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Assessing Interpersonal Subtypes in Depression

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Abstract

The context-free diagnoses outlined by DSM may not provide enough information to represent the heterogeneity observed in depressed patients. Interpersonal factors have been linked to depression in a mutually influencing pathoplastic relationship where certain problems, like submissiveness, are related to symptom chronicity. The current study evaluated interpersonal pathoplasticity in a range of depressive presentations. We examined archival data collected from 407 participants who met criteria for Major Depressive Disorder (MDD), Dysthymic Disorder (DD), or subthreshold depression (sD). Latent profile analysis (LPA) identified five interpersonal subtypes (vindictive, intrusive, socially avoidant, exploitable, and cold). Apart from gender, the subtypes did not differ significantly on demographic characteristics, psychiatric comorbidity, or self-report depression severity. Socially avoidant participants were more likely to meet criteria for a clinical depression diagnosis (MDD or DD), while vindictive participants were more likely to have subclinical depression. Our results indicate that interpersonal problems may account for heterogeneity observed in depression.

Major Depressive Disorder (MDD) has been identified as the most common mental disorder in the United States, with a lifetime prevalence rate of 16.6% according to the National Comorbidity Survey – Replication (NCS-R; Kessler et al., 2005). The assessment and treatment of MDD is complicated by the wide array of clinical presentations and varying severity associated with it (Goldberg, 2011; Judd, Akiskal, & Paulus, 1997). Goldberg (2011) noted that it is a fallacy to consider MDD a homogeneous construct, given the range of symptoms experienced by individuals reporting depression. Additionally, severity of presenting symptoms has been shown to influence treatment outcome within samples diagnosed with MDD (Elkin et al., 1995) and increase the risk for a depression diagnosis in the future (Forsell, 2007). The *Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition* (DSM-5; American Psychiatric Association (APA), 2013) organizes depressive psychopathology based on symptom count and course (i.e., MDD and Persistent Depressive Disorder, formerly Dysthymic Disorder in DSM-IV (APA, 2000)). However, this non-etiological approach assumes that depressive psychopathology is homogenous, does not

explain factors associated with mild or severe presentations, and largely ignores the *context* in which the symptoms of depression manifest. Understanding this context may enable clinicians to better understand differences in depressive presentations, including whether or not symptoms reach clinical threshold, and make more informed treatment decisions.

Interpersonal assessment provides a clinically useful way of identifying qualitatively different groups of individuals experiencing depressive psychopathology. For example, Joiner and Timmons (2009) noted the importance of interpersonal functioning in the etiology and maintenance of depression. Specifically, excessive reassurance-seeking, characterized as repeated requests for affirmation, regardless of whether it has already been provided, and generally submissive behavior, have been associated with more severe, enduring depression (Pearson, Watkins, & Mullan, 2010). Therefore, considering the interpersonal context in which depressive symptoms are expressed could enhance evaluation of depression in naturalistic treatment settings.

One model that has been used to illustrate the impact of interpersonal functioning on the clinical presentation of depression is the *interpersonal circumplex* (IPC; Leary, 1957). The IPC is rooted in interpersonal theory, which posits that one's interpersonal style can be described using two orthogonal dimensions: dominance and affiliation (see Figure 1 for an example of the IPC and its eight octants). Using the IPC model to define the interpersonal context of depression is based on the theory of pathoplasticity, which is characterized by a mutually influencing non-etiological relationship between psychopathology and personality. In this way, psychopathology and personality influence the expression of each other, but neither exclusively causes the other, as might occur in an etiological or spectrum relationship. Widiger and Smith (2008) provide an example of a pathoplastic relationship between the five-factor model (McCrae & Costa, 2003) personality trait of conscientiousness and eating disorders. They explain that while conscientiousness does not necessarily predispose someone to develop an eating disorder, it may inform the manner in which such psychopathology is expressed. An individual with high levels of conscientiousness might be more prone to display the extreme constraint associated with anorexia nervosa. By contrast, a person with low levels of conscientiousness may be more likely to exhibit the impulsive dysregulation present in binge eating. Individual differences in interpersonal functioning have been found to exhibit a pathoplastic relationship with a range of psychiatric disorders, such as social phobia (Cain, Pincus, & Grosse Holtforth, 2010; Kachin, Pincus, & Newman, 2001), generalized anxiety disorder (Przeworski et al., 2011; Salzer et al., 2008), post-traumatic stress disorder (Thomas et al., 2014) and eating pathology (Ambwani & Hopwood, 2009; Hopwood, Clarke, & Perez, 2007). Interpersonal pathoplasticity has also been used to predict variability in response to psychotherapy within a disorder (Cain et al., 2010).

Two prior studies have specifically investigated interpersonal pathoplasticity in depression. Cain et al. (2012) demonstrated evidence of interpersonal pathoplasticity in a sample of 312 patients diagnosed with MDD from the Collaborative Longitudinal Personality Disorders Study (CLPS). They identified six distinct interpersonal subtypes in depression (extraverted, dominant, arrogant, cold, submissive, and unassuming) that did not differ on demographic variables or baseline psychiatric comorbidity. MDD patients in the submissive group

reported significantly more depression chronicity and poorer global functioning over a 10-year follow-up period, even after controlling for comorbid personality pathology.

