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**Deconstructing Individual Differences in Long-Term Personality
Disorder and Trait Change**

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Abstract

Converging lines of evidence suggest that personality pathology is comprised of shared and unique impairments. The current study leveraged a large clinical sample (N=505) and a person-centered statistical approach, ipsative change analysis, to decompose individuals' multidimensional profiles at two time points into a metric which captures change in the elevation of the profile (i.e., impairment severity) and change in relationships between dimensions in the profile (i.e., stylistic symptom presentation). Results demonstrated that both severity and style change were predictors of overall pathology change, although the relative importance of these metrics was influenced by assessment method. Specifically, structured interview showed strong effects of severity change relative to style change, whereas self-report was less definitive. In addition, severity change was the stronger predictor of changes in psychosocial functioning. Results support earlier evidence of shared and unique factors in personality pathology while highlighting the influence of assessment method on models of pathology structure.

Keywords: Ipsative, personality disorder, personality, multimethod, longitudinal

Deconstructing Individual Differences in Long-Term Personality Disorder and Trait Change

The current taxonomic system of personality disorders (PDs) in the United States as instantiated in the DSM-5 (American Psychiatric Association, 2013) features 10 discrete diagnoses¹. Yet, few researchers or clinicians believe that categorical diagnoses represent ontologically valid or distinct disorders (e.g., Aslinger et al., 2018; Haslam, Holland, & Kuppens, 2012; Hopwood et al., 2018; Kernberg & Caligor, 2005; Sharp et al., 2015; Wright, Hopwood, Skodol, & Morey, 2016). Instead, both clinical theory and empirical evidence point to substantial overlap and shared impairments across diagnoses, even as there are also specific features unique to each disorder (e.g., attention seeking for histrionic personality disorder). This suggests the potential value of a multidimensional profile perspective, in which variation in PD features are understood as reflecting multiple correlated dimensions that can be decomposed into their shared and unique elements. Exemplifying the interest in such an approach, the Alternative Model for Personality Disorders included in Section III of the DSM-5 (e.g., Skodol et al., 2011) sought to articulate both shared and specific dimensions of personality problems in an effort to reconceptualize personality disorder taxonomy.

¹ Promisingly, ICD-11 (World Health Organization, 2018) has adopted a dimensional system and DSM-5 (American Psychiatric Association, 2013) includes an “alternative” dimensional system. Some have interpreted the latter’s Criterion A as a measure of severity and impairment, with Criterion B specifying the expression of the pathology (i.e., style).

Using a multidimensional profile perspective permits ipsative analyses in which an individual's profile at one point in time can be compared to the same individual's profile at other points in time with respect to both global change as well as changes in specific features. Such analyses allow a parsing of information about how individuals are changing as a function of development, treatment, or other factors that occur over time. For instance, global symptom reduction would suggest a general improvement in functioning, whereas improvements in some features coupled with deterioration in others would reflect a more qualitative pattern of change in personality that might not be evident when considering a global aggregate. A recent study taking an ipsative change approach found significant average changes and individual differences in both severity and style in a nonclinical sample (Woods, Edershile, Wright, & Lenzenweger, in press). The current study is an attempt to replicate these previous findings in a clinical sample and extend these initial results by linking changes in severity and style to functional outcomes.

Personality disorder severity and style

Disparate clinical theories of PD all point to common factors in the etiology of personality pathology (e.g., Beck, Davis, & Freeman, 2004; Kernberg & Caligor, 2005; Linehan, 1993; Pincus, 2005; Young, Klosko, & Weishaar, 2003). For example, psychodynamic models of PD development posit a toxic blend of dispositional affective disturbance (i.e., too high or too low activation) and early experiences with important others that inhibit

identity consolidation (Kernberg & Caligor, 2005). Kernberg's psychodynamic and highly influential nosological model of PDs uses two dimensions for classification: a severity dimension ranging from psychotic to neurotic, as well as the level of extraversion, which determines the stylistic presentation of the pathology. Although sometimes viewed as incongruent with psychodynamic models, the cognitive approach to understanding PD etiology also points to a dynamic relationship between early temperament and early experience such that temperament may predispose particular coping strategies such as avoidance, with chronically accessible strategies cyclically reinforcing maladaptive beliefs about the self, others, or the world (Beck Davis, & Freeman, 2004). Beck and colleagues (2004) distinguish between PDs based upon specific maladaptive core beliefs and coping strategies; however, they do not hypothesize distinct developmental pathways for each disorder. Thus, both psychodynamic and cognitive approaches to understanding personality pathology would predict shared developmental trajectories among personality disorders, with unique, stylistic features resulting from idiosyncratic dispositional and environmental interactions.

Cross-sectional research offers compelling evidence for shared variance in personality pathology. A series of factor analytic studies have reported a significant general factor in personality pathology (Hopwood et al., 2011; Jahng et al., 2011; Oltmanns, Smith, Oltmanns, & Widiger, 2018; Sharp et al., 2015; Wright et al., 2016; Williams, Scalco, & Simms, 2018).

