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# Can Text Analysis of TAT Protocols Differentiate Patients Operating at Neurotic, Borderline, and Psychotic Levels of Personality Organization?

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To the Graduate Council:

I am submitting herewith a dissertation written by Paul H. Tullis entitled "Can Text Analysis of TAT Protocols Differentiate Patients Operating at Neurotic, Borderline, and Psychotic Levels of Personality Organization?." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Michael Nash, Major Professor

We have read this dissertation and recommend its acceptance:

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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Can Text Analysis of TAT Protocols Differentiate Patients Operating at Neurotic,  
Borderline, and Psychotic Levels of Personality Organization?

A Dissertation Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Paul H. Tullis

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## Abstract

This study examined whether computerized text analysis of Thematic Apperception Test (TAT) protocols could differentiate patients operating at neurotic, borderline, and psychotic levels of personality organization (LPO). From a large University psychological clinic archival database, I identified fifty-two ( $N = 52$ ) patients whose files: a) contained verbatim TAT responses; and b) included diagnosis indicative of neurotic, borderline, or psychotic LPO. Verbatim TAT transcriptions were input and analyzed using Linguistic Inquiry Word Count (LIWC) software. I hypothesized that 1) The use of cognitive words would be more common among the TAT protocols of the neurotic patients than among the protocols of the borderline and psychotic patients; 2) the use of negative emotion words and negation words would be more prominent among the psychotic and borderline patient protocols than among the neurotic patients. A limited number of psychotic protocols meeting selection criteria required me to eliminate the psychosis category in the analysis; however, the results of one-way ANOVA found that the neurotic group used cognitive words during TAT administration at a significantly higher rate than did the borderline group. The effect size for this difference was moderate to large.

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## Chapter 1: Introductory Remarks

This archive study tests whether word count analysis alone of Thematic Apperception Test (TAT) (Murray, 1943) protocols can distinguish patients operating at different levels of personality organization. The TAT consists of 32 black and white picture cards. All of the pictures are ambiguous, and many of them are provocative. Eight to twelve cards are selected for administration, based on the age and sex of the testing subject. The subject is shown each card, one at a time. Subjects are asked to answer the following question for each card: 1) what is happening in the scene depicted?; 2) what led up to the situation?; 3) what is the outcome of the situation?; 4) what are the characters feeling and thinking? Subject responses are recorded verbatim.

I collected and analyzed a sample of TAT response protocols from the archives of a community psychological clinic housed at a large university in the southeastern United States. The use of clinic archive material allowed me to use a clinical population sample for this study, which would otherwise be difficult or impossible to access. I used Linguistic Inquiry Word Count (LIWC) (Tausczik & Pennebaker, 2010), a linguistic analysis software program, to analyze patients' TAT responses. I hypothesized, based on existing theory and research, that the TAT response patterns of neurotic, borderline, and psychotic patients would significantly differ in the use of negation words, negative emotion words, and cognitive process words. I argued that these hypothesized patterns of word usage are reflective of differences between these three levels of personality organization in terms of maturity of defenses and in terms of complexity of representations.

## Chapter 2: Literature Review

### Level of Personality Organization

Psychoanalytically informed clinicians tend to conceive of individual patients along two distinct and interacting dimensions: level of personality organization, and type of personality organization (McWilliams, 1994; Lerner, 1991). Type of personality organization, or personality configuration, refers to an individual's character type (e.g. depressive, hysteric, obsessive/compulsive, or narcissistic). Level of personality organization (LPO), the focus of this study, refers to the maturity of an individual's character. Patients are classified as functioning at one of three levels of organization: neurotic, borderline, or psychotic.

**Structural criteria for LPO.** According to Kernberg's structural model (1984; 1971), each patient's level of organization is indicated by her/his position on three dimensions: 1) degree of identity integration; 2) maturity of defensive operations; and 3) capacity for reality testing. The table in Appendix A provides a differentiation of neurotic, borderline, and psychotic levels of personality organization according to their defining structural criteria.

**Identity integration.** Degree of identity integration refers to the how sharply delimited one's sense of self and other is, along with the degree to which contradictory aspects of self and others are integrated as a cohesive whole (Kernberg, 1984). In normative terms, identity refers to one's stable, enduring sense of who he or she is in relation to society. According to Erikson's (1986) psychosocial theory of human development, identity formation is the central psychosocial crisis of adolescence, although identity is normally subject to some changes throughout the course of life. In *The Ego and*

*the Problem of Identity* (1986), he describes identity formation as the outcome of “the selective repudiation and mutual assimilation of childhood identifications and their absorption in a new configuration...dependent on the process by which a society...identifies a young individual” (p. 230).

The normal, healthy outcome of this crisis of adolescence is a stable, well-adjusted sense of self in relation to the world, in preparation for subsequent identity development. The identity of the healthy individual is an “evolving configuration”, subject to modification throughout the lifespan in response to changing circumstances and demands (Erikson, 1986, p. 232). Identity formation in adolescence enables the healthy individual to make these adjustments smoothly, without undue psychological distress or disturbance.

Identity diffusion and experimentation with different roles are a normal part of adolescence. In post-adolescence, however, diffusion represents “the inability of [the ego] to establish an identity” (Erikson, 1986, p. 239). Identity diffusion is often prominent in cases of pre-psychotic and borderline forms of pathology. A discussion of identity diffusion in borderline pathology is central to Helene Deutsch’s (1986) description of the “as-if” personality, characterized by “a highly plastic readiness to pick up signals from the outer world and to mold oneself and one’s behavior accordingly” (p. 76). According to Kernberg (1984), identity diffusion “is reflected in the subjective experience of chronic emptiness, contradictory self-perceptions, contradictory behavior that cannot be integrated in an emotionally meaningful way, and shallow, flat, impoverished representations of others” (p. 12).

***Defensive operations.*** Maturity of defensive operations is defined according to how adequately one’s intrapsychic defenses protect against anxiety and painful affect while also



maintaining touch with reality (Kernberg, 1984, 1971). The concept of psychological defense can be traced to Sigmund Freud's early discovery that the human psyche endeavors to keep painful thoughts and feelings from becoming conscious (Freud, 1894). In keeping with his early topographical model of the psyche, Freud initially conceived of defense as a generalized mode of mental functioning that counterbalances the demand for discharge by instinctual drives (Cramer, 1991). The publication of *The Ego and the Id* (1923) heralded Freud's structural model of psychic functioning. His structural model posited that the psyche consists of the id, the ego, and the superego. The defenses were now conceived of as functions of the ego, which is responsible for simultaneously mediating the internal demands of the id and the superego, as well as the external demands of reality.

Anna Freud provided the first systematic elaboration of the defense mechanisms with the publication of *The Ego and the Mechanisms of Defense* (1936/1966). She explained that the defenses serve to protect the ego from anxiety and accompanying painful affect. She described three types of anxiety, each distinguished by its source. The first was superego anxiety, which emerged because of that prohibitive agency's protests against the sexual and aggressive instinctual demands of the id. She viewed superego anxiety as the primary source of neurosis in mature adults.

The second type of anxiety described by Anna Freud was objective anxiety, i.e. anxiety arising from fear of punishment for instinctual urges by an external agency. She viewed objective anxiety as infantile in nature. Whereas the adult psyche is held under sway of a powerful superego, the infantile psyche is not. This view reflects the assumption of early instinctual psychoanalytic theory that for the first few years of life, the id and ego

are poorly differentiated, and that the superego develops relatively later in childhood. With both superego anxiety and objective anxiety, however, anxiety fundamentally stems from forbidden instincts seeking discharge. In both cases, defenses are employed in response to anxiety arising from conflict between desire and prohibition.