Dawood, Thomas, Wright, and Hopwood (2013) also examined interpersonal pathoplasticity in a sample of 172 college students scoring in the moderately to severely depressed range on the *Patient Health Questionnaire* (PHQ-9; Spitzer, Kroenke, & Williams, 1999). They found five distinct interpersonal subtypes (dominant, warm, submissive, cold, and undifferentiated) that did not differ in terms of depressive severity. Importantly, the dominant group endorsed more problematic alcohol use while the cold group demonstrated greater personality pathology. However, this study was limited by its reliance on a college student sample, thus restricting the generalizability of their findings to clinical populations.

Both the Cain et al. (2012) and Dawood et al. (2013) studies relied on samples with a restricted range of depressive severity. Cain and colleagues evaluated patients diagnosed with MDD using a semi-structured diagnostic interview, while Dawood and colleagues evaluated self-reported depressive symptoms in a non-clinical student sample, limiting their focus to the high and low ends of severity respectively. Differences in depression severity have been shown to have important implications for treatment outcome (Elkin et al., 1995) and risk for continuing to meet depressive symptom criteria for clinical disorders in the future (Forsell, 2007). Further, a range of interpersonal problems and depressive severity is expectable in a community clinic context where clinicians will likely encounter both clinical and subthreshold forms of depression. Therefore, investigations of interpersonal pathoplasticity in depression should include a spectrum of depressive conditions, including milder, subthreshold depression as well as clinical disorders such as Persistent Depressive Disorder (i.e., Dysthymia) and MDD.

Current Study

The current study used archival data selected from a sample of participants who sought treatment at an urban psychotherapy research program from 1988 to 2011. The current sample was selected based on presentation with a wide range of depressive conditions of differing intensity, duration, and assignment of "clinical" status." In order to demonstrate interpersonal pathoplasticity across depression diagnoses of varying severity, three criteria must be met: (a) the identification of distinct and homogeneous interpersonal subtypes of depressed individuals, (b) interpersonal subtype classification that is not accounted for by demographic variables (e.g., age, ethnicity) or features of psychopathology (e.g., symptom severity or psychiatric comorbidity), and (c) evidence of differential expression of the disorder (e.g., symptom chronicity) across interpersonal subtypes. Thus, we first aimed to replicate studies examining specific depressive presentations (Cain et al. 2012; Dawood et al., 2013) and identify prototypical interpersonal subtypes in patients with a range of depressive psychopathology by applying latent profile analysis (LPA) to IPC octant scores. Second, we tested for differences between the interpersonal subtypes on demographic variables, self-report depression severity, and psychiatric comorbidity. Third, building on Cain et al. (2012), we hypothesized that patients presenting with submissive interpersonal problems would be more likely to meet DSM criteria for a clinical diagnosis, such as MDD or Dysthymic Disorder, rather than less severe, subthreshold symptoms.

Method

Participants and Procedure

Participants were drawn from a larger archival dataset of outpatients seeking treatment at the Brief Psychotherapy Research Program (Brief Program) at Beth Israel Medical Center, in New York City. An aim of the Brief Program is to investigate the impact of personality, particularly *DSM* Cluster C personality disorders, and interpersonal problems on psychotherapeutic treatment outcome. Brief Program participants were not selected according to a particular depressive presentation and comprise a diversity of depression diagnoses of varying severity. As a result, the study sample approximates a depressed population treated in a naturalistic setting. Further details regarding the Brief Program's participants and treatments are described elsewhere (e.g., Muran, 2002).

The current study selected 407 participants from a pool of 1,087, each of whom met Brief Program selection criteria. Participants for the current investigation were chosen according to the following three criteria at intake: (1) diagnosis of Major Depressive Disorder (MDD), Dysthymic disorder (DD), or subthreshold depression (sD), (2) completion of self-report assessments, and (3) informed consent. MDD or DD diagnoses were assessed using the *Structured Clinical Interview for DSM-IV-Axis I* (SCID-I; First, Spitzer, Gibbon, & Williams, 1995) administered at intake. An sD diagnosis was determined using the intake SCID and Symptom Checklist-90 Revised Edition (SCL90R; Derogatis, 1983) depression subscale score (DEP subscale score), also completed at intake. Patients who did not meet criteria for an MDD or DD diagnosis but whose DEP subscale score achieved a T-score of 70 or greater (Wetzler & Marlowe, 1989; Wetzler & Marlowe, 1993), corresponding to the 98th percentile of the SCL90R non-patient normative group, (Derogatis, 1983) were assigned to the sD diagnostic category. A T Score of 70 was used as a cutoff for significant self-report depressive symptoms, as recommended in the manual (Derogatis, 1983).

Of the total sample, 218 participants met criteria for MDD (53%), 112 participants met criteria for DD (28%), and 77 participants met criteria for sD (19%). In addition, 42 participants had comorbid MDD and DD, representing 19% of MDD participants. Mean age was 41.5 years ($SD = 11.92$) and 52.8% were women. Most participants self-identified as White (78.4%) and were employed at the time of the intake assessment (74.9%). The sample was highly educated, with nearly half of participants holding an undergraduate degree (46.2%) and close to a third completing a graduate degree (29.2%) (see Table 1). Additional comorbid Axis I disorders are also reported in Table 1. A large proportion of the sample also had at least one comorbid personality disorder (PD) diagnosis (67.5%), with PD NOS (24.3%) or a Cluster C PD (30.4%) being the most common.