Hopwood et al. (2011) extracted the first un-rotated component from the 10 DSM personality disorders that they interpreted as a severity dimension and which was predictive of overall dysfunction. Following this work, Wright and colleagues (2016) interpreted their extracted general factor as a marker of severity and was more closely linked with overall functioning than any of the secondary stylistic factors. Williams and colleagues (2018) reported a general factor which was strongly linked to each of the 10 PDs, and was related to a host of psychopathological constructs, such as internalizing symptoms and interpersonal behavior problems. Jahng et al., (2011) also reported a strong general PD factor that was linked to each of the 10 PDs and was also linked to substance abuse. Although this general factor has been interpreted in different ways, such as severity (Hopwood et al., 2011; Wright et al., 2016), interpersonal dysfunction (Jahng et al., 2011), and neuroticism (Livesley & Jang, 2000), there is clear evidence of substantial shared variance among the 10 PDs. Although we acknowledge that the interpretation of this general factor is a point of debate, for the purposes of the current study we will refer to this factor as severity.

Longitudinal changes in personality disorder severity and style

Although there has been substantial theoretical and empirical work on the structure of personality pathology, less is known about its longitudinal trajectory. Like basic personality traits, dimensional ratings of each of the PDs tend to be quite stable in the short term and somewhat less so in the long term (Clark, 2007). However, PD symptoms have been shown to be

relatively less stable than basic personality traits in the short term (Morey et al., 2007) and over longer periods (Hopwood et al., 2013). Stability estimates of PD symptoms appear to be influenced by assessment method (Samuel et al., 2011); yet, converging evidence points to sizable change in PD symptoms over time. Of particular note, each of the 10 PDs tend to decrease in severity over time at similar rates (Lenzenweger, 1999). In addition, shared variance across PDs has been shown to predict future functioning to a substantially greater degree than variance associated with particular PDs (Hopwood et al., 2011), and to show reciprocal change with functioning such that reduction in shared PD variance is associated with better functioning (Wright et al., 2016) pointing towards an important common pathway underlying personality pathology.

Evidence for substantial shared variance and common longitudinal trajectories supports a moving away from viewing PDs as separate entities towards a model that can account for both shared and specific variation in the expression of personality problems across people. Cronbach and Gleser (1953) decomposed multidimensional profiles into metrics that approximate the general (i.e., severity) and specific (i.e., stylistic features) distinction discussed above. In their approach, severity is reflected in the overall mean of a multidimensional profile, whereas stylistic features are reflected in the configuration of the profile. For example, imagine an elderly individual who is being assessed for the first time due to concerns about cognitive decline. He is tested using the Weschler Adult Intelligence Scale (Pearson Education

Inc., 2008) and his full-scale composite IQ (FSIQ) score is in the average range, with each of the index scores (i.e., verbal comprehension, perceptual reasoning, working memory, and processing speed) which make up the FSIQ also being in the average range. In scenario **A**, this same individual is re-assessed and now has an FSIQ at 80 (i.e., low average), with all of the respective index scores also in the low average range. One would say that this individual's multidimensional profile of index scores reduced in overall mean, but not in their relationship to each other. In other words, the overall magnitude of the multidimensional profile decreased. In scenario **B**, the patient is re-assessed following a focal stroke in the right parietal lobe. As a consequence, the patient's perceptual reasoning (PRI) is in the low average range, while the other index scores remain in the average range. Here, the primary change in the multidimensional profile of index scores reflects a shift in the relationship between PRI and the other index scores. This scenario illustrates a change in the patient's cognitive style—average in most areas, but deficient in perceptual reasoning.

When paired with longitudinal data, this type of decomposition permits analyses that distinguish between changes in severity and style within an individual's profile. An example of pure severity change would be an individual who met one criterion for each PD at baseline and no criteria for any PD at follow-up. Here, only the total number of criteria changed; the relationships between stylistic features of the multidimensional profile across the various disorders remained the same. A different individual who met

four dependent PD criteria and no other criteria at baseline, but four avoidant criteria and no other criteria at follow-up has no change in total number of criteria (i.e., severity), but does have changes in the stylistic features of the multidimensional profile, reflecting a shift in symptom presentation from social dependency to social withdrawal.

A recent study of ipsative change in personality pathology suggested that multidimensional profile change over time in personality pathology was explained by both severity and style change (Woods et al., in press). That is, total change in personality pathology was accounted for by significant shifts in mean-level pathology declines (i.e., severity) as well as changes in the manifestation of the pathology (i.e., style; e.g., shifting from dependent to avoidant presentation). However, the relative importance of severity and style in accounting for total change showed strong method effects: Interviewer-rated multidimensional PD change was mostly due to shifts in severity while self-reported PD change was somewhat more due to shifts in style. Moreover, while severity and style change were correlated in self-reported PD, they were unrelated in interviewer-rated PD. This suggests that severity and style are less sharply differentiated in self-report, which has previously been attributed to content differences between interview and self-report questions, and the focus on specific behavioral manifestations of pathology in interviews, among other hypotheses (e.g., Hopwood et al., 2013; Morey & Hopwood, 2013; Samuel et al., 2011). In addition, while both severity and style change were related to baseline Axis 1 diagnosis in

interviewer-rated PD, only style change was related to Axis 1 diagnosis for self-reported PD. This finding may be due to the method effects described above or to the sample characteristics, which were reflective of general (i.e., non-clinical) population levels of PD (Lenzenweger, 1999). It is possible that a clinical sample with greater baseline pathology (and consequently greater room for change) may help further clarify severity and style change more generally, as well as the links between these components of change and clinical outcomes.