In addition to conflict between instinctual desire and internally or externally sourced prohibition, anxiety can arise when the strength of aggressive and/or libidinal instincts is experienced by the ego as overwhelming in and of itself (Freud, 1936/1966). With instinctual anxiety, the ego fears its own disintegration or annihilation in the face of overwhelming instinctual demands, rather than punishment from some internal or external source. This is viewed as a special form of anxiety in that it represents a failure or breakdown of the relationship between the ego and its subsidiary structures, a relationship that normally maintains psychic homeostasis. Instinctual anxiety is thus characteristic of certain normal or pathological stages of development, during which “a sudden accession of instinctual energy threatens to upset the balance of the psychic institutions, as is normally the case owing to physiological changes, at puberty and the climacteric, and occurs for pathological reasons at the beginning of one of the periodic advances which occur in psychosis” (Freud, 1936/1966, p. 60). As with superego and objective anxiety, instinctual anxiety compels the ego to mobilize the psychological defenses in an attempt to restore intrapsychic harmony.

Anna Freud’s categorization of the sources of anxiety that lead to defensive operations, and her distinction between infantile and mature forms of anxiety, are founded on the assumption that all mental life is fundamentally driven by the need on the part of the ego to manage sexual and aggressive instinctual drives. This essentially instinctual/ego-

driven view of psychological functioning minimizes the importance of external relationships with others, who are viewed as “merely the goal of the drive to enable its discharge” (Buckley, 1986, p. vii). Object relations theory challenged this instinctually based, ego-driven view of psychological functioning by positing that humans are fundamentally relationship-seeking (e.g. Fairbairn, 1954). The early writings of Melanie Klein (1935, 1928) exemplify the standpoint that, beginning in infancy, internalization of caregivers gives rise to persecutory anxiety, which the infant manages through primitive defenses such as denial, projection and splitting. The use of primitive defenses in adults remains central to psychoanalytic understanding of severe psychopathology (Grotstein, 1981; Kernberg, 1984, 1971). Empirical studies using the TAT support the notion that the use of defense mechanisms changes over the course of normal childhood development (Cramer, 2007; Porcerelli, Thomas, Hibbard, & Cogan, 1998).

***Reality testing.*** Reality testing is a term used to describe the individual’s capacity to distinguish what is real from what is not real. Reality testing is expressed: 1) in one’s ability to distinguish self and other as separate; 2) in the ability to differentiate between internal and external stimuli (i.e. fact from fantasy); and 3) in the ability to evaluate self and other with depth and accuracy (Kernberg, 1984, 1971). In broad theoretical terms, the emergence of reality testing begins during infancy in adaptation to the demands and frustrations imposed by the environment, and develops throughout childhood as cognitive capacities evolve (Piaget, 1972; Freud, 1936/1966; Klein, 1928).

In diagnostic terms, reality testing may be impaired, or it may be intact. The most obvious example of impaired reality testing is the presence of delusions and/or hallucinations. In such cases, reality testing is considered absent (Kernberg, 1984). Beyond

its sheer absence, impaired reality testing may be reflected in the interview setting to varying degrees by “whatever inappropriate affect, thought content, or behavior can be observed” (Kernberg, 1984, p. 18), or by the interviewee’s incapacity to empathize with the interviewer’s perceptions of the interview. The use of denial and primitive projection in assessment and interview settings is also understood to be indicative of impaired reality testing (Cramer, 1991; Kernberg, 1986).

### **Neurotic, psychotic, and borderline LPO.**

***Neurotic level of personality organization.*** Neurotic-level patients demonstrate relatively good overall functioning. The problems they seek treatment for are typically circumscribed (McWilliams, 1994). Neurotic patients rely primarily on higher order defenses to manage intrapsychic conflict, such as repression, reaction formation, identification, rationalization, and intellectualization (McWilliams, 1994; Kernberg, 1984). Neurotics are characterized by an integrated sense of identity (Kernberg, 1984). They have a sharply delimited sense of self and other. Their representations of self and other are stable over time, are complex, and integrate contradictory aspects into a cohesive whole (McWilliams, 1994; Kernberg, 1984). The neurotic’s capacity for reality testing is intact, as reflected in the ability to differentiate between self and other and between internal and external origins of stimuli, and in the ability to evaluate self and other with accuracy and depth (McWilliams, 1994; Kernberg, 1984).

***Psychotic level of personality organization.*** Patients organized at the psychotic level may be actively psychotic, as indicated by the presence of hallucinations, overtly delusional thinking, and/or other psychotic symptoms (e.g. catatonia, e.g. hebephrenia); however, psychosis may not be immediately apparent, such as in the absence of delusions

and/or hallucinations (McWilliams, 1994). As Michael Eigen states in the preface of *The Psychotic Core* (1986), “Overtly psychotic individuals make up a relatively small proportion of the general and patient population, but psychotic attitudes and stages can be components of a broad range of emotional states and mental disorders” (p. vi).

Diagnostic systems based purely on descriptive criteria, such as the DSM-IV-TR (APA, 2000) and the ICD-10 (1992), focus on symptoms that are readily accessible by observation and self-report. This purely descriptive approach is prone to overlooking crucial indicators of psychosis that may not be immediately evident, such as identity diffusion and subtler forms of delusional thinking. In recent years, psychiatric researchers have turned their attention to the diagnostic complexities of psychotic mental illness and its implications for treatment (e.g. Coentre, Blanco, Fontes, & Power, 2011). The problem of detecting underlying psychosis in the absence of overt symptoms was highlighted in a recent study of cognitive deficits in early psychosis, which found that when compared with depressive patients and healthy controls, pre-psychotic individuals demonstrated relative deficits in working memory and executive functioning (Schulze, Zimmermann, Gschwandter, Pflueger, Rapp, Studerus, & Riecher-Rossler, 2013). Consideration of the patient along the three dimensions of personality organization that Kernberg’s (1984) system of structural diagnosis advocates is useful for revealing when an underlying psychotic structure is present.

Psychotic patients rely on primitive psychological defenses, including denial, primitive forms of projection and introjection, withdrawal, and splitting (McWilliams, 1994; Kernberg, 1984). The defenses of the psychotic person function as means of protecting against profound dread (of annihilation), disintegration, and self-object merging

(McWilliams, 1994; Karon & Vanderbos, 1981; Sullivan, 1953). This contrasts with other levels of organization, where psychological defenses protect against anxiety arising from intrapsychic conflict (McWilliams, 1994; Kernberg, 1984).

Identity diffusion is conspicuous in psychotic patients (McWilliams, 1994; Kernberg, 1984). The psychotic person's sense of self and of other is often poorly delimited, and he/she may experience profound anxiety over basic existential questions, such as "who am I", or "how do I know I exist" (McWilliams, 1994). The psychotic person's capacity for reality testing is severely compromised. Poor reality testing may be reflected in delusional ideation, and/or hallucinatory experiences. When such dramatic indicators are absent, impaired reality testing may become apparent over time through the patient's confusion between self and non-self, or through confusion between internal and external origins of stimuli (Kernberg, 1984).

***Borderline level of personality organization.*** As its name suggests, this level of personality organization indicates functioning at a level between neurotic and psychotic levels of organization. Broadly speaking, the borderline level of organization is characterized by impairments in identity integration, defensive operations, and reality testing that are less severe than those found with psychotic patients, but are too severe and pervasive to consider the patient neurotic. As McWilliams (1994) succinctly states, borderline patients are "too sane to be considered crazy, and too crazy to be considered sane" (p. 50).

