words used and QOL (see Table 2). There was no association between schizotypy and positive affect words. There were also no associations shown between depression and specific categories within negative affect words. In the non-schizotypy group, sadness words were shown to be significantly associated with depression and inversely associated with QOL. Our main hypothesis that negative affect word use would be linked to depression level was not fully supported by our findings; however, there does seem to be a relationship between QOL and the number of negative affect words used by those with schizotypy.

Within the schizotypy group, we determined if specific traits were associated with affect word use, depression or QOL (Table 3). We observed that anger word use was associated with positive schizotypy traits and inversely associated with negative schizotypy traits. No significant associations were found between schizotypy traits and negative affect or positive affect words. Regarding emotional distress, we observed that depression was significantly associated with positive schizotypy traits and QOL was inversely associated with negative schizotypy traits. No significant associations were found between disorganized schizotypy and any study variable.

4. Discussion

The primary aims of this study were to utilize lexical analysis to examine negative affect word use in schizotypy and examine the link between word use and emotional distress in this population. Three interesting findings emerged from this study. First, consistent with some past research, those with schizotypy used significantly more negative affect words than the non-schizotypy group. Second, the schizotypy group showed greater depression levels and lower QOL than the non-schizotypy group. Third, negative affect word use in the schizotypy group was inversely correlated with QOL, and a trend level correlation was observed between negative affect word use and depression.

Our findings show that lexical analysis has the potential to be a valuable tool in illuminating negative affect word use in psychometric schizotypy. Having a behaviorally-based measure of negative affect word use — such as lexical analysis — can help researchers obtain a multi-method assessment of emotional distress. In the future, clinicians may benefit from such assessments that could identify emotional distress based on how patients communicate — examining the speech of people at increased risk for psychosis is an initial step in this process. Previous studies examining speech in schizotypy have found those with schizotypy use significantly more negative affect words than controls in laboratory (Najolia, Cohen, and Minor, 2011) and real-world settings (Minor et al., under review). This is consistent with what was observed in the current study, as those with schizotypy used a greater amount of negative affect words during a long-form interview. Negative affect is certainly a trademark symptom of schizotypy and schizophrenia, which greatly diminishes social functioning and overall well-being (Kwapil et al., 2012). Our results show how negative affect in schizotypy is translated into speech, which could be a possible marker for emotional distress and also apply throughout the psychosis-spectrum.

A second main finding was that those with schizotypy experience greater emotional distress than the healthy population. Our results align with past research on studies focusing on emotional distress in the schizophrenia-spectrum. Both depression (Gozdzik-Zelazny, Borecki, and Pokorski, 2011) and low QOL (Cohen and Davis, 2009; Brosey and Woodward, 2015) have previously been observed in those with schizotypy and schizophrenia. These findings carry important implications. Clinical high risk populations who transition to full-blown psychosis tend to have high levels of emotional distress before transition. (Amminger et al., 2006; Yung et al., 2007). Having a variety of validated methods capable of identifying depression and other forms of emotional distress from different angles in schizotypy is needed in order to enrich assessment strategies. Interventions designed for reducing emotional distress in people at high risk may help to ward off transition into psychosis or other psychiatric disorders, or lessen the severity of symptoms upon transition.

Our correlational results for the schizotypy group indicated a trend level association between depression and negative affect words, a significant inverse association between negative affect words and QOL, and no association between positive affect words and either form of emotional distress. One notable finding from the non-schizotypy group was that greater sadness word use — but not negative emotion more generally — was associated with lower QOL and greater depression. This finding may stem from sadness-type states having a greater emotional effect on people who do not endorse schizotypal traits. Overall QOL has been shown to be highly related to depression (Skevington, Lofty and O’Connell, 2004). Because of this close connection between depression and QOL, it is unclear as to why our results did not show a significant association with negative affect words and depression. One explanation for the lack of significant findings in schizotypy may be tied to restricted range within this group: Few

schizotypy participants demonstrated low scores on depression or high scores on the QOL index. Although depression is typically less severe in schizotypy compared to clinical depression or schizophrenia (e.g., Campellone et al., 2016), we still observed that few people in the schizotypy group were absent of depression symptoms. Future research should examine the ways in which negative affect word use might be an indication of other forms of dysfunction independent of depressive symptoms. Despite only observing a trend level relationship, however, the pattern was consistent with previous reports such that people with schizotypy endorse greater depression levels, have a lower QOL, and use negative affect words at a higher frequency.