The strong method effects reported by Woods and colleagues and Samuel and colleagues (2011) may have important implications for future longitudinal research on personality pathology and therefore merit replication. If self-report and clinical interview provide discrepant information regarding how personality pathology changes over time, it would be important for future researchers to be aware of the potential method effects and the impact they may have on their results. In addition to replicating the method effects reported in the prior work, it is also important to explore whether severity and style have differential links to important outcomes. In particular, finding discrepancies in associations between severity and style change with clinical outcomes would underscore the usefulness of the severity/style framework in understanding PDs. Woods and colleagues obtained only baseline Axis 1 diagnosis and reported mental health treatment; thus, this preliminary work should be extended to capture a broader picture of psychosocial functioning. Finally, the prior work was

conducted using an undergraduate sample. Although this sample was oversampled for personality pathology and mirrored population estimates of PD (Lenzenweger, 1999), replication in a clinical sample is needed. Thus, the primary aims of the current study are to 1) test whether the significant impacts of severity and style change on total personality pathology change replicate, with an eye towards method effects, in a clinical sample and 2) extend our understanding of the importance of severity and style change in predicting patient functioning. Specifically, based upon previous work, we hypothesized that: 1) both severity and style would be significant predictors of multidimensional change in personality pathology and 2) the overall proportion of total change explained by severity and style would vary by method such that severity would be stronger for interview but roughly equivalent with style for self-report. The examination of associations between severity and style change and clinical outcomes was exploratory.

In addition to ipsative change in personality pathology, Woods and colleagues applied the same procedure to study changes in non-pathological, normal range basic personality traits (i.e., individuals' affective, cognitive, and behavioral tendencies across situations). It is important to examine basic personality and personality pathology together for several reasons. First, both show systematic change, even if changes tend to be greater for PDs than basic personality traits (Hopwood et al., 2013; Morey et al., 2007). Basic personality tends to follow a normative trajectory of development such that individuals become more conscientious, agreeable, and emotionally

stable over time, referred to as the maturity principle (i.e., Roberts, Caspi, & Moffitt, 2001; Roberts & Mroczek, 2008). A combination of high neuroticism, low extraversion, low agreeableness, and low conscientiousness also tends to be linked to personality pathology (e.g., Morey et al., 2002) suggesting that maturational changes in basic personality may be linked with reductions in personality pathology (Wright, Pincus, & Lenzenweger, 2011). Indeed, there is evidence that, at least for borderline PD, shifts in symptoms over time are associated with changes in neuroticism, extraversion, agreeableness, and conscientiousness (Wright, Hopwood, & Zanarini, 2015). Further research has shown similar relationships between rates of change in avoidant PD symptoms and change in neuroticism, dominance, and affiliation (Wright, Pincus, & Lenzenweger, 2013). These findings together suggest that both personality pathology and basic personality show systemic change which may reflect a shared underlying process. Woods et al., (in press) reported that basic personality total change was reflected by both severity/maturity and style change; however, severity/maturity and style changes explained much less of the variance in total change than did their pathological analogues. Therefore, the current study will also test whether previous findings that both severity/maturity and style changes predict total change in basic personality replicate, albeit less so than for PDs, and extend this work to see if severity/maturity and style change in basic personality predict clinical outcomes as would be predicted if personality pathology can be reflected in the basic personality traits.

Method

Sample

The current study used participants in the Collaborative Longitudinal Personality Disorder Study (CLPS; Gunderson et al., 2000) who provided data at baseline as well as 2- (range = 244 - 505) and 4-year (range = 231 - 481) follow-ups. Extensive demographic and psychodiagnostic information is available elsewhere (e.g., Gunderson et al., 2000). Although previous studies using CLPS data have examined associations between the variables examined in the present study (e.g., Hopwood et al., 2011; Morey et al., 2007), this is the first to use a multidimensional profile approach to decomposing changes in personality and PDs. It is also the first to use these data to extract these elements of the multidimensional profile to predict clinical outcomes. Thus, the current study takes a distinct approach from the traditional, variable-centered approach.

Measures

Personality pathology was assessed via both interview and self-report. Participants were interviewed about personality pathology using the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996), a semistructured interview assessing DSM-IV Axis II criteria (identical to those presented in DSM-5 Section II definitions of PD) manifesting over the previous two years.