Measures

Structured Clinical Interview for DSM-IV-Axis I & II (SCID; First, Spitzer, Gibbon, & Williams, 1995)—The SCID, a semi structured clinical interview, assesses for the presence of symptoms associated with Axis I psychiatric disorders listed within the DSM-IV using a clinical scale ranging from 1 (“*absent*”) to 3 (“*threshold*”). The SCID has demonstrated validity in depression diagnosis, with sensitivity of 74.2% and specificity of

81% (Sanchez-Villegas et al., 2008). Fair psychometric properties for the SCID-II have also been established for Axis II PD evaluation (First et al., 1995). In the current study, the SCID was used to assign participants to MDD, DD, or sD groups and to identify comorbid psychiatric Axis I as well as Axis II PD diagnoses. Research assistants administering the SCID participated in extensive training that included viewing a demonstration video, practicing administration through role-playing activities, and observation of a live interview (see Muran et al., 2005 for a more detailed description of SCID training). Prior to conducting interviews, assistants were required to achieve an ICC of at least 0.70 on an inter-rater reliability test in which they rated recorded SCID I and SCID II evaluations administered by experienced program personnel.

Symptom Checklist-90 Revised Edition (SCL90R; Derogatis, 1983)—The SCL90R is a 90-item, patient-rated, self-report measure assessing general psychiatric symptomology using a Likert-type format based on degree of severity. Included items assess symptoms within ten clinical scales (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, Psychoticism, and Additional Items). Participants rate how distressed they are by each item, from 0 (“*not at all*”) to 4 (“*extremely*”). The total mean score, or General Severity Index (GSI), and the mean score of the 13 items evaluating depression (DEP) were used in the present study. The SCL90R has demonstrated validity and reliability within clinical as well as non-clinical samples (e.g., Derogatis, 1983; Derogatis, Rickels, & Rock, 1976). The 13-item DEP subscale also has good psychometric properties (Moffett & Radenhausen, 1990). In the current sample, Cronbach’s alphas were .96 and .88 for the SCL90R GSI and SCL90R DEP subscale, respectively. The SCL90R DEP subscale score was used in the present study to assign participants to the sD group and determine severity of depressive symptoms at intake.

Inventory of Interpersonal Problems-Short Circumplex Scales (Soldz, Budman, Demby, & Merry, 1995)—The 32-item IIP-SC assesses interpersonal functioning across eight subscales, using the circumplex dimensions of Dominance and Affiliation as orthogonal anchoring points. The IIP-SC also contains a general factor measuring overall level of interpersonal distress. Items list various interpersonal behaviors, and participants rate how distressed they are by each using a Likert-type scale ranging from 0 (*Not at All*) to 4 (*Extremely*). The IIP-SC has demonstrated good psychometric properties in a number of validity studies examining clinical as well as nonclinical samples (e.g., Gurtman, 1996; Hopwood, Pincus, DeMoor, & Koonce, 2008). Cronbach’s alphas for the current study sample ranged from .71 (Vindictive) to .85 (Nonassertive) for the octant scores. In the present study, IIP-SC octant scores were used to classify participants into interpersonal subtypes.

Data Analysis

Latent profile analysis (LPA) was conducted using Mplus© 6 (Muthén & Muthén, 2010) to classify depressed individuals into latent groupings based on their interpersonal profile. The IIP-SC octant scales were used as the observed variables for the LPA models. Model fit was compared using the Bayes information criteria (BIC), smaller values of which indicate better fit to the data.

The structural summary method for analyzing circumplex data was used to model an interpersonal profile of IIP-SC octant scores as a cosine-curve function (see Figure 2). As Figure 2 shows, the parameters of this curve are its (a) *angular displacement* or the predominant interpersonal problem on the IIP-SC; (b) *amplitude* or a measure of interpersonal profile differentiation; and (c) *elevation*, an index of interpersonal distress across all types of interpersonal problems on the IIP, with high values (≥ 1) indicating high overall distress (Gurtman & Balakrishnan, 1998). The goodness-of-fit of the modeled curve to actual scores can be evaluated by calculating an R^2 value, which quantifies the degree to which the interpersonal profile conforms to prototypical circumplex expectations. To the extent that a group's interpersonal profile exhibits non-trivial amplitude (i.e., is differentiated) and conforms well to circumplex expectations (i.e., $R^2 \geq .80$), the group may be distinctively characterized by the prototypical interpersonal pattern indicated by the profile's angular displacement. Detailed descriptions of the structural summary, procedures for solving for the various parameters, and interpretive guidelines that relate each of these summary features to clinical hypotheses have been reported (see Wright, Pincus, Conroy, & Hilsenroth, 2009).

The structural summary method does not allow for between-group statistical comparisons of interpersonal data; therefore, circular statistics were also calculated. Following the methods and guidelines recommended by Wright et al (2009), circular means, circular variances, and 95% circular confidence intervals (CI) were calculated for each group. Circular CIs are calculated as a way of identifying reliable differences in group's circular means, allowing for a statistical comparison between each corresponding subtype, with the expectation that each pair of CIs will not overlap.

Finally, external validation of interpersonal pathoplasticity was conducted by testing group differences on demographic variables, intake psychiatric comorbidity, depression severity, and likelihood of meeting criteria for a depression diagnosis of varying degree, ranging from MDD to sD. Interpersonal subtypes were compared using an analysis of variance (ANOVA) with Bonferroni post hoc analyses and chi-square analyses with adjusted standardized residuals in order to provide more detail on emerging group differences.