Like psychotic patients, borderlines rely on primitive defenses such as denial, splitting, and primitive projection; however, defensive distortion of reality is significantly less severe (McWilliams, 1994; Kernberg, 1984). As with neurotic patients, the defensive

operations of borderlines protect against intrapsychic conflict, rather than protecting against the fears of annihilation and self-object merger seen with psychotic patients (Kernberg, 1984). Borderline patients exhibit identity diffusion, characterized by poor integration of contradictory aspects of self and other; however, unlike with psychotic patients, they are able to distinguish between self and other (Kernberg, 1984). Their representations of self and other are unstable and subject to dramatic changes over time. The borderline typically describes her/himself and others in ways that are dismissive of complexity and ambiguity (McWilliams, 1994; Kernberg, 1984). Reality testing is intact in terms of differentiation of self and non-self and in terms of internal versus external origins of stimuli; however, the borderline patient's capacity to realistically evaluate self and other with complexity and depth is low compared with neurotics (Kernberg, 1984).

**TAT research on levels of personality organization.** Existing research findings demonstrate that patients' TAT response patterns reflect the use of certain defenses and internal representations, which in turn correspond with levels of personality organization (e.g. Hibbard, Porcerelli, Kamoo, Schwartz, & Abell, 2010; e.g. Westen, Lohr, Silk, Gold, & Kerber, 1990). Hibbard et al's (2010) study involved coding patient (N=155) TATs using the Object Relations and Social Cognition (ORSC) (Westen, Lohr, Silk, Kerber, & Goldrich, 1989) and the Defense Mechanisms Manual (DMM) (Cramer, 1996) scales for the TAT. ORSC coding variables include complexity of representations, affective tone of relationships, capacity for emotional investment and understanding of social causality. DMM coding variables included denial, projection, and identification, which are viewed as a sequence of defenses indicating successively greater defensive maturity.

Hibbard et al's TAT study (2010) found confirmation of their hypotheses that use of denial would decrease between groups of successively higher levels of organization, while use of identification increased as organization level increased. All ORSC variables yielded significant differences between normal, neurotic, borderline, and psychotic subjects, with moderate to large effect sizes.

## **LIWC**

LIWC (Pennebaker, Booth, & Francis, 2007) is a computerized text analysis program that analyzes the rate of use of different categories of words within a given text. Tausczik and Pennebaker (2010) describe LIWC as consisting of a processing component and a dictionary component. The processing component opens text files, then categorizes each word contained within the text file by comparing it to a dictionary file. The dictionary file consists of over 80 dictionaries, or word categories, each comprised of a collection of words that define that category.

LIWC word categories can be broadly categorized as content words and style words. Content words comprise what is being communicated within a given text, and include nouns, regular verbs, adjectives, and adverbs. Style words reflect how the content is being communicated, and include pronouns, prepositions, articles, and conjunctions. LIWC output provides a rate of usage along each of its dictionary categories, given as percentage of word count for each category relative to overall word count.

LIWC appeals to the purposes of this study in a number of ways. LIWC targets specific words, rather than relationships within and among clauses. It is designed for analysis of text from any source, including both written and spoken narratives. These considerations make it ideally suited for testing hypothesized differences in word usage



using transcribed data from clinical testing. Furthermore, LIWC's array of dictionaries includes linguistic style and psychological process dimensions. It thus facilitates examination of how participants construct their TAT narratives, as well as what actions and attributes they assign to their narrative's characters. LIWC's categories are atheoretical, unlike other existing programs whose dictionaries are derived from existing theoretical constructs (e.g. General Inquirer, Gottshalk-Gleser Method) (see Mehl, 2006). Finally, as discussed below, LIWC is a relatively new program that has demonstrated research utility across a wide spectrum of research questions, including clinical research. To date, only one published LIWC study (Pennebaker and King, 1999) has examined TAT responses. As described below, that study utilized a non-clinical sample. No LIWC studies examining LPO have been published to date. This study is thus innovative in the sense that it explores the potential application of LIWC to personality diagnosis.

**LIWC psychological research.** Researchers have used LIWC to examine a range of psychological correlates, including attentional focus, emotion, and personality traits. In a non-clinical study of attentional focus, Rude, Gortner, and Pennebaker (2004) posited that depressive individuals are biased toward a pervasively negative view of self and other, and that depressive individuals are more focused on themselves than non-depressive people. Based on this, they hypothesized that use of negative emotion words and 1<sup>st</sup> person singular pronouns on a writing task would differ, based on self-reported level of depression, in a non-clinical sample of undergraduate volunteers (N = 124). They found that depressed participants used negative emotion words more frequently than non-depressed participants. Depressed participants also used 1<sup>st</sup> person singular pronouns more frequently than those who were not currently depressed.

Tausczik & Pennebaker (2010) point to a study on experiences of teasing by Kowalski (2000) as an example of LIWC utility for social and psychological research. Specifically, they argue that LIWC-based research can help discern not only who or what is the focus of attention, but also how focus can shift according to one's perspective. They cite Kowalski's (2000) findings that undergraduate volunteers used more self-referencing pronouns when describing experiences of being teased than when describing instances where they teased others. Conversely, participants used more pronouns referencing others when writing about teasing than when being teased.

Research on language use and personality has also yielded some positive results. Pennebaker and King (1999) conducted a study where the TAT was administered to a group of 69 undergraduate volunteers. They found that a composite LIWC measure of achievement was moderately correlated with judges' ratings of need for achievement. In a separate study included in the same article publication, Pennebaker and King (1999) report low but stable correlations between certain Big-5 personality traits and use of emotion words and social references. Neuroticism was positively correlated with negative emotion words, but negatively correlated with positive emotion words. Extraversion was positively correlated with negative emotion words and social reference words. Agreeableness was positively correlated with positive emotion words, and negatively correlated with negative emotion words. Pennebaker and King (1999) point out that "although these correlation coefficients are quite modest, they were all statistically significant given the sample size of 841 participants" (p. 1306).

**Clinical research using LIWC.** LIWC-based research has found relationships between language use and symptoms of mental illness. As discussed above, researchers

have presented findings demonstrating that word count analysis can discriminate between depressed and non-depressed individuals in non-clinical population (Rude et al, 2004). Word count analysis has also yielded significant findings regarding traumatization. In one study, Romisch, Leban, Habermas, and Doll-Hentschker, (2014) compared written narrative of traumatic events with narratives of non-traumatic events in a sample of 14 women with current diagnoses of post-traumatic stress disorder (PTSD) and 14 women without any trauma history. Participants were each asked to provide three verbal narratives recollecting the happiest, most distressing, and most angering events in their lives. Results supported their hypotheses of greater immersion on the distress-related narrative task among the PTSD participants, as indicated by higher word count, more frequent use of perceptual words, and more past tense perspective.

In another recent study examining word count and traumatization, Papini, Yoon, Rubin, Lopez-Castro, and Hien (2015) used LIWC to compare narratives provided by trauma survivors with PTSD with narratives from trauma survivors without PTSD. “Consistent with hypotheses, the PTSD group used more third-person singular pronouns... fewer third-person plural pronouns...and more death-related words” (Papini et al, 2015, p. 298).

Papini et al’s (2015) study also found that “strong correlations were observed with different symptom clusters of PTSD” (p. 298). The use of third-person singular pronouns was positively correlated with re-experiencing symptoms. Cognitive flexibility words were negatively correlated with re-experiencing symptoms. The use of death-related words was negatively correlated with avoidance and numbing symptoms. Greater use of anxiety words

was associated with lower hyperarousal symptoms. A strong positive association was observed between sad words and re-experiencing symptoms.