Self-reported personality pathology was obtained using the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993). This

questionnaire assesses a range of personality traits across the normal to abnormal spectrum. The SNAP can be scored both in terms of diagnostic dimensions and maladaptive traits. For the present study, only the 12 pathological traits were used to avoid overlapping items and constructs. Severity and style change for both diagnostic-based dimensions and maladaptive traits was considered in the current study.

Basic personality was assessed using the NEO Personality Inventory, Revised (NEO-PI-R; Costa & McCrae, 1992). This inventory was designed to capture the five major personality factors: extraversion, neuroticism, agreeableness, conscientiousness, and openness. Neuroticism was reverse coded (i.e., emotional stability) so that all factors were keyed towards higher maturity.

Overall functioning was assessed using the Global Assessment of Functioning (GAF), which is a single item measure ranging from 1 to 100 indicating symptom severity and level of functioning. Participants were assessed using the GAF at baseline and follow-up years 2 and 4.

Specific domains of functioning were assessed using both self-report and interview-derived measures. Participants were interviewed about their occupational, social, and recreational functioning using the Longitudinal Interval Follow-up Evaluation (LIFE; Keller et al., 1987). Participants were assessed using the LIFE at baseline as well as 2- and 4-year follow-up. In addition, participants reported on their own functioning using the occupational, social, and recreational subscales of the Social Adjustment

Scale—Self-Report (SAS-SR; Weissman & Bothwell, 1976). Participants were assessed using the SAS-SR at baseline, 2-year, and 3-year follow-up. The SAS-SR was not administered at the 4-year follow-up.

Analytic Strategy

Each dimension of each measure was standardized on the means and standard deviations of the first wave after computing descriptive statistics and prior to ipsative change analysis. Ipsative change in multidimensional profiles was estimated using the method described by Cronbach and Glesser (1953). Total change, D^2 , is the sum of squared differences between dimensions (i.e., PDs and personality factors) in the profile. D^2 is non-directional and represents a conglomeration of three forms of change: elevation, scatter, and shape. Severity/maturity and style change were calculated using the equations for elevation and shape change, respectively. Elevation (i.e., severity/maturity) change is the difference in the means of an individual's profiles at two time points. Elevation change was squared to make it non-directional for the purposes of predicting total change, paralleling D^2 . Scatter (D'^2) is the standard deviation from the profile's mean, divided by the square root of the number of dimensions in the profile. This metric is not of theoretical interest and was therefore ignored for our subsequent analyses. Profile shape change is calculated by removing elevation and scatter from D^2 . Consequently, shape (i.e., style) change, D''^2 , is the difference in an individual's profile at two time points after removing each profile's mean and standard deviation.

Associations between metrics of change and clinical outcomes were estimated using multiple regression, controlling for baseline levels of the outcome. A priori significance level was set to $p < .01$.

Results

Table 1 shows the descriptive statistics for severity and style change across each of the PD measures as well as the normal personality measure prior to standardization. Severity for the personality disorder measures refers to mean change across all dimensions within the measure (e.g., ten diagnostic dimensions for interviewer rated personality pathology) from one wave to another. Maturity for normal personality refers to mean changes across the five basic personality dimensions from one wave to another. Style change for both the personality disorder and normal personality measures refers to shifts in the relationships between the respective dimensions of each measure after severity and scatter (see above) are removed. On average, severity decreased for all measures of PD while staying static for normal personality (note, however, that severity is elevation squared for explaining total change). Severity change tended to be greater from baseline to years 2 and 4 than between years 2 and 4 across all measures.

Parsing Total Change

For interviewer-rated PD, both severity and style significantly and independently (i.e., when adjusting for each) explained total change (i.e., D^2) between all waves (Table 2). R^2 values suggested that total change in interviewer-rated PD predominantly reflected changes in the overall number

of personality pathology criteria met (i.e., severity change) rather than changes in which type of criteria were being met (i.e., stylistic change).

For self-reported PD scored in the DSM PD diagnoses, both severity and style change significantly and independently explained total change between all waves (Table 2). As with interviewer-rated PD, R^2 values suggest that total change was explained predominantly by changes in the overall number of items endorsed (i.e., severity change) rather than which specific items were endorsed (i.e., stylistic change).

The same self-report measure was re-scored as pathological traits. For these traits, both severity and style were also significantly and independently related to total change between all waves for self-reported maladaptive personality traits (Table 2). Examination of the R^2 values suggests that total change was attributable to changes in both the types of items which were endorsed (i.e., stylistic change), and overall mean changes (i.e., severity change).

For self-reported basic personality traits, both severity and style were significantly related to total change between all waves separately, as well as together (Table 3). R^2 values for change from baseline to year 2 and years 2-4 favored stylistic change; severity and style were approximately equal for change from baseline to year 4. It is notable that R^2 in total change for basic personality is generally lower than R^2 values for personality pathology using the same self-report methodology, regardless of whether pathology was scored as traits or diagnoses.