Results

Four (0.98%) of the 407 participants were missing intake IIP-SC data and 89 (21.87%) participants were missing intake SCL90R data. For the IIP-SC, mean replacement values were generated if the participant was missing fewer than two of the items required for an IPC octant score. This follows Schafer and Graham's (2002) recommendation that mean replacement is appropriate when item intercorrelations are high, as in the octants of the IIP-SC. Mean replacements were calculated for two of the four participants missing IIP-SC data; the other two participants had more than two items missing on one IPC octant and, therefore, mean replacement was not used. These two participants contributed only seven of the eight IPC octant scores to the final analyses.

For the SCL90R data, Derogatis (1983) suggests in order to be considered valid, no more than 18 items may be missing and each subscale must be at least 60% complete. The GSI

and subscale scores may then be calculated by dividing the sum of their item ratings by the total number of items completed. Of the 89 participants with missing SCL90R data, 5 (1.23% of the total sample) had invalid DEP scores (missing more than eight items) and 2 (0.49% of the total sample) had invalid GSI scores (missing more than 18 items). This resulted in a final sample of 400 participants with completed SCL90R data. Means and standard deviations were calculated for intake SCL90R GSI, SCL90R DEP scale, as well as IIP-SC octant scores and distress (elevation) (see Table 2). All scales were evaluated for skew and kurtosis and found to be normally distributed.

Intake personality disorder (PD) diagnosis was evaluated as a possible covariate. Chi-square analyses were calculated to assess the relationship between presence of a PD diagnosis and presence of a depression diagnosis as well as interpersonal subtype classification. Contrary to past studies, presence of a PD diagnosis was not related to presence of clinical depression or interpersonal subtype classification (PD and Depression [$\chi^2(1, n = 407) = 2.43, p = .12, V = .08$], PD and Interpersonal Subtype [$\chi^2(4, n = 407) = 3.75, p = .44, V = .10$]). As a result, PD diagnosis was not included as a covariate in the current study.

Interpersonal Profiles in Depressive Psychopathology

Interpersonal pathoplasticity was investigated in three steps. First, LPAs evaluated whether interpersonal subtypes exist within a sample of 407 Brief Program participants meeting criteria for a spectrum of depressive psychopathology, ranging from MDD to sD. Second, emerging interpersonal groups were compared on demographic characteristics, baseline psychiatric comorbidity, and self-report depression levels to ensure group assignment was not influenced by those factors. Third, differences between interpersonal subtypes on clinical diagnosis were tested to demonstrate that interpersonal problems influence the presentation of depressive symptoms.

Using the structural summary method and the norms provided by Hopwood et al. (2008), an interpersonal profile was calculated for all 407 depressed participants at baseline. The interpersonal profile for the sample was located in the FG octant (218.86°), suggesting socially avoidant interpersonal problems. The sample had an elevation of .06, indicating low interpersonal distress, and an amplitude of .29, indicating low interpersonal differentiation. The sample also had an R^2 of .92, which typically indicates excellent interpersonal prototypicality and interpersonal homogeneity. However, previous research by Cain et al. (2012) and Dawood et al. (2013) suggested that depressed individuals may form smaller and more prototypical interpersonal groups, creating multiple circular distributions with offsetting interpersonal profiles. Therefore, participants' IIP-SC octant scores were subjected to LPA to derive further information about the interpersonal make-up of the sample.

Prior to running the LPA, IIP-SC octant scores were ipsatized in order to prevent the identification of clusters based on level of interpersonal distress rather than on specific interpersonal typology. Models were estimated ranging between one and ten interpersonal profiles. Table 3 summarizes model fit and entropy statistics. A five-profile solution was selected, based on the strength of the BIC fit statistic. The entropy was .75, slightly below the traditional .80 cutoff, yet high enough to suggest that comparisons between groups would yield reliable results. The resulting subtypes of the five-profile solution were

subjected to circumplex group comparison techniques using unipsatized octant scores (Wright et al, 2009) (see Table 4).¹ Figure 1 plots the typology of interpersonal problems reported by the sample as well as by the five interpersonal subtypes. The current sample of depressed participants included vindictive (121.21°, $n = 33$), intrusive (32.61°, $n = 71$), socially avoidant (239.59°, $n = 53$), exploitable (309.46°, $n = 112$), and cold (196.41°, $n = 138$) interpersonal subtypes (see Figure 1). Group elevations ranged from .43 (cold) to .91 (vindictive), suggesting moderate to high interpersonal distress, and amplitudes ranged from 0.51 (cold) to 1.32 (socially avoidant), suggesting moderate to high interpersonal profile differentiation. Overall, these results indicated that when classified into more distinct and homogeneous interpersonal subtypes, participants endorsed more interpersonal distress and more differentiated interpersonal problems than was apparent as a generally depressed group. The R^2 value was also greater than .90 for all five groups, indicating excellent interpersonal prototypicality for each interpersonal subtype.

Circular statistics were also calculated for the five interpersonal subtypes (see Table 4). Importantly, the 95% CIs for the subtypes did not overlap supporting the argument that the participants within each identified subtype endorsed specific interpersonal problems. Taken together, these results support the hypothesis that, like participants reporting specific depressive presentations (Cain et al., 2012; Dawood et al., 2013), those diagnosed with a range of depressive disorders may be classified into subtypes according to distinct interpersonal issues.