To summarize the concepts and findings discussed so far, LPO is a diagnostic concept that classifies patients as neurotic, borderline, or psychotic. Classification is determined by patients' location along three dimensions: identity integration/diffusion, level of defensive operations, and capacity for reality testing. Clinical research examining between-LPO differences in defensive maturity and complexity of representations have yielded moderate to large effect sizes. Existing research also supports the utility of LIWC for examining patterns of word usage that reflect a range of categories of psychological functioning, such as affect, personality traits, and attention. LIWC research examining certain diagnostic populations has found clinically relevant differences in word usage that are moderately-to-strongly correlated with the presence and severity of symptoms.

**Level of personality organization and DSM-IV-TR diagnosis.** As described below, this study categorized each participant as neurotic, borderline, or psychotic, based on her/his DSM-IV-TR assessment report diagnosis. This broad categorization scheme is based on this researcher's assumption, supported by existing literature, that a parallel relationship exists between LPO diagnosis on one hand, and DSM-IV-TR multiaxial diagnosis on the other (Hibbard et al, 2010; Smits, Vermote, Claes, & Vertommen, 2009; McWilliams, 1994; Kernberg, 1984).

Specifically, this study assumes that an individual with diagnosis of one or more Axis I disorders (with the exception of any psychotic disorder, psychotic features, or bipolar mood disorder) and no comorbid Axis II diagnosis is functioning at the neurotic level of personality organization. Individuals with an Axis II personality disorder or bipolar

mood disorder are assumed to function at the borderline LPO. Individuals diagnosed with a psychotic disorder or any other disorder with psychotic features are considered to be organized at the psychotic level, regardless of comorbidity.

The decision to classify participants diagnosed with a bipolar mood disorder as functioning at the borderline level may seem contentious from the standpoint of contemporary mainstream psychiatry, since the DSM-IV-TR considers these disorders to be essentially mood-driven, and thus separate and distinct from Axis II personality disorders (APA, 2000). Psychoanalytically oriented theoretical and clinical literature, however, supports this classification. In the DSM-IV-TR diagnostic scheme, Bipolar I and Bipolar II disorders are each characterized, in part and to varying degrees, by manic thinking and/or behavior. Object relations theory has long held that mania and hypomania are defensive in nature, functioning to protect the individual from anxiety and from painful feelings (of guilt and longing). They do so through the denial of those aspects of internal and external reality that give rise to such unpleasant stimuli (Klein, 1935, 1940, 1952). According to McWilliams (1994), "Mania is the flip side of depression...an essentially depressive organization, which is counteracted by the defense of denial" (p. 248). Omnipotence and idealization, which inevitably distort reality, are also typical in manic and hypomanic states. In bipolar individuals, mania alternates or coexists with depressive phenomena, such as shame, guilt, and beliefs of self-inadequacy or worthlessness (Psychodynamic Task Force, 2006). Overall, the presence of a bipolar mood disorder implies the use of primitive defenses (especially denial), distortion of reality, and unstable identity. This clinical picture bears sufficiently strong similarity to Kernberg's (1984) borderline personality

organization to merit the classification of bipolar individuals as borderline for the purpose of this study.

**Denial and negation.** In the LIWC dictionary, Negations is a Linguistic Processes word category (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). The Negations category consists of 57 words. Examples of words in this category include *aren't*, *cannot*, *hadn't*, and *nothing*.

This study assumes that higher frequency of negation words in TAT response narratives is one indicator of pervasive use of denial by the respondent. Denial involves ignoring or disavowing the existence of internal or external stimuli that would otherwise provoke intolerable anxiety. Denial is viewed one of the most developmentally primitive and least adaptive of psychological defenses (McWilliams, 1994; Cramer, 1991a, 1991b). According to Cramer (1991a), negation on the TAT may be expressed through negating statements: "Negation is scored if a character in a story 'does not...' any action, wish, or intention that, if acknowledged, would cause displeasure, pain, or humiliation" (p. 218). In addition to use of negating statements, denial may manifest in TAT responses through the ignoring of people or objects depicted on the TAT picture cards, or through unrealistically positive depictions of events (Weiner & Greene, 2008; Cramer, 1991a, 1991b). Only denial through the use of negation words is examined in this study.

**Projection and negative emotion.** Negative Emotions is an LIWC Psychological Processes subcategory of Affective Processes words. 499 words make up this subcategory. The Negative Emotions subcategory is composed of Anxiety, Anger, and Sadness subgroups. Negative Emotions words include *hate*, *worthless*, *enemy*, *fright*, and *guilt*, as well as numerous profanities.

Higher frequency of negative emotion words on the TAT is assumed to reflect the use of projection. Projection “consists of attributing characteristics to people and situations without adequate justification” (Weiner & Greene, 2008, p. 438). Projected attributes often involve angry feelings and hostile intentions, and are frequently reflected on the TAT in themes of mistrust and in excessive concerns about danger and persecution. (Cramer, 1996). Projection requires some capacity for differentiation of self and other; thus, it is considered a more developmentally mature, more sophisticated mode of defense than denial. Nonetheless, projection involves the distortion of reality, and is thus understood as being relatively primitive and maladaptive (McWilliams, 1994; Cramer, 1991a, 1991b).

**Cognitive process words, reflective functioning, and object complexity.**

Cognitive Processes is an LIWC Psychological Processes word category. 730 words make up this category. Cognitive Processes subcategories include Insight, Causation, Discrepancy, Tentative, Certainty, Inhibition, Inclusive, and Exclusive. Examples of Cognitive Processes words include *attribute, determine, provoke, indecisive, avoid, include, and exclude*.

This study hypothesized that as LPO increased between the three patient groups, frequency of cognitive process words would be greater. This hypothesized trend was based on the assumption that frequency of cognitive words provides some indication of individuals’ capacity for reflective functioning. Reflective functioning is defined as “the capacity to envision and think about mental states, in oneself and in others, in the service of building realistic models of why they behave, think, and feel as they do” (Bouchard et al., 2008, p. 47). The capacity to reflect on one’s own mental state and to conceive of others as autonomous rather than as self-objects is associated with relatively advanced levels of self-

other differentiation, and with greater complexity of object representations (see Fertuck, Mergenthaler, Target, Levy, & Clarkin, 2012; see Hibbard et al, 2010).

### **Rationale for This Study**

Identifying a given patient's LPO is crucial to both diagnosis and treatment (PDM Task Force, 2006; McWilliams, 1994). Accurately diagnosing an individual as neurotic, borderline, or psychotic is complex, and requires the use of converging sources of clinical data, including free-response instruments like the TAT (Weiner & Greene, 2008; Bornstein, 2010). Standardized TAT interpretation systems have been developed to provide clinicians with relatively objective criteria for scoring responses, e.g. Social Cognition and Object Relations Scales (SCORS) (Westen, 1995) e.g. Defensive Maturity Manual (DMM) (Cramer, 1996). These standardized TAT interpretation systems rely on coding by trained judges, who assign numerical scores to patient responses based on interpretation system guidelines. Training judges to an acceptable level of inter-rater reliability is expensive and time-consuming, to say nothing of the time and effort required to actually score and code TAT responses using such coding systems. These systems ultimately rely on judges' subjective decisions. This inevitably poses questions about the reliability of the scores they provide. LIWC-based TAT analysis based on word count may be able provide an expedient, more objective aid for interpretation that does not require highly trained raters.

This study is exploratory in nature. Existing LIWC research findings support the existence of trends in word usage that are associated with psychological functioning and psychopathology; however, LIWC research has not addressed the question of how LPO is reflected in word usage on a performance-based narrative assessment instrument like the TAT. This study therefore contributes to existing knowledge about how important aspects



of personality and psychopathology are reflected in language use. It is also a novel application of LIWC-based methodology to clinic archive data. As such, this study may provide a new basis for clinical research using text analysis software.