Prediction of Clinical Outcomes

Next, we estimated which of the change metrics significantly predicted clinically important outcome measures at years 2 and 4. Table 4 shows R^2 values for the change metric after removing variance explained by the baseline level covariate. Overall, there were a large number of significant effects across severity and style change, although effect sizes were generally small. As expected (e.g., Morey et al., 2007), interviewer-rated PD and both trait- and PD-scored self-reported PD had more significant associations with outcomes than did normal personality, which showed only one significant association. However, whereas interviewer-rated PD's associations to outcome variables were generally significant for both severity and style change, self-reported PD in both scoring methods tended to only have significant links through severity change. Across both waves, R^2 values were strongest for change indices predicting GAF scores as well as social functioning on the LIFE. Basic personality severity and style change were poor predictors of psychosocial outcomes.

Discussion

Both empirical evidence (e.g., Hopwood et al., 2011; Wright et al., 2016) and clinical theory (e.g., Bornstein, 1998; Kernberg, & Caligor, 2005; Pincus, 2005) support the distinction between the level of overall impairment of personality pathology (i.e., severity) and the manner in which personality disorder manifests (i.e., style). This study demonstrates that ipsative profile change metrics provide a compelling method for disentangling severity from

style in longitudinal data. Woods and colleagues (in press) recently investigated PD and personality profile change and found support for significant changes in severity and style in both basic traits and PDs among undergraduates. Interestingly, assessment method impacted estimates of the overall magnitude of change explained by severity and style in that study, such that interviewer-rated PD change was driven primarily by severity change, whereas self-reported PD change showed slightly stronger style change. The goal of the current study was to replicate these analyses in a clinical sample and to expand this work to examine how changes in severity and style are linked to important outcomes.

Overall, our findings replicate those of Woods et al. (in press) in showing the importance of decomposing severity and style to understand PD symptom remission and personality change over time. Both changes in the overall severity of pathology that is common to all PDs and shifts in the configuration of prominent PD features in the profile were important for understanding total profile change across both interview and self-report assessment methods. This lends further support for the distinction between the overall level of impairment and style of expression in personality pathology, as has been hypothesized by others (e.g., Bornstein, 1998; Kernberg & Caligor, 2005).

Our results also partially replicate those of Woods et al. (in press) with respect to method effects. As in the previous study, interviewer-rated PD change was overwhelmingly driven by severity change, although style

change was still significant. Two studies in clinically diverse samples now suggest that the main influence on changes in PD symptoms assessed by interview has more to do with overall severity than particular PDs. Using the SNAP as our self-reported PD measure allowed us to calculate self-reported personality pathology in two ways: as personality disorder diagnostic dimensions and pathological traits. The relative R^2 values for severity and style change when the SNAP was scored as PD diagnostic dimensions largely favored severity change, which was discrepant from earlier findings. However, when the SNAP was scored as pathological traits, style and severity explained similar proportions of the variance in total change. These findings together suggest two influences on the degree to which changes are due to severity or style. First, self-report appears to be somewhat more sensitive to stylistic change, whereas changes in interview seems to primarily relate to changes in severity. Second, syndrome-based models appear to be more impacted by changes in severity, likely because putative syndromes tend to mix empirically distinct traits. In contrast, evidence-based trait models, which distill personality pathology into more homogenous domains, may be more capable of picking up stylistic changes in how an individual's personality profile is configured.

The discrepancy in findings regarding the relative importance of severity and style change for self-reported PD between current study and Woods and colleagues' (in press) previous findings is noteworthy. One possible explanation is that the previous study used an non-clinical sample

whereas the current study used a clinical sample. It should be noted, however, that the sample used in the previous study has been shown to have a distribution of personality pathology reflective of population estimates (Lenzenweger, 1999). Another possibility is that the discrepancy comes from differences in scale construction. The MCMI-II features substantial item overlap (ranging from 9-18% across scales), and many of its items are scored positively for one PD subscale, and reverse-scored for another. Item overlap could drive the importance in change in style as change in overlapping items would shift one PD score down while driving another up. Whether the discrepancy in results is due to differences in samples, scales, or some other factor is an open question; however, the correspondence in findings between this study and the previous study in the interviewer-rated PD and normal personality change estimates suggests that it is likely due to differences between the measures rather than the samples. This hypothesis is also supported by the contrast in R^2 values for severity and style when the SNAP was scored as pathological traits rather than diagnostic dimensions. Notably, the pattern of results when using the former scoring method mirrored those of Woods et al. (in press).

The discrepancy between scoring methods for self-reported personality pathology is itself worthy of discussion. The finding that style change is much more prominent for pathological traits than diagnostic dimensions is may be explained by the relative heterogeneity of presentations within PD diagnostic groups (Skodol, 2012; Widiger & Trull, 2007) and the more

homogeneous nature of trait dimensions relative to PDs. Alternatively, this finding can be explained by the difference in purposes between pathological trait measures and diagnostic dimensions. The former is designed explicitly to parse between presentations of pathology (i.e., style) while the latter is chiefly concerned with estimating whether an individual has clinically significant distress or impairment (i.e., severity). It is also worth noting that personality pathology reflected as pathological traits is more conceptually in line with what is traditionally meant by style than shifts within diagnostic dimensions, although this does not necessarily mean that these results are necessarily more reflective of “real” ipsative change.