Further Evidence for Interpersonal Pathoplasticity in Depressive Psychopathology

Comparisons were made between the five interpersonal subtypes on demographic variables, psychiatric comorbidity, and self-reported severity of depressive symptoms at intake (see Table 5). These analyses were conducted to demonstrate that interpersonal classification was not due to these factors. The interpersonal subtypes did not differ significantly in age [$F(4, 395) = .27$; $p = .89$, $\eta^2 = .00$], race [$\chi^2(32, N = 399) = 30.79$, $p = .53$, $V = .14$], education [$\chi^2(24, N = 401) = 21.44$, $p = .61$, $V = .12$], employment status [$\chi^2(12, N = 401) = 4.61$, $p = .97$, $V = .06$], comorbidity with mood, anxiety, or substance use disorders, comorbidity with one or more personality disorders, or self-reported severity of depressive symptoms at intake. Of note, the interpersonal subtypes differed significantly by gender [$\chi^2(4, N = 407) = 12.54$, $p < .05$, $V = .18$]. Examination of the adjusted standardized residuals revealed that the exploitable group had a significantly higher proportion of women, while the cold group had a significantly smaller proportion than expected.

Differences between the Interpersonal Subtypes on Rates of Clinical Depression

Finally, the five interpersonal subtypes were compared in terms of meeting diagnostic criteria at intake for a depression diagnosis of varying severity, including severe MDD, mild yet persisting DD, and subclinical sD (see Table 6). As predicted, the interpersonal subtypes were found to differ significantly in terms of clinical diagnosis [$\chi^2(8, N = 407) = 17.56$, p

¹We also applied the structural summary method to a four-profile solution as part of our preliminary analyses. The groups identified included: vindictive (143.42°, $n = 72$), intrusive/overly nurturant (16.01°, $n = 142$), socially avoidant (233.55°, $n = 103$), exploitable (315.40°, $n = 86$). However, we ultimately chose the five-profile solution for all subsequent analyses due to its improved model fit and entropy statistics.

< .05, $V = .15$]. Notably, the socially avoidant group had a significantly smaller proportion of participants than expected endorsing subclinical depression (sD) and therefore, a greater proportion meeting criteria for a clinical depression diagnosis of either MDD or DD. We had predicted that a submissive group would have a greater likelihood of meeting criteria for a clinical diagnosis; however, we did not find a purely submissive group in our LPA. The socially avoidant group endorsed problems with being both cold (e.g. keeping distance from others) and nonassertive (e.g. trouble confronting others) in their relationships, suggesting primary difficulties with submissive detachment, in partial support of our hypothesis. Comparatively, the vindictive group had a significantly larger proportion of participants than expected endorsing subclinical depression and significantly smaller proportion meeting criteria for the most severe presentation, MDD.

Discussion

Analyses for the current study were completed using archival data collected from participants who sought treatment at an urban psychotherapy research program from 1988 to 2011. The first aim was to extend previous interpersonal pathoplasticity studies that investigated a single depressive presentation by identifying interpersonal subtypes across a range of depressive presentations, more closely approximating psychopathology seen in treatment settings. LPA was applied to the IPC octant scores of 407 participants and five distinct interpersonal subtypes (vindictive, cold, socially avoidant, exploitable, intrusive) emerged. Like depressed individuals evidencing a specific presentation (Cain et al., 2012; Dawood et al., 2013), participants diagnosed with a range of depressive severity could be further classified according to their interpersonal behavior.

The second aim of the current study was to confirm that interpersonal subtype classification could not be better accounted for by demographic or clinical factors. The five subtypes identified in the current study did not differ on most demographic variables (age, race, education, and employment status), self-report depression severity, and psychiatric comorbidity. There were gender differences however; the cold group had a significantly greater proportion of men than predicted, while the exploitable group had a significantly larger number of women. Though unexpected, this result was consistent with research suggesting that men typically endorse interpersonal problems on the cold-dominant area of the IPC and women report issues related to warm-submission (Gurtman & Lee, 2009). It is possible that inclusion in cold and exploitable groups may have been partially determined by participant gender. That said, gender is a complex construct, encompassing variables, such as socialization, that may have also contributed to subtype classification. Nevertheless, as hypothesized, depressive symptoms of varying severity and interpersonal behavior reflect mutually influencing, non-etiological (i.e. pathoplastic) psychological systems.

The third aim of the current study was to demonstrate differential expression of depressive psychopathology across interpersonal subtypes. We found that at intake, the socially avoidant group contained a smaller proportion of participants endorsing subclinical depression than expected and thus, a greater proportion diagnosed with more severe, clinical depression (MDD or DD). This result is a partial replication of the findings by Cain and colleagues (2012). Individuals with socially avoidant interpersonal problems report being

overly cold, avoidant of social interactions, and unable to assert themselves in their relationships with others, thus supporting the premise that interpersonally withdrawn, nonassertive behavior predicts longer lasting, more serious depressive psychopathology (Cain et al., 2012; Joiner & Timmons, 2009; Pearson et al., 2010) that will meet criteria for a clinical diagnosis.

This result is also consistent with recent findings by Grosse Holtforth et al. (2014) showing that highly introverted (socially avoidant) patients report the most depressive symptoms as compared to patients with other types of interpersonal problems. By contrast, the vindictive group had a larger percentage of participants than expected reporting only subclinical depressive symptoms, and a lower percentage of participants meeting criteria for MDD, the most severe form of clinical depression. This suggested the possibility that vindictive interpersonal problems may serve as a buffer against the development of MDD.