## Chapter 3: Method

### Participant Selection and Data Collection

**Clinic & archive description.** Participant data was gathered from the archives of a psychological training clinic. The clinic is housed at a large public university located in the Southeastern United States. It provides a variety of psychological services to the general public and to graduate and undergraduate students at its hosting institution. The services this clinic offers include comprehensive assessments addressing a wide scope of presenting problems (e.g. determination of eligibility for classroom/testing accommodations, assessment of parenting fitness by court order, assessment of treatment needs).

The clinic is staffed by doctoral student trainees enrolled in the hosting institution's clinical psychology program. All student-trainees working in the clinic have completed at least their first year of the doctoral program, which includes two semesters of coursework in clinical assessment. Clinical assessment coursework includes didactic and practical familiarization with the TAT. Students are trained to transcribe patients' TAT responses verbatim. All students receive assessment and therapy supervision from experienced licensed clinician faculty members (adjunct or full-time). Clinic supervisors must approve and sign off on all completed assessment reports.

Inactive clinic files are stored in the clinic archives. All files are kept in the secure archive location in the clinic for seven years before being destroyed. At present, the archive includes inactive files dating as far back as 2009.

**Patient consent.** At intake, all patients at this clinic complete documentation of informed consent. The informed consent document that each patient signs includes acknowledgement that the clinic exists for the purpose of training clinical psychology

doctoral students. Patients are also informed that all sessions are video recorded. Intake patients acknowledge that their de-identified patient records may be used for research and training purposes. At intake, the student-trainee conducting the intake session reviews the consent document with the patient to ensure that the patient understands the informed consent they are asked to provide.

**Participant selection & data collection.** Institutional Review Board (IRB) approval for this study was obtained prior to beginning data collection. Patient files were selected from the clinic archive based on the following criteria: 1) Only inactive patient files were used for this study; 2) Only files belonging to patients who were between 18 and 65 years old at the time of intake were selected; 3) Only patient files containing a completed and signed assessment report that includes DSM-IV-TR diagnosis of an Axis I and/or Axis II disorder were selected; 4) Only files containing a verbatim record of the patient's TAT responses were selected.

**Participant classification.** Once all participant files were collected, each participant was assigned to the neurotic LPO group, the borderline LPO group, or the psychotic LPO group. Group classification of each participant was made according to her/his final assessment report's DSM-IV-TR diagnosis/es.

**Neurotic LPO group.** Participants assigned to the neurotic group met the following criteria: 1) any Axis I diagnosis with the exception of a bipolar mood disorder, a psychotic disorder, or a diagnosis of a disorder with psychotic features; 2) no comorbid diagnosis of an Axis II personality disorder.

**Borderline LPO group.** Participants assigned to the borderline group met the following criteria: 1) diagnosis of any bipolar mood disorder or any Axis II personality

disorder with the exception of schizotypal personality disorder; 2) no comorbid diagnosis of a psychotic disorder or diagnosis that included psychotic features.

***Psychotic LPO group.*** Participants with a diagnosis of any psychotic disorder or an Axis I or Axis II disorder with psychotic features were assigned to the psychotic group.

**Data collection.** TAT protocols from each participant file were transcribed in Microsoft Word format. LIWC analysis of TAT transcript word count along the program's 82 dictionary categories was conducted. Word count percentage means for negation words, cognitive process words, and negative emotion words were compiled for the three sample groups.

## **Hypotheses**

The following hypotheses for differences in word usage between the psychotic group (P), the borderline group (B), and the neurotic group (N) were formulated.

**Hypothesis 1.** One-way ANOVA will demonstrate significant differences in the use of Negation words between the psychotic, borderline, and neurotic patient groups. Post-hoc comparison will show that the psychotic group's use of negation words is significantly greater than the borderline and neurotic groups, and that the borderline group's use of negation words is significantly greater than the neurotic group's. (H0: P = B = N) (H1: P > B > N) ( $p < .05$ ).

**Hypothesis 2.** ANOVA will show that the use Negative Emotions words differs significantly between the psychotic, borderline, and neurotic groups. Post-hoc comparison of the three groups will show that the psychotic group's use of Negative Emotion words is significantly greater than that of the borderline and neurotic groups, and that the

borderline group's use of Negative Emotion words is significantly greater than the neurotic group's. (H0: P = B = N) (H1: P > B > N) ( $p < .05$ ).

**Hypothesis 3.** ANOVA will show that the use of Cognitive Processes words differs significantly between the psychotic, borderline, and neurotic groups. Post-hoc comparison will show that the psychotic group's use of Cognitive Processes words is significantly less than the borderline and neurotic groups' frequency of use, and that the borderline group's frequency of use is significantly less than the neurotic group's. (H0: P = B = N) (H1: P < B < N) ( $p < .05$ ).

The hypotheses for this study are summarized in Table 1.

Table 1

<i>Hypothesized Word Usage Differences Among Neurotic, Borderline, and Psychotic Patients</i>		
Word usage category	Hypothesized main effect <sup>a</sup>	Hypothesized post-hoc comparisons <sup>b</sup>
Negative Emotions words	Significant main effect: P ≠ B ≠ N	Post-hoc differences are significant: P > B > N
Negation words	Significant main effect: P ≠ B ≠ N	Post-hoc differences are significant: P > B > N
Cognitive Processes words	Significant main effect: P ≠ B ≠ N	Post-hoc differences are significant: P < B < N

*Note.* P = psychotic group; B = borderline group; N = neurotic group. <sup>a, b</sup> .05 significance level.

**Data analysis.** This study originally intended to use one-way ANOVA to test for hypothesized word count mean differences between the neurotic, borderline, and psychotic participant groups. Post-hoc analyses of ANOVA results were to be conducted using Tukey's Honest Significant Differences (HSD) Test. As discussed in the results section

below, however, concerns about the size and composition of the psychotic group necessitated its elimination, and modification of all hypotheses.

Independence of observations was satisfied by the design of this study. Assumptions of normality and heterogeneity of variance were checked, and ANOVA were computed, using Statistical Package for Social Sciences (SPSS) software. The alpha value for ANOVA testing of significant differences between the three groups ( $k = 3$ ) was .05 ( $p < .05$ ),  $df = 2$ .

## Chapter 4: Results

A search through all files in the clinic archive yielded 52 eligible patient TAT protocols ( $N = 52$ ) for use in this study. The dates of assessments for these protocols ranged from 2009 to 2015. In terms of biological sex, 24 participants were female, and 28 were male. Participant age ranged from 18 to 57, with a mean age of 30.86. 25 participants were assigned to the neurotic LPO group ( $n = 25$ ) (11 females, 14 males). The borderline group consisted of 21 participants ( $n = 21$ ) (11 females, 10 males). The psychotic group consisted of 6 participants ( $n = 6$ ) (2 females, 4 males). Each participant was assigned an identification code based on group classification and file number order. Appendix B provides a table listing each participant by code, group assignment, and assessment diagnosis/es.

Normality of distribution was checked using Kolmogorov-Smirnov Test of Normality. Normality tests showed that distribution of Negation words, Negative Emotions words, and Cognitive Processes words did not significantly differ from normal for any of the three sample groups. Levene's Tests demonstrated homogeneity of variance between groups for all hypothesized variables.

### **Anomalous Data**

The psychotic group size ( $n = 6$ ) was quite small. This raised doubt as to whether the dependent variable means for the psychotic group were generalizable of the overall population of psychotic patients. To address this concern, the psychotic group was eliminated from this study. Revised hypotheses predicted differences between the neurotic and borderline groups in the use of Negation words, Negative Emotions words, and Cognitive Processes words.

## Revised Hypotheses

Three revised hypotheses were tested. They are summarized in Table 2.