Beyond attempting to replicate the findings of Woods and colleagues (in press) in a clinical sample, we also looked at the extent to which severity and style change showed differential links to important clinical outcomes. Our results showed relatively small but significant links to changes in clinical outcomes across two years and four years. Although the overall strength of the associations was small, finding significant links across severity and style for both self-reported and interviewer-rated PD change supports the notion that severity and style are distinct and both are important for understanding psychosocial functioning.

Our study adds to a relatively small literature using ipsative methods to understand PD change longitudinally. Woods and colleagues (in press) recent work has been summarized above. An earlier study by Samuel and colleagues (2011) also found method effects in ipsative change, such that

self-reported PD showed less change over time than PD rated by their psychotherapists. Although the authors did not differentiate between severity and style change, they did note that those with greater personality pathology at baseline tended to show more total ipsative change. Johnson and colleagues (2000) used intra-class correlations for their method of ipsative analysis and found that change within a given PD dimension tended to be greater than overall change across PDs. However, this method of analysis is unable to differentiate between severity and style change.

A series of studies of normal personality used Cronbach and Gleser's (1953) ipsative change scoring to understand development in children. Here the authors used Cronbach and Gleser's original three ipsative change metrics—elevation, scatter, and shape. The first of these studies found that a significant proportion of the sample changed in terms of elevation and scatter, but not shape (DeFruyt et al., 2006). This finding was replicated in a two child and adolescent patient samples (De Bolle et al., 2009; DeFruyt et al., 2006b). This final study reported that ipsative change in personality appeared to be unaffected by depression severity or undergoing psychotherapy. The apparent incongruity in lack of significant style change between these studies and the current study and Woods and colleagues (2018) likely reflects differences in approach to modeling ipsative change. The previous studies of normal personality compared the proportion of their sample that showed significant change in each of Cronbach and Gleser's (1953) metrics. Recall that in Cronbach and Gleser's (1953) method, total

change (D^2) is first estimated, then elevation change is removed by subtracting the mean, leaving a mixture of scatter and shape change (D'^2). Finally, scatter can be removed to isolate shape change (D''^2). The underlying logic was that if a greater proportion of the sample showed significant change in total change (D'^2) prior to removing elevation (D^2), then at least some portion of ipsative change in personality must be attributable to elevation change. Because of our focus on distinguishing severity and style change, as in Woods et al.'s (in press) recent work, we isolated elevation change by calculating differences in mean profile scores over time (i.e., elevation) to predict total change. This gave us a quantitatively pure estimate of elevation change. This approach allowed us to estimate the proportion of total change due to elevation and style changes, in line with our research question, whereas the previous work calculated the frequency of significant change across the change metrics.

In summary, this study has both substantive and methodological implications. Substantively, it adds to the growing empirical literature that documents the value of parsing severity and style in personality pathology (Hopwood et al., 2011; Jahng et al., 2011; Oltmanns, Smith, Oltmanns, & Widiger, 2018; Sharp et al., 2015; Wright et al., 2016; Williams, Scalco, & Simms, 2018). However, while these previous studies have relied on similar factor analytic method, we have replicated their results conceptually using a distinct class of statistical analyses. Across both factor analytic and ipsative analyses, generally speaking, the shared aspects of PD explain a relatively

larger proportion of the variation in PD features and have relatively more predictive validity. These support the utility of an overall severity index for personality pathology, which has been suggested in both the psychoanalytic tradition (Kernberg & Caligor, 2005) and more recently in DSM 5's alternate model of personality disorders (APA, 2013). The distinct features of PD, which might be represented by syndromes or traits, depict how individuals with PD diagnoses differ from one another stylistically. These features might provide clinically useful information about how individuals with PDs differ from one another, a topic that merits further research. This distinction corresponds somewhat to the move to distinguish general and specific features in the diagnostic manuals, and points to a number of areas for further investigation, including the development of valid approaches to distinguishing severity and style and data that could help clinicians use severity/style framework to maximize diagnostic utility.

There are two main methodological implications of this study. First, the results complement the Woods et al. (in press) study by using an ipsative change approach to break profile change into distinct metrics representing change across the profile (i.e., general change) and change within the constituent components of the profile (i.e., specific change). The advantages of this approach include that it leverages longitudinal data to cleanly distinguish severity and style, can be used to compare different assessment methods and scoring approaches as discussed here. Second, this study showed that distinctions between severity and style may depend on the type

of assessment method used, with self-report measures with PD variation scored as evidence-based dimensions perhaps providing a relatively more powerful approach to detecting stylistic change than PD syndrome based scoring methods. Overall, this research offers key insights about the nature of personality pathology and highlights useful tools for further research.