The IPC dimensions of agency and communion may be used to further understand the observed heterogeneity of depressive presentations between interpersonal subtypes. While the agency-driven vindictive group was less likely to be diagnosed with severe depression, the submissive, socially avoidant group was more likely to meet criteria for clinical symptoms. However, though the exploitable group also endorsed a high degree of submissiveness similar to that of the socially avoidant group, its included participants were not significantly more likely to experience clinical depression, suggesting that communion may serve as a buffer against severity of depression in this group. Taken together, these results strongly support the presence of interpersonal pathoplasticity in a range of depressive presentations, indicating that specific interpersonal behavior is associated with depression of greater or lesser diagnostic severity.

In the current study, the interpersonal problems associated with depressive psychopathology were notably diverse (i.e., a single interpersonal problem does not adequately describe the potential diversity in clinical presentation of these patients). This is consistent with previous findings by Cain and colleagues (2012), and Dawood and colleagues (2013), who found six and five interpersonal subtypes in depression, respectively. Taken together, the results of all three studies investigating interpersonal pathoplasticity in depression have found that interpersonal problems, spanning the entire interpersonal circumplex (dominant, submissive, cold, warm), play a role in the clinical presentation of depression across populations (clinical samples vs. student samples) and assessment measures (structured interviews vs. self-report). In this way, LPA as applied to IPC octants is a valuable tool to parse a range of interpersonal problems into subtypes that allow researchers and clinicians to better understand the context in which psychopathology manifests, which has important implications for psychotherapy process and outcome. The subtypes identified in the present study represent the context of depressive psychopathology in our sample and accordingly will differ slightly in number and profile across different samples and different methods. Future studies should continue to investigate interpersonal subtypes in depression in order to examine convergences and divergences in the number and type of profiles identified.

Clinical Implications

Results from the current study may be expanded into clinical practice by enabling clinicians to better understand the range of interpersonal problems and distress associated with depression. For example, the average interpersonal problem reported by depressed outpatients in this sample was cold, characterized primarily by difficulty feeling close in relationships and a tendency to keep others at a distance. However, cold interpersonal problems were associated with low interpersonal distress and were not related to an increased likelihood of meeting criteria for a depressive diagnosis of varying severity. Once subtype classification was considered, it was clear that participants were endorsing higher levels of interpersonal distress and interpersonal profile differentiation than evidenced by averaging across participants. These findings suggest that an assessment of interpersonal functioning at the start of treatment may improve diagnostic clarity by providing a more thorough evaluation of the context of symptoms. For example, socially avoidant depressed participants were less likely than expected to endorse only subclinical depression and, therefore, more likely to meet criteria for a clinical diagnosis of depression (MDD or DD). Alternatively, vindictive participants were more likely to report subclinical depressive symptoms and less likely to meet criteria for MDD. The submissive, withdrawn behavior of a socially avoidant patient appears significantly associated with the more intense, prolonged symptoms of a clinical disorder, while the social aggression of the vindictive patient is less so. The combativeness of vindictive patients may actually protect against severe depression, whereas the passive detachment of socially avoidant patients might exacerbate symptoms.

Such diagnostic precision may also serve to enhance clinicians' capacity to begin tailoring treatment interventions to better target the interpersonal characteristics of their depressed patients. For example, Grosse Holtforth et al. (2007) found that cold submissive interpersonal problems were associated with fears of feeling vulnerable in front of others. Such concerns may make socially avoidant depressed patients more prone to treatment noncompliance in order to protect themselves from rejection by the therapist. In contrast, friendly submissive interpersonal problems were related to needing others and a fear of separation. Therefore, exploitable depressed patients may require a therapeutic focus on assertiveness skills and self-direction before undertaking behavioral activation to reduce depressive symptoms.

Similarly, interpersonal problems have been found to influence the development of the therapeutic alliance, with friendly submissive patients more easily forming an alliance than cold dominant patients (Muran et al., 1994). Specific to depression, Grosse Holtforth et al. (2014) found that patients with cold interpersonal problems reported lower alliance ratings as compared with highly introverted or highly unassuming patients. With a thorough understanding of the interpersonal subtypes in depression, the therapist can anticipate the effect of interventions, facilitating alliance and improving outcome (Tracey, 2002).

Limitations and Future Directions

The current study was limited by restricted demographic characteristics. Similar to Cain et al. (2012) and Dawood et al. (2013), the racial composition of our sample was primarily White, limiting the generalizability of findings to other racial groups. Future research should

incorporate more ethnically diverse samples. Additionally, sD is a relatively new diagnostic concept, and there are inconsistencies across studies as to how it is defined. sD was operationalized in this study as being present when a participant did not meet SCID diagnostic criteria for MDD or DD but endorsed depression symptoms (SCL90R DEP scale score above the 98th percentile). Incorporating a self-report questionnaire into the sD operationalization was considered valid since a previous study demonstrated that sD was well detected using this method (Karsten et al., 2010). However, the validity of the sD definition used would have been strengthened by a comparison with an alternative operationalization. An important direction for future research may be to strengthen the diagnostic conceptualization of sD by comparing symptoms identified by self-report questionnaire and diagnostic interview (Cuijpers & Smit, 2004). Finally, the current study was archival, which limited the hypotheses that could be tested. For example, we were unable to examine differences in psychotherapy process or outcome variables among subtypes. Future studies should test interpersonal problems as moderators of process and outcome to investigate psychotherapy interventions targeting at-risk interpersonal subtypes in depressed patients.