Finally, we examined the schizotypy subscales and their relationship to affective word use, depression, and QOL. Anger words were significantly associated with positive traits of schizotypy and inversely associated with negative traits. We also observed a significant association between positive traits and depression and an inverse association between negative traits and QOL. These findings illustrate the significant heterogeneity present within schizotypy. Heterogeneity is well documented in the schizophrenia-spectrum as symptoms can vary widely from person to person (Carpenter and Kirkpatrick, 1988; Takahashi, 2013). Lexical analysis may offer assistance in better classifying some of these trait differences. Identifying specific schizotypal traits that may be associated with particular speech patterns may provide a more specialized approach in categorizing emotional distress experienced at different stages of the psychosis-spectrum.

A strength of this study was the use of LIWC as the primary tool to evaluate speech content. Using LIWC in conjunction with the IPII was also a strength, as participants are encouraged to focus on personal narratives involving their life story. Additionally, the IPII differs from structural diagnostic interviews in that participants are encouraged to speak as long

as they would like with little influence regarding affective prompts or time limits from examiners. However, while this current study may have had higher ecological validity than past studies — due to use of the IPII — it should still be a point of emphasis to utilize lexical analysis on speech captured outside of a lab setting, as it would greatly benefit researchers and clinicians in learning more about associations between emotional distress and word choice in real world applications (see Minor et al., under review). A second limitation of this study is that although we highlight the limitations of subjective measures, we employ these measures to determine emotional distress and schizotypy status. The major aim of this study was to evaluate lexical markers of affect; since self-report is the most widely used measure of emotional distress and schizotypy, these were implemented to test their convergence with lexical markers. This is critical for beginning to build a psychometric case for behaviorally-based metrics. A third limitation is that our sample consisted of only college students; however, this is consistent with previous studies concerning schizotypy (Cohen et al., 2011; Gooding et al., 2005; Kwapil et al., 1997; Minor and Cohen, 2012; Minor et al., 2014). While university settings provide a great platform for schizotypy studies, those involved are functioning at a high enough level to be attending a university. This may lead to generalizability concerns, noted recently in Zhang and Brenner (2017). Future studies should make a concerted effort to recruit people with schizotypy outside of academic settings.

Moreover, while we chose to dichotomize schizotypy into high and low groups based off of overall symptom presentation, an equally acceptable technique is to separate schizotypy into their positive, negative, and disorganized subscales and examine group differences. Although few studies have used this approach to investigate word use, research examining speech and depression have shown that high levels of depression are associated with an increase in negative

word choice and a decrease in positive word choice (Vanheule et al., 2009). Thus, given the close relationship between depression and negative symptoms (Corcoran et al., 2011), it would not be surprising to find similar patterns present in negative schizotypy. Indeed, another direction for future work is to determine the overlap of speech patterns that may exist between positive, negative, and disorganized subscales.

Other factors relating to emotional distress — including anhedonia and neurocognition — are not accounted for in the current study as well, which could have affected speech content. Anhedonia is a well-known symptom of schizophrenia – as well as depression. The lack of pleasure experienced often associated with anhedonia could have affected the content and duration of the interviews, particularly in the schizotypy group. The high levels of depression observed in the schizotypy group — although not clinical in nature — make effects of anhedonia even more likely. Neurocognitive deficits are also common in people with schizophrenia. A study by Cohen et al., (2014) showed that neurocognitive deficits are associated with language disorder in a schizophrenia sample. Neurocognitive deficits are also commonly observed in schizotypy, but to what extent they are correlated with language disorder symptoms is unclear.