There is mounting empirical evidence that personality pathology should be conceptualized in terms of two components, with one reflecting clinical severity and the other the behavioral manifestation of the pathology (i.e., style). Much of this research has relied on factor analytic approaches to parsing shared variance, interpreted as severity, from stylistic features. To complement this approach, the current study uses ipsative analysis to separate longitudinal change due to severity from change due to style. Our analyses in a clinical sample replicated those using a student sample (Woods et al., in press). Results demonstrated that the extent to which severity and style each played a role in explaining total change varied by data collection method (i.e., interview or self-report), and, within the same method, by scoring method (i.e., traits or diagnoses), replicating previous findings. The current study also demonstrated that these different change metrics have significant associations with clinically relevant psychosocial outcomes. This study once again highlights the utility of a dimensional approach to understanding personality pathology with a shared core of pathological severity and distinct stylistic features.

Authorship Note

W.C.W. and A.G.C.W. developed the study concept. Testing and data collection were performed by A.E.S., L.C.M., and C.J.H. W.C.W. performed the data analysis and interpretation under the supervision of A.G.C.W and in consultation with C.J.H. W.C.W. and A.G.C.W. drafted the paper. A.E.S, L.C.M., and C.J.H. provided critical revisions. All authors approved the final version of the paper for submission.

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Table 1: Descriptive statistics for change metrics

	Mean	SD	Range
Interview-rated PD			
Severity			
Baseline - Year 2	-.08	.10	-.51 - .23
Baseline - Year 4	-.11	.11	-.56 - .20
Year 2 - Year 4	-.03	.08	-.46 - .29
Style†			
Baseline - Year 2	.76	.61	.00 - 2.66
Baseline - Year 4	.89	.66	.01 - 3.02
Year 2 - Year 4	.81	.65	.00 - 2.80
Self-rated PD (Diagnostic Dimensions)			
Severity			
Baseline - Year 2	-.42	.81	-2.9 - 2.7
Baseline - Year 4	-.53	.83	-3.7 - 3.2
Year 2 - Year 4	-.11	.61	-3.1 - 2.1
Style			
Baseline - Year 2	.89	.31	.03 - 3.01
Baseline - Year 4	.95	.64	.09 - 3.57
Year 2 - Year 4	.83	.65	.05 - 3.35
Self-rated PD (Pathological Traits)			
Severity			
Baseline - Year 2	-.79	1.7	-7.43 - 6.64
Baseline - Year 4	-1.10	1.7	-6.79 - 6.21
Year 2 - Year 4	-.31	1.4	-7.64 - 8.36
Style			
Baseline - Year 2	.42	.40	.01 - 2.66
Baseline - Year 4	.45	.41	.04 - 2.88
Year 2 - Year 4	.32	.34	.01 - 2.03
Self-rated normal personality			
Maturity			
Baseline - Year 2	-.01	.14	-.51 - .61
Baseline - Year 4	-.01	.15	-.51 - .68
Year 2 - Year 4	-.00	.11	-.49 - .37
Style			
Baseline - Year 2	.06	.11	-.13 - 1.04
Baseline - Year 4	.06	.10	-.23 - .89
Year 2 - Year 4	.04	.07	-.24 - .51

Note: PD = personality disorder. †These values were based on participants who had some variability across waves. Thirty-nine participants had no change (reflecting scores of 0 at each wave) from baseline to year 2. When included, the descriptive statistics for the q-correlations suggest greater stability in shape ($M r = .64, SD = .31, \text{range} = -.33 - 1.00$). Eighty-five participants had no shape change from baseline to year 2 ($M r = .62, SD = .34, \text{range} = -.51 - 1.00$) and 92 to participants had no change from year 2 to year 4 ($M r = .66, SD = .33, \text{range} = -.40 - 1.00$), also suggesting greater stability in shape.

Table 2: Severity and style change as predictors of total change for personality pathology

Pathology Measure	Univariate				Multivariate			
	<i>B</i>	99% <i>CIs</i>	β	R^2	<i>B</i>	99% <i>CIs</i>	β	R^2
Interview-rated PD								
Baseline - Year 2								
Severity	15.20***	13.91-16.49	.78	.61	14.47***	13.24-15.69	.74	.66
Style	3.89***	2.79-4.99	.35	.12	2.52***	1.82-3.22	.23	
Baseline - Year 4								
Severity	14.83***	13.57-16.09	.78	.61	14.59***	13.39-15.79	.77	.64
Style	3.14***	1.78-4.50	.24	.05	2.44***	1.60-3.28	.18	
Year 2 - Year 4								
Severity	16.45***	14.87-18.03	.76	.57	15.87***	14.37-17.36	.73	.62
Style	4.27***	2.81-5.73	.31	.09	3.06***	2.11-4.01	.22	
Self-rated PD (Diagnostic Dimensions)								
Baseline - Year 2								
Severity	14.18***	13.03-15.33	.82	.67	12.25***	11.24-13.26	.71	.77
Style	6.11***	5.10-7.12	.57	.33	3.65***	3.03-4.28	.34	
Baseline - Year 4								
Severity	12.34***	11.27-13.41	.82	.67	11.70***	10.78-12.63	.77	.76
Style	4.87***	3.54-6.20	.41	.17	3.58***	2.86-4.31	.30	
Year - to Year 4								
Severity	15.58***	14.00-17.17	.80	.63	13.74***	12.29-15.20	.70	.72
Style	4.83***	3.78-5.89	.52	.27	2.85***	2.16-3.54	.31	
Self-rated PD (Pathological Traits)								
Baseline - Year 2								
Severity	18.71***	16.59-20.84	.71	.51	13.08***	11.65-14.51	.50	.81
Style	8.93***	8.07-9.78	.77	.59	6.81***	6.18-7.44	.59	
Baseline - Year 4								
Severity	18.67***	16.69-20.66	.76	.57	14.35***	12.86-15.83	.58	.79
Style	8.18***	7.16-9.20	.70	.49	5.80***	5.10-6.50	.50	
Year 2 - Year 4								
Severity	17.14***	15.10-19.18	.75	.56	12.85***	11.37-14.32	.56	.80
Style	6.81***	5.95-7.68	.72	.52	4.94***	4.34-5.54	.53	