**Hypothesis 1.** The borderline group's mean percentage of Negation words use will be significantly greater than the neurotic group's mean percentage of Negation words ( $p < .05$ ).

**Hypothesis 2.** The borderline group's mean percentage of Negative Emotions words use will be significantly greater than the neurotic group's mean percentage of Negative Emotions words ( $p < .05$ ).

**Hypothesis 3.** The neurotic group's mean percentage of Cognitive Processes words will be significantly greater than the borderline group's mean percentage of Cognitive Processes words ( $p < .05$ ).

The three revised hypotheses were tested using one-way ANOVA. The total sample size for this analysis was 46 ( $N = 46$ ), with 25 subjects in the neurotic group ( $n = 25$ ) and 21 in the borderline group ( $n = 21$ ).

Table 2

### *Hypothesized Differences Among Neurotic and Borderline Patients*

Word usage category	Hypothesized main effect <sup>a</sup>
Negation	Significant main effect B > N
Negative Emotions	Significant main effect B > N
Cognitive Processes	Significant main effect B < N

*Note.* B = borderline group; N = neurotic group. <sup>a</sup> .05 significance level.



## Analysis Results

ANOVA results of hypothesis testing and effect size for significant results are summarized in Table 3.

**Negation words.** The difference in relative percentage of Negation words between the neurotic group ( $M = 2.22, SD = 1.06$ ) and the borderline group ( $M = 1.95, SD = .86$ ) was not statistically significant,  $F(1,44) = 0.88, p = .35$ .

**Negative Emotions words.** The difference in use of Negative Emotions words between the neurotic group ( $M = 2.84, SD = 1.16$ ) and the borderline group ( $M = 2.60, SD = 1.19$ ) was not statistically significant,  $F(1,44) = .49, p = .49$ .

**Cognitive Processes words.** The neurotic group's mean relative percentage of Cognitive Processes words ( $M = 19.46, SD = 2.63$ ) was significantly more prominent than the borderline group's mean relative percentage ( $M = 17.78, SD = 2.48$ ),  $F(1, 44) = 4.88, p = .03$ . This difference was in the direction predicted. Eta-squared ( $\eta^2$ ), a commonly used effect size metric for one-way ANOVA (Levine & Hullett, 2002), was used to determine the effect size for Cognitive Processes words. For Cognitive Processes words,  $\eta^2 = .10$ .

Guidelines based on Cohen (1988) suggest the following interpretation guidelines for  $\eta^2$ :  $\eta^2 = .01$  is a small effect size;  $\eta^2 = .06$  is a medium effect;  $\eta^2 = .14$  is a large effect size (see Fritz, Morris, & Richler, 2011). Using these guidelines, the effect size for Cognitive Processes words found here is medium-to-large.

Table 3

*Results of revised ANOVA hypothesis testing and effect size*

	Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$ <sup>a</sup>
Between Groups-N	.838	1	.838	.881	.353	
Within Groups-N	41.885	44	.952			
Total-N	42.723	45				n/a
Between Groups-NE	.681	1	.681	.399	.486	
Within Groups-NE	60.687	44	1.379			
Total-NE	61.368	45				
Between Groups-Cog	32.081	1	32.081	4.882	.032*	n/a
Within Groups-Cog	289.123	44	6.571			
Total-Cog	59.275	45				.10

*Note.* N = Negation words; NE = Negative Emotions words; Cog = Cognitive Processes words. \* denotes statistical significance at .05 level ( $p < .05$ ). <sup>a</sup> reported only for significant results.

### Post-hoc Power Analysis

Given its exploratory nature, this study had no precedent. An *a priori* power analysis based on expected effect sizes could therefore not be conducted. In light of this, a post-hoc power analysis was conducted for the results of each ANOVA. It is important to note that the results of this analysis are not meant to influence readers' interpretation of negative findings (see Hoenig & Heisey, 2001, for a critique of the use of post-hoc analysis to dispute null findings). Post-hoc analysis results are provided only to facilitate discussion of this study's strengths and limitations. Post-hoc power analysis was conducted with G-power 3.1, a statistical software package used for conducting power analyses for various types of tests, including *F*-tests such as one-way Analysis of Variance (ANOVA) (Faul, Erdfelder, Lang, & Buchner, 2007).

For the Negation ANOVA ( $f = .10$ ,  $p = .05$ ,  $N = 46$ ), the achieved power was .10. For the Negative Emotions ANOVA ( $f = .10$ ,  $p = .05$ ,  $N = 46$ ), the achieved power was .10. For Cognitive Processes ANOVA ( $f = .33$ ,  $p = .05$ ,  $N = 46$ ), the achieved power was .60.

## Chapter 5: Discussion

This study sought to test the degree to which the word usage of neurotic, borderline, and psychotic patients conforms to existing theory. This study also tested the feasibility of using word count methodologies to quantify LPO, a psychoanalytic construct of personality maturity.

The psychotic group was omitted from analysis due to small group size. The results reported here show that as hypothesized, neurotic participants used Cognitive Processes words more frequently than the borderline participants on the TAT. The effect size for this difference was medium-to-large. Results of ANOVA hypothesis testing revealed that for Negative Emotions words and Negation words, the neurotic and borderline groups did not significantly differ.

### Significance of Results

**Support of LPO theory.** The demonstrated difference in cognitive word use between sample groups is consistent with the theory-based assertion that individuals functioning at a higher LPO tend to think about self and other with greater complexity, nuance, and differentiation (Westen, 1995; McWilliams, 1994; Kernberg, 1984). There is abundant research evidence for the claim that higher LPO is associated with greater complexity of representation (e.g. Hibbard et al, 2010, Westen et al, 1990). From the standpoint that complexity of representations is reflected in word usage, this study's positive finding serves as additional support for existing LPO theory.

**Utility of word count analysis.** Individual words constitute the basic unit of meaning in speech. Words interactively provide the basis for more complex structures of linguistic communication. This is not controversial; however, the extent to which

inferences can be made about personality and other complex dimensions of psychological functioning based simply on word count is a relatively new and unexplored domain of research (Pennebaker, Mehl, & Niederhoffer, 2003). The results reported here suggest that word count methodology can be usefully applied in the domains of research and praxis.

**Research utility.** This study's hypotheses are rooted in clinical theory and in existing research findings. The results reported here include a moderate-to-large effect size for the demonstrated difference in cognitive word use. This finding is consistent with Hibbard et al's (2010) discovery of a moderate effect size for TAT complexity of representation between LPO groups. It is important to note, however, that Hibbard et al (2010) coded for complexity using trained ORSC raters. In contrast, this study used simple word count analysis.

It is significant that this study's relatively low-level approach to language use yielded a finding consistent with Hibbard et al's more complex approach. These results help support the existing argument that word count analysis can provide some insight into stable, enduring psychological dimensions, including personality and its derivatives. More specifically, these results demonstrate the potential utility of LIWC (and word count analysis research in general) for examining relationships between LPO and subsidiary constructs, such as complexity of representations and reflective functioning.

**Clinical utility.** This study's results support the use of word count analysis as a supplementary tool for psychological assessment. Word count analysis may also be useful for examining psychotherapy process and outcome.

*Interpretation of assessment protocols.* Projective test response protocols are often scored and interpreted using established coding systems. For the TAT, these include the

SCORS (Westen, 1995), and the DMM (Cramer, 1996). Established Rorschach coding systems include the Exner Comprehensive System (2003) and the Rorschach Performance Assessment System (Meyer, Viglione, Mihura, Erard, & Erdberg, 2011). The use of each of these systems requires extensive training to achieve an acceptable level of reliability. This is time-consuming and effort-intensive. Aside from training, the same can be said for the process of scoring actual patient protocols.

