

**Title: Level of Personality Functioning as a Predictor of Psychosocial Functioning –
Concurrent Validity of Criterion A**

Running title: AMPD, Criterion A, Personality functioning, Psychosocial functioning

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Abstract

The Alternative Model for Personality Disorders (AMPD) in the Diagnostic and Statistical Manual of Mental Disorders (*DSM*), fifth edition (*DSM-5*), defines personality functioning by assessment of impairment in Identity and Self-direction (Self-component) and in Empathy and Intimacy (Interpersonal). These four domains constitute the Level of Personality Functioning Scale (LPFS), a trans-diagnostic measure of PD severity. The association between the LPFS and psychosocial impairment based on other previously established psychosocial functioning instruments has not been reported.

A total of 317 individuals, including a representative clinical sample of 282 patients (192 with a PD diagnosis), was evaluated with the Structured Clinical Interview for the *DSM-5* AMPD (SCID-5-AMPD) Module I. Self-reported impairment was measured by the Work and Social Adjustment Scale (WSAS) and social and occupational impairment was assessed by the functioning score of Global Assessment of Functioning scale (GAF-F).

WSAS and GAF-F both correlated significantly with mean LPFS scores and the sum of *DSM-IV* PD criteria. For both measures, the mean LPFS was a stronger predictor for psychosocial impairment than the sum of *DSM-IV* PD criteria. Within the LPFS, the Self component was a better predictor than the Interpersonal component for both WSAS and GAF-F. For the four domains the results diverged, with Identity as the strongest predictor by far for WSAS. Empathy was the only significant predictor for impairment evaluated by GAF-F, but its contribution to variance was not substantial.

Introduction

We know from a substantial amount of research that personality-related problems have a negative impact on social activity and occupational, leisure, and basic daily functioning (see e.g.; Skodol, 2018 for a review). Together, these disabilities are often referred to as psychosocial functioning, and personality disorders (PDs) appear to have a stronger influence on psychosocial functioning than other mental disorders (Hastrup, Kongerslev, & Simonsen, 2018; Skodol, 2018; Skodol et al., 2002). Borderline PD (BPD) has often been shown to have the strongest association with impairment (Hastrup et al., 2018; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005) and is also the most well-studied PD from the perspective of impact on functioning (Skodol, 2018). However, the categorical diagnostic approach to PDs has been highly criticized because of inherent limitations, like excessive co-occurrence among diagnostic PD categories, arbitrary diagnostic thresholds and heterogeneity within each category (Bernstein, Iscan, & Maser, 2007; Crawford, Koldobsky, Mulder, & Tyrer, 2011; Hopwood, Kotov, et al., 2018; Widiger & Samuel, 2005). The impact of personality pathology severity on psychosocial functioning across diagnostic categories, rather than the impact of any specific diagnosis, has now gained increased research interest (Wright, Hopwood, Skodol, & Morey, 2016).

Through the years, several indicators of PD severity have been proposed and discarded (Crawford et al., 2011; Hopwood et al., 2011). For example, the general criteria for PD in the official classification (Section II) of the Diagnostic and Statistical Manual of Mental Disorders, fifth edition, (*DSM-5*) have proved to have limited validity (Bornstein, 2016) and are considered inefficient and too difficult to operationalize effectively (Hopwood et al., 2011; Livesley, 1998). Furthermore, the Global Assessment of Functioning (GAF) scale (GAF, American Psychiatric Association, 1994) lacks sufficient specificity for PDs (Widiger & Trull, 2007), and the sum of PD criteria, often used as a measure of severity in research, has been criticized because many criteria confound dysfunction and symptom expression

(Hopwood et al., 2011; Parker, 1997). Despite this limitation, the total number of PD criteria continues to be used as a measure of PD severity in research (e.g., Arntz et al., 2003; Few et al., 2013; Hopwood et al., 2011).

An important objective of the *DSM-5* PD revision process was that trans-diagnostic core features of PDs should be included in any measure of severity. The Personality and Personality Disorders (P&PD) Work Group was influenced by the conclusions drawn from the Collaborative Longitudinal Personality Disorders Study (CLPS; Gunderson et al., 2000). In one paper based on this study, the authors concluded that severity, as measured by the sum of PD-specific diagnostic criteria, outperformed stylistic elements of symptom expression as a predictor of concurrent and prospective social, occupational, and leisure dysfunction (Hopwood et al., 2011). The CLPS demonstrated that seven of the *DSM-IV* (American Psychiatric Association, 2000) PD criteria loaded more strongly on this severity dimension than others. These criteria were all related to aspects of self and of relationships to others (Hopwood et al., 2011). In alignment with previous reports (Bender & Skodol, 2007; Kernberg & Caligor, 1996; Ronningstam, 2009), this suggested that disturbance in perspectives on self and others constituted core features of all PDs. The study provided important empirical support for two important prerequisites for the model; severity and style should be measured separately, and a measure of severity should involve a self-other perspective (Bender, Morey, & Skodol, 2011). Several authors have described how the focus of self and others aligns well with important theories of personality pathology (Bender et al., 2011; Hopwood, Mulay, & Waugh, 2019; Luyten & Blatt, 2013; Pincus, 2018; Waugh et al., 2017; Widiger et al., 2018). In order to develop a dimensional scale to assess severity, several validated clinician rated measures involving this perspective were evaluated. However, most of these instruments were originally developed for research, requiring extensive training for the raters. For example, the validated Quality of Object Relations Scale (QORS; Azim, Piper,

Segal, Nixon, & Duncan, 1991), evaluating an individual's internal ability to establish mature relationships, required two 1-hour interviews conducted one week apart. The Object Relations Inventory (ORI; Bers, Blatt, Sayward, & Johnston, 1993; Huprich, Auerbach, Porcerelli, & Bupp, 2016), which evaluates the quality of a person's mental representations of self and others, requires extensive training. However, these clinician-rating instruments had demonstrated satisfactory psychometric properties in clinical studies, and these and related measurements were informative for the development of an instrument more suitable for clinical use in *DSM-5*. A secondary data analysis was then performed to develop a continuum suitable for clinical use (Morey et al., 2011). Two self-report instruments were used; the General Assessment of Personality Disorder (GAPD, Livesley, 2006) and the Severity Indices of Personality Problems (SIPP-118; Verheul et al., 2008). Both instruments evaluate personality dysfunction. Items from these were selected according to their relevance for self / other – related impairment and then independently rated by members of the P & PD WG, in order to specify the level of personality pathology associated with each item. A coherent global dimension was delineated, predicting the likelihood of receiving any *DSM-IV* PD diagnoses, as well as multiple *DSM-IV* PD diagnoses (Morey, Benson, Busch, & Skodol, 2015). The Level of Personality Functioning (LPFS) represents the operationalization of this severity continuum.

In the Alternative Model for Personality Disorders (AMPD; see Hopwood et al., 2019 for a comprehensive presentation) in *DSM-5*, personality pathology is *defined* by a specific level of impaired personality functioning (Criterion A) and described by different patterns of pathological personality traits (Criterion B), while criteria C to G describe pervasiveness, stability, and alternative explanations for personality pathology. Personality functioning is constituted in the LPFS, intending to represent a continuum of severity, representing core features of personality pathology. This unidimensional scale involves

assessment of two intertwined and closely related components, *Self* and *Interpersonal*. These are each divided into two elements of personality functioning: *Identity* and *Self-direction* (Self) and *Empathy* and *Intimacy