In conclusion, expanding on past studies examining interpersonal pathoplasticity in depression, the current study identified five interpersonally distinct subtypes across a range of depressive presentations. The interpersonal subtypes identified in the current study varied slightly from previous research in terms of number and interpersonal profile due to sample and methodological differences. Future research should examine convergences and divergences in the number or type of interpersonal profiles identified in depression. The interpersonal subtypes identified in the current study were not better accounted for by other moderators such as demographic variables, psychiatric comorbidity, and self-report depression severity. These findings indicate that interpersonal problems may account for some of the heterogeneity observed in the clinical presentation of depressed patients. Consistent with previous research, we found that socially avoidant, submissive interpersonal problems were associated with a lower likelihood of reporting subclinical symptoms (sD) and, thus, greater likelihood of meeting criteria for a more severe depression diagnosis (MDD or DD). Furthermore, vindictive interpersonal problems were related to a greater likelihood of endorsing subclinical forms of depression (sD) and a lower likelihood of meeting criteria for the most serious presentation, MDD. Accounting for interpersonal subtypes in depression may improve diagnosis, treatment planning, and therapeutic outcome.

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Figure 1. Circumplex Locations of Interpersonal Subtypes

Note. An example of the 8 octants found in the Interpersonal Circumplex (IPC) adapted from Leary (1957). Octants are labeled with the alphabetical notation originally provided by Leary (1957) (e.g., PA, BC, DE, etc.). Circumplex locations for the Full Sample ($N = 407$) located at 218.86° , Group 1: Vindictive ($n = 33$) located at 121.21° , Group 2: Intrusive ($n = 71$) located at 32.61° , Group 3: Socially Avoidant ($n = 53$) located at 239.59° , Group 4: Exploitable ($n = 112$) located at 309.46° , Group 5: Cold ($n = 138$) located at 196.41° ; All circumplex locations are approximate.

Figure 2. An Example of a Structural Summary Profile

Note. X axis = circumplex angle in degrees; Y axis = standard (z) score on IIP-SC IPC octant; Angular displacement = angular shift from 0 degrees to reported peak value, indicates interpersonal typology. Amplitude = measure of profile differentiation. Represents the degree to which the individual or group strongly endorses interpersonal behaviors that are like and not like them. An amplitude value of 0 indicates a flat, undifferentiated profile whereas a high amplitude value indicates a profile with a clear interpersonal peak and trough. Elevation = mean level of the profile, reflects the overall degree of interpersonal distress.

Table 1

Demographic and Clinical Characteristics (N=407)

Demographic Category	N	%
<u>Gender</u>		
Female	215	52.8
Male	192	47.2
<u>Ethnicity</u>		
White	319	78.4
Black	26	6.3
Hispanic	21	5.2
“Other” (e.g. South Asian, Biracial)	12	2.9
Not reported	29	7.1
<u>Employment Status</u>		
Employed	305	74.9
Unemployed	86	21.1
Retired	9	2.2
Not reported	7	1.7
<u>Education Level</u>		
Some high school	2	.5
High school graduate	18	4.4
Some college	72	17.7
Undergraduate degree	188	46.2
Graduate degree	119	29.2
Not reported	8	1.9
<u>Axis I Comorbidity</u>		
Alcohol Abuse/Dependence	5	1.2
Posttraumatic Stress Disorder	4	.9
Panic Disorder	31	7.6
Social Phobia	32	7.8
Generalized Anxiety Disorder	75	18.4
Obsessive Compulsive Disorder	8	1.9
<u>PD Diagnosis Type</u>		
No PD	132	32.4
Cluster A PD	12	2.9
Cluster B PD	7	1.7
Cluster C PD	124	30.4
Depressive PD	33	8.1
PD NOS	99	24.3

Note. Axis I Comorbidity and PD Diagnosis Type = Cluster A PD (Schizoid, Schizotypal, Paranoid), Cluster B (Antisocial, Borderline, Narcissistic, Histrionic) diagnosed using SCID.

Table 2

Descriptive Characteristics of the Intake Symptom and Interpersonal Scores

	<i>N</i>	<i>M</i>	<i>(SD)</i>	<i>Skew</i>	<i>Kurtosis</i>
Intake SCL90R GSI	404	1.07	(.58)	.80	.46
Intake SCL90R DEP scale	402	1.83	(.81)	.11	-.61
Intake IIP-SC Elevation	403	.53	(.69)	-.07	-.30
Intake IIP-SC Domineering Octant	406	3.69	(3.06)	.81	.14
Intake IIP-SC Vindictive Octant	407	4.15	(3.29)	.64	-.46
Intake IIP-SC Cold Octant	405	6.15	(4.09)	.30	-.81
Intake IIP-SC Avoidant Octant	407	6.75	(4.15)	.25	-.83
Intake IIP-SC Nonassertive Octant	406	8.39	(3.74)	-.20	-.54
Intake IIP-SC Exploitable Octant	407	7.78	(3.41)	.03	-.52
Intake IIP-SC Overly Nurturant Octant	407	7.56	(3.59)	-.02	-.65
Intake IIP-SC Intrusive Octant	407	5.04	(3.67)	.46	-.51