With all of the systems just mentioned, it is prescribed practice for examiners to record patient responses verbatim. This is in order to help ensure accurate post-administration scoring, and interpretation. Given the availability of verbatim response records, word count analysis software such as LIWC may offer a supplemental means of protocol interpretation. As discussed below, the simple counting of words cannot replace comprehensive coding procedures. Word count analysis can, however, serve as an expedient aid to augment protocol interpretation. The SCORS and the DMM, for example, do not directly address questions of traumatization. Past research shows that LIWC analysis of narrative performance can reveal word use patterns associated with PTSD (Papini et al, 2015, Romisch et al, 2014; Rude et al, 2004). At least one study using word count analysis of Rorschach protocols has shown that word usage can differentiate between sexual abuse history inpatients and inpatient controls (Rosenberg, Hulsey, and Rosenberg, 2000). These extant findings, along with the results of this study, indicate that word count analysis of clinical material may serve as a useful aid for interpreting narrative assessment data.

*Psychotherapy process and outcome.* The utility of word count analysis for examining psychotherapy process and outcomes has precedent in past findings. Mergenthaler (1996)

analyzed preexisting transcripts of psychoanalytic therapy of 20 patients over the course of 25 or more sessions. He found that change in patients' rate of emotion and abstraction words over time was associated with positive therapeutic change. Pennebaker, Mayne, and Francis (1997) found that among bereaved subjects, changes over time in the proportional use of positive emotion words and negative emotion words on a disclosive writing task predicted positive physical and emotional changes. These past findings, along with this study's demonstrated difference in a hypothesized indicator of LPO, suggest that word count analysis is a potent tool for examining psychotherapy process and the changes that result over time.

### **Limitations of This Study**

**Sample characteristics.** This study originally intended to examine differences in three dependent variables between neurotic, borderline, and psychotic patient groups. The small number of psychotic subjects necessitated eliminating the psychotic group from the analysis. As a result, psychotic LPO word usage was not included in these analyses or results.

This study's methodology has no precedent in existing research. Predictions of effect size could thus not be stated with any confidence. Because of this, an *a priori* power analysis to determine the sample size necessary for sufficient power could not be conducted. Post-hoc power analyses of the three ANOVAs conducted here revealed that none of these three hypothesis tests achieved a power of .80, the commonly accepted minimum power for social science research (Cohen, 1988). All eligible patient files at the data collection site were gathered; hence, it was impossible to remedy this study's low power by increasing its sample size.

**Heterogeneity of character type.** The classification scheme used here was quite broad. As stated from the onset, this study examined LPO without regard to personality type (e.g. depressive, hysterical, narcissistic). The neurotic group included a wide variety of Axis I diagnoses, such as mood disorders (e.g. Major Depressive Disorder, Dysthymic Disorder) and anxiety disorders (e.g. Post-Traumatic Stress Disorder, Social Phobia, Generalized Anxiety Disorder). Similarly, the borderline group represented a heterogeneity of personality disorder diagnoses (e.g. Borderline Personality Disorder, Schizoid Personality Disorder, Personality Disorder Not Otherwise Specified). Axis I comorbidity was common throughout both the neurotic group and the borderline group.

With respect to the neurotic group, the heterogeneity of diagnosis found here is not unprecedented (see Hibbard et al, 2010). With respect to borderline LPO, however, previous studies have focused exclusively on Borderline Personality Disorder (see Fertuck et al, 2012, see Hibbard et al, 2010). The decision to utilize a broad classification scheme for this study was based on an interest in Kernberg's (1984) structural approach to LPO diagnosis. Although this study's method of participant classification has some precedent, the acuity of the inferences that these results allow is limited. Previous text analysis research focused on specific types of pathology irrespective of LPO has demonstrated that word usage varies according to pathology (Papini et al, 2015; Romisch et al, 2014; Pennebaker and King, 2011). Given this, it is reasonable to speculate that differences in word usage *within* each participant group may have confounded the analysis of differences *between* the neurotic and borderline groups.

**Participant classification.** The use of archive data is a strength of this study; however, it is also a potential confound, and bears mention here. Participant classification



was based exclusively on DSM-IV-TR diagnoses. These original diagnoses were each based on the convergence of assessment data from interviews and various instruments. Each participant's final diagnoses were made based on the judgment of the student clinician performing the assessment and her/his assessment supervisor. The overall sample represented a multitude of discrete decisions made by different students and clinicians over the course of about six years.

With respect to diagnostic validity, the DSM-IV-TR prescribes a descriptive approach based primarily on observable symptoms. As such, it is vulnerable to overlooking more subtle manifestations of character pathology (Kernberg, 1984). It is possible that character pathology was overlooked when some participants assigned to the neurotic group were initially diagnosed, particularly given the frequent occurrence of comorbidity and substance use disorders across the neurotic group (see Appendix B). According to Kernberg (1971), borderline patients who overtly appear neurotic may be differentiated by the presence of polysymptomatic neurosis and substance addiction. DSM-IV-TR personality disorder criteria do not acknowledge such descriptive evidence of borderline LPO.

Decisions about diagnosis and participant LPO classification in past studies (Fertuck et al, 2012, Hibbard et al, 2010) were made by the researchers themselves. In contrast, this study's classification decisions were based on past diagnoses from individual clinician-trainees, in collaboration with their respective supervisors. Within the methodological constraints set forth here, it was not possible to confirm the validity or reliability of the diagnostic decisions that guided participant classification.

**Sole reliance on word count.** This study examined indicators of denial, projection, and complexity of representations in TAT narratives. This was based exclusively on word

count. More complex aspects of language such as object-verb relationships, linguistic style, and context cannot not be accessed using word count (see Pennebaker et al, 2003). Other important dimensions of the narratives provided, such as attunement between the TAT images and the participants' stories, were also not accessible here.

This study's word count approach was limited in its ability to access the very LPO criteria that informed its hypotheses. For example, in terms of assessing denial, use of negating phrases (inferred here by use of negation words) is only one mechanism through which unpleasant aspects of experience are denied (Cramer, 1991b). Other mechanisms of denial, such as ignoring people portrayed on TAT cards or giving unrealistically positive narratives, cannot be detected solely by counting words. As another example, complexity of representations is a multifaceted construct that reflects the integration, differentiation, and complexity of one's view of both self and other. This study examined differences in use of Cognitive Processes words, assumed to be a rough indicator of the extent to which a given respondent thinks about thinking when talking about others. Other facets of the complexity of representation construct that may be reflected in language use, such as range of cognitive words used within and across stories, are not accessible to simple LIWC analysis.

### **Future Directions**

The limitations of this study discussed above offer a starting point for examining potential future directions. Using an identical or similar methodology to the one employed here, a larger sample size would provide greater statistical power, and thus enable the detection smaller effect sizes. In addition, an adequately sized psychotic group would allow testing for hypothesized differences in word usage between psychotic, borderline, and neurotic subjects, as originally intended here.

In light of questions raised about validity and reliability of diagnoses, a future study using the participant classification scheme employed here (i.e. assignment to neurotic, borderline, or psychotic group) might also benefit from a more standardized method of group assignment. An example of such an approach can be found in Hibbard et al's TAT study (2010), where questions of group assignment for *some* participants were resolved based on MMPI clinical scale cutoffs. The previously discussed question of variability in terms of character type can be addressed by more narrowly examining specific types of symptomology (e.g. only anxiety- or mood- disordered neurotics, only Borderline Personality Disorder). This more narrow approach would, of course, necessitate the availability of more data than was found here.