This study offers preliminary evidence of the potential effectiveness of lexical analysis in identifying depressive and affective states that cause severe emotional distress in psychometric schizotypy. Researchers should seek to replicate these procedures and findings not only throughout the rest of the schizophrenia-spectrum but in other speech domains as well (see Minor et al., 2016). Our results add to the growing literature concerning negative affect word use in mental illness. Recently, self-referential words have garnered attention in regards to their relationship with negative affect words in people with schizophrenia (e.g., Fineburg et al., 2016). Results from Fineburg and colleagues (2016) suggested that negative affect word use — as well

as self-referential word use — may not be indicators of psychosis, but simply a marker for general illness. One way to parse this relationship may be to analyze speech samples from people with schizophrenia with high levels of depression and compare them to speech from people with schizophrenia displaying low levels of depression. As self-referential words have been shown to be used at a higher rate in people with depression compared to people with schizophrenia (Fineburg et al., 2015), comparing people with schizophrenia with varying levels of depression in their use of negative affect words and self-referential words may provide a more homogenous picture of the two categories. Indeed, further innovations to LIWC and other lexical analysis tools may also provide nuanced word categories better able to accurately isolate these ambiguous disparities.

Furthermore, future work using lexical analysis should continue to explore the relationship between word use, depressive symptoms and QOL in order to gain a better understanding of the potential benefits lexical analysis has in identifying emotional distress. Studies should also investigate potential speech patterns that may be specific to particular stages of the psychosis-spectrum, (i.e, schizotypy, clinical high risk, schizophrenia) with the hope of further parsing the use of language to better identify possible transitional indicators of psychosis. By expanding the work and results found in this study, lexical analysis has the potential to become an objective method capable of identifying emotional distress in severe psychopathology.

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Conflict of interest

None

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Table 1. Group Differences in affect words, depression, and psychological quality of life (QOL).

	Schizotypy (<i>n</i> = 33)	Non-Schizotypy (<i>n</i> = 33)
	Mean (SD)	Mean (SD)
Negative Affect Words	1.86* (0.68)	1.47 (0.51)
Anxiety Words	0.48 (0.43)	0.54 (0.51)
Anger Words	0.34 (0.30)	0.23 (0.27)
Sadness Words	0.41 (0.25)	0.33 (0.25)
Positive Affect Words	2.77 (0.76)	2.85 (0.92)
QOL	12.04** (3.39)	15.45 (2.14)
Depression	9.73** (5.20)	2.30 (2.37)

Notes: SD: standard deviation; * $p < 0.05$; ** $p < 0.01$

Table 2. Correlations between affect words, depression, and psychological quality of life (QOL) within schizotypy and non-schizotypy groups.

<i>Word Use</i>	Schizotypy (<i>n</i> = 33)		Non-schizotypy (<i>n</i> = 33)	
	Quality of Life	Depression	Quality of Life	Depression
Negative Affect	-0.29*	0.21	-0.14	0.13
Anxiety	0.01	-0.08	0.15	-0.02
Anger	-0.30*	0.23	-0.04	-0.10
Sadness	-0.03	0.08	-0.48**	0.38*
Positive Affect	0.20	-0.14	0.00	-0.13

Notes: ** $p < .01$; * $p < .05$

Table 3. Correlations between schizotypy traits, affect words, depression, and psychological quality of life (QOL) within the schizotypy group ($n = 33$).

	Positive traits	Negative traits	Disorganized traits
Negative Affect	-0.06	-0.03	0.04
Anxiety	-0.20	0.16	0.16
Anger	0.29*	-0.33*	0.25
Sadness	0.09	-0.13	-0.27
Positive Affect	0.02	-0.09	0.19
Depression	0.33*	0.09	0.25
QOL	0.03	-0.29*	-0.21

Notes: ** $p < .01$; * $p < .05$

Highlights:

- Lexical analysis is a viable, behavior-based tool for identifying emotional distress.
- Negative affect words were used more prevalently in schizotypy compared to people without schizotypy.
- Higher depression level and lower psychological quality of life was found in schizotypy.
- Associations between negative affect words and psychological quality of life were present in schizotypy.