Note. SCL90R GSI = intake SCL90R General Severity Index, a measure of overall psychiatric distress; SCL90R DEP scale = intake SCL90R DEP subscale score, a measure of depressive distress; IIP-SC Elevation = a measure of overall interpersonal distress; Intake IIP-SC Dominant Octant - Intake IIP-SC Intrusive Octant = intake IIP-SC octant scores, measures of interpersonal distress in eight specific domains

Table 3

Latent Profile Analysis Model Fit Indices and Entropy Statistic at Intake

	BIC	Entropy
One-profile solution	8362.75	--
Two-profile solution	8068.91	.71
Three-profile solution	7895.64	.73
Four-profile solution	7844.81	.74
Five-profile solution	7822.15	.75
Six-profile solution	7829.54	.77
Seven-profile solution	7837.79	.77
Eight-profile solution	7849.32	.79
Nine-profile solution	7864.85	.79
Ten-profile solution	7881.80	.80

Note. BIC = Bayesian Information Criterion; Entropy is a measure of classification certainty with values > .80 reflecting acceptable certainty. Dashes indicate that no entropy is calculated for a one-profile solution (i.e., classification certainty is perfect by definition). Bold type indicates preferred model.

Table 4

Interpersonal Characteristics of the Sample and its Subtypes at Intake

Group	N	Structural summary parameters				Circular Statistics		
		Angle	Elevation	Amplitude	R ²	Circular Mean	Circular Variance	95% Circular CI
Depressed Sample	407	218.86°	0.06	0.29	0.92	--	--	--
Group 1 (Vindictive)	33	121.21°	0.91	1.09	0.96	120.89°	21.86°	128.11° – 113.67°
Group 2 (Intrusive)	71	32.61°	0.46	0.56	0.96	30.76°	36.25°	38.50° – 23.03°
Group 3 (Soc. Avoid.)	53	239.59°	0.71	1.32	0.94	240.03°	14.51°	243.34° – 236.13°
Group 4 (Exploitable)	112	309.46°	0.49	0.82	0.92	306.84°	27.46°	311.92° – 301.75°
Group 5 (Cold)	138	196.41°	0.43	0.51	0.90	199.18°	45.47°	206.76° – 191.59°

Note. Angle = circumplex location of the predominant interpersonal trait in degrees; Elevation = average octant endorsement; Amplitude = a measure of profile differentiation; R^2 = interpersonal prototypicality. Circular Mean = the average of the angular displacements for each individual within the group; Circular Variance = the dispersion of the angular displacements of individuals within a group around the circular mean; 95% Circular CI's = 95% circular confidence intervals which identify reliable differences in circular means.

Table 5
Comparisons of the Interpersonal Subtypes on Intake Diagnostic Comorbidity and Depressive Symptom Severity

	Group 1: Vindictive (n = 33)		Group 2: Intrusive (n = 71)		Group 3: Soc. Avoidant (n = 53)		Group 4: Exploitable (n = 112)		Group 5: Cold (n = 138)		
Comorbidity	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>N</i>	(%)	<i>V</i>
Mood D/O	5	(15.2)	4	(5.6)	9	(16.9)	16	(14.2)	21	(15.2)	.31 .11
Anxiety D/O	15	(45.4)	38	(53.5)	19	(35.8)	48	(42.8)	52	(37.6)	.21 .12
Alcohol/Substance Use D/O	1	(3.0)	1	(1.4)	0	(0.0)	2	(1.7)	1	(0.72)	.71 .07
Personality D/O	26	(78.7)	50	(70.4)	44	(83.0)	80	(71.4)	99	(71.7)	.44 .10
Depression Severity	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>F</i> (4, 210) <i>p</i> <i>η</i> ²
Intake DEP Score	2.04	(.85)	1.82	(.78)	1.99	(.68)	1.75	(.81)	1.80	(.85)	1.39 .24 .01

Note. Comorbidity = Axis I and II comorbidity diagnosed using SCID-I/P and SCID-II respectively; Depressive Symptom Severity = intake SCL90-R DEP subscale score, a measure of depressive distress; *V* = Cramer's *V*, measure of effect size in Chi-Square analysis; *η*² = measure of effect size in ANOVA.

Table 6

Comparison of the Interpersonal Subtypes on Depression Diagnosis at Intake

	Group 1: Vindictive (n = 33)	Group 2: Intrusive (n = 71)	Group 3: Soc. Avoidant (n = 53)	Group 4: Exploitable (n = 112)	Group 5: Cold (n = 138)	χ^2 (8)	p	V	Group Differences
	N (%)	N (%)	N (%)	N (%)	N (%)				
MDD Diagnosis	10 (30.3)	39 (55.0)	31 (58.5)	61 (54.5)	77 (55.8)	17.56*	.03	.15	3<sD 1>sD 1<MDD
DD Diagnosis	12 (36.4)	16 (22.5)	18 (34.0)	35 (31.3)	31 (22.5)				
sD Diagnosis	11(33.3)	16 (22.5)	4 (7.5)	16 (14.2)	30 (21.7)				

Note. Depression Diagnosis: measured by meeting diagnostic criteria for MDD or DD using SCID-I/P, sD using SCID-I/P and SCL90R; V = Cramer's V, measure of effect size in Chi-Square analysis;
* p<.05.

Group Differences: determined by an examination of the standardized residuals.