Setting aside the issue of sample size and more narrow focus, future TAT research examining LPO can also be conducted using the data collected for this study. With the availability of reliably trained coders, ANOVA examining word count could be augmented with a comparison of mean SCORS and/or DMM scores among LPO groups. Finally, similar future efforts might benefit from more complex methods of statistical analysis than the simple ANOVA comparison employed here. Doing so would allow a search for more complex examination of word usage patterns through the simultaneous analysis of multiple independent and dependent variables. As an example of such an approach using the variables examined in this study, Multiple Analysis of Variance (MANOVA) can examine whether use of Negation words, Negative Emotion words, and Cognitive Processes words simultaneously vary according to LPO.

## **Concluding Remarks**

The concept of LPO represents a unique contribution of psychoanalytic theory. Careful consideration of LPO in assessment and treatment acknowledges the depth and complexity of psychopathology in a way that goes beyond more mainstream, descriptive approaches to diagnosis. Despite the limitations of this study, the results reported here demonstrate that LPO is reflected in word usage. As such, they provide confirmatory support for the well-established notion that higher LPO is associated with more complex representations of self and other. These results also demonstrate the utility of LIWC and word count methodologies for clinical research and practice.

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## Appendices

Appendix A  
Differentiation of Personality Organization (adapted from Kernberg, 1984, p. 20)

Structural Criteria	Neurotic	Borderline	Psychotic
Identity integration	Sharp delimitation of self/other. Integrated identity: contradictory aspects of self and others are integrated into a cohesive whole.	Delimitation of self/other to maintain ego boundaries. Identity diffusion: contradictory aspects of self and others are poorly integrated and kept apart.	Identity diffusion. Self representations and object representations are poorly delimited, or else there is delusional identity.
Defensive operations	Repression and high-level defenses: reaction formation, isolation, undoing, rationalization, intellectualization. Defenses protect patient from intrapsychic conflict.	Mainly splitting and low-level defenses: denial, early projection, omnipotence, primitive idealization. Defenses protect patient from intrapsychic conflict.	Mainly splitting and low-level defenses: denial, early projection, omnipotence, primitive idealization. Defenses protect patient from disintegration and self/object merging
Reality testing	Capacity to test reality is preserved. Differentiation of self from nonself, intrapsychic from external origins of perceptions and stimuli. Capacity to evaluate self and others realistically and in depth.	Capacity to test reality is preserved. Differentiation of self from nonself, intrapsychic from external origins of perceptions and stimuli. Capacity to evaluate self and others is realistically is low and lacking in depth.	Capacity to test reality is lost. Capacity to evaluate self and others is severely impaired, leading to severe distortions.

Appendix B  
Participant ID Codes, Group Assignments, and Diagnoses

Participant ID Code	Group assignment <sup>a</sup>	Diagnosis/es
N01	N	Generalized Anxiety Disorder
N02	N	Major Depressive Disorder; Pervasive Developmental Disorder
N03	N	Generalized Anxiety Disorder; Attention Deficit Disorder/Hyperactivity Disorder
N04	N	Panic Disorder, Depressive Disorder; Attention Deficit/Hyperactivity Disorder
N05	N	Major Depressive Disorder; Alcohol Dependence
N06	N	Mood Disorder Due to Pain
N07	N	Generalized Anxiety Disorder
N08	N	Cyclothymic Disorder; Post- Traumatic Stress Disorder
N09	N	Learning Disorder Not Otherwise Specified
N10	N	Dysthymic Disorder; Alcohol Dependence
N11	N	Asperger's Disorder; Attention Deficit/Hyperactivity Disorder; Depressive Disorder Not Otherwise Specified
N12	N	Attention Deficit/Hyperactivity Disorder; Anxiety Disorder Not Otherwise Specified
N13	N	Social Phobia; Generalized Anxiety Disorder; Major Depressive Disorder
N14	N	Adjustment Disorder With Anxiety and Depressed Mood
N15	N	Major Depressive Disorder
N16	N	Pervasive Developmental Disorder; Depressive Disorder Not Otherwise Specified
N17	N	Mood Disorder Not Otherwise Specified; Post-Traumatic Stress Disorder
N18	N	Generalized Anxiety Disorder; Dysthymic Disorder

<sup>a</sup> N = neurotic group, B = borderline group, P = psychotic group.

Participant ID Code	Group assignment	Diagnosis/es
N19	N	Major Depressive Disorder
N20	N	Dysthymic Disorder
N21	N	Post-Traumatic Stress Disorder; Alcohol Dependence
N22	N	Depressive Disorder Not Otherwise Specified
N23	N	Autism Spectrum Disorder
N24	N	Attention Deficit/Hyperactivity Disorder
N25	N	Autism Spectrum Disorder
B01	B	Avoidant Personality Disorder; Depressive Disorder Not Otherwise Specified
B02	B	Personality Disorder Not Otherwise Specified; Mood Disorder Not Otherwise Specified
B03	B	Personality Disorder Not Otherwise Specified; Mood Disorder Not Otherwise Specified
B04	B	Avoidant Personality Disorder
B05	B	Personality Disorder Not Otherwise Specified; Major Depressive Disorder; Anxiety Disorder Not Otherwise Specified
B06	B	Borderline Personality Disorder; Poly-substance Dependence
B07	B	Borderline Personality Disorder; Major Depressive Disorder
B08	B	Schizoid Personality Disorder
B09	B	Bipolar I Disorder
B10	B	Obsessive-Compulsive Personality Disorder; Major Depressive Disorder; Anorexia Nervosa; Post-Traumatic Stress Disorder
B11	B	Personality Disorder Not Otherwise Specified; Aspergers Disorder; Learning Disorder Not Otherwise Specified
B12	B	Personality Disorder Not Otherwise Specified



Participant ID Code	Group assignment	Diagnosis/es
B13	B	Personality Disorder Not Otherwise Specified; Major Depressive Disorder
B14	B	Histrionic Personality Disorder
B15	B	Narcissistic Personality Disorder; Bipolar II Disorder; Poly-substance Dependence
B16	B	Personality Disorder Not Otherwise Specified
B17	B	Personality Disorder Not Otherwise Specified; Panic Disorder With Agoraphobia; Major Depressive Disorder; Generalized Anxiety Disorder
B18	B	Borderline Personality Disorder; Major Depressive Disorder
B19	B	Histrionic Personality Disorder; Conversion Disorder
B20	B	Paranoid Personality Disorder
B21	B	Paranoid Personality Disorder; Major Depressive Disorder; Generalized Anxiety Disorder
P01	P	Schizoaffective Disorder
P02	P	Major Depressive Disorder With Psychotic Features
P03	P	Major Depressive Disorder With Psychotic Features; Dysthymic Disorder; Generalized Anxiety Disorder
P04	P	Schizoaffective Disorder; Learning Disorder Not Otherwise Specified; Personality Disorder Not Otherwise Specified
P05	P	Major Depressive Disorder With Psychotic Features; Schizoid Personality Disorder
P06	P	Major Depressive Disorder With Psychotic Features; Social Phobia

### **Vita**

Paul Tullis was born in San Juan, Puerto to Paul and Aida Tullis. He grew up in Jacksonville, Florida. He graduated from Bishop Kenney High School in 1990. After graduation, he enlisted in the United States Army as an infantryman. He served in the army for five and a half years. Paul moved to Georgia after the army. He spent three years working as a jail medic, and another five years as a police officer. Paul began his undergraduate studies at the University of West Georgia in 2004. He earned his Bachelor of Arts Degree in psychology from UWG in 2009, and went on to earn his Master of Arts psychology degree in 2011. Paul is continuing to work toward his Doctor of Philosophy degree in clinical psychology from the University of Tennessee at Knoxville.