Note: *** $p < .001$; PD = personality disorder

Table 3: Severity and style change as predictors of total change for self-reported normal personality

Time Scale	Univariate				Multivariate			
	<i>B</i>	<i>99% CIs</i>	β	<i>R</i> ²	<i>B</i>	<i>99% CIs</i>	β	<i>R</i> ²
Baseline - Year 2								
Severity	9.75***	7.89-11.62	.52	.27	7.77***	6.44-9.09	.41	.64
Style	2.88***	2.53-3.23	.69	.47	2.58***	2.29-2.88	.62	
Baseline - Year 4								
Severity	9.39***	8.03-10.75	.62	.39	8.36***	7.26-9.47	.55	.60
Style	2.16***	1.78-2.53	.55	.30	1.84***	1.56-2.13	.47	
Year 2 - Year 4								
Severity	10.46** *	8.15-12.77	.50	.25	7.49***	5.80-9.19	.36	.62
Style	2.35***	2.05-2.65	.70	.50	2.08***	1.80-2.35	.62	

Note: *** $p < .001$

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Table 4: Severity and style as predictors of clinical outcomes at years 2 and 4

		Year 2						Year 4				
		GAF	LIFE Soc	LIFE Wrk	LIFE Rec	SAS Soc	SAS Wrk	SAS Rec	GAF	LIFE Soc	LIFE Wrk	LIFE Rec
Interviewer-Rated PD												
	Severity	.05***	.05***	.02***	.02***	.02***	.01	.03***	.07***	.07***	.02**	.03***
	Style	.03***	.03***	.01**	.01**	.00	.00	.01**	.00	.01**	.00	.00
	Severity/Style	.06***/ ***	.07***/ ***	.03**/ns	.02**/ns	.02***/ns	.01 ns/ns	.04***/ns	.07***/ns	.07***/ns	.02**/ns	.03***/ ns
Self-reported PD (Diagnostic Dimensions)												
	Severity	.05***	.03***	.04***	.02***	.04***	.01	.04***	.02**	.02**	.01	.00
	Style	.01	.01	.00	.01**	.01	.01**	.01	.01**	.01	.00	.01
	Severity/Style	.06***/ ns	.07***/ ns	.023***/ ns	.023***/ ns	.04***/ns	.02 ns/**	.04***/ns	.02**/ns	.02**/ns	.01 ns/ns	.01 ns/ ns
Self-reported PD (Pathological Traits)												
	Severity	.08***	.04***	.03***	.02***	.05***	.01**	.03***	.03***	.02***	.01	.01
	Style	.00	.01**	.01	.01**	.01	.00	.00	.00	.01	.00	.00
	Severity/Style	.08***/ ns	.07***/ ns	.03***/ns	.03***/ns	.06***/ns	.02**/ns	.03***/ns	.03***/ns	.03**/ns	.01 ns/ns	.01 ns/ ns
Self-reported Normal Personality												
	Severity	.00	.01	.00	.00	.00	.00	.02**	.00	.00	.01	.00
	Style	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Severity/Style	.00 ns/ns	.01 ns/ns	.00 ns/ns	.00 ns/ns	.00 ns/ns	.00 ns/ns	.02**/ns	.00 ns/ns	.00 ns/ns	.01 ns/ns	.00 ns/ ns

Note: All values are R² values adjusting for baseline values of the outcome. ** p < .01; *** p < .001; ns = non-significant. For multivariate regressions, significance for severity is indicated before the slash and style after. PD = Personality disorder; GAF = Global assessment of functioning; LIFE Soc = Longitudinal interval follow-up examination social subscale; LIFE Wrk = Longitudinal interval follow-up examination occupational/work subscale; LIFE Rec = Longitudinal interval follow-up examination recreation subscale; SAS Soc = Social adjustment scale social subscale; SAS Wrk = Social adjustment scale occupational/work subscale; SAS Rec = Social adjustment scale recreation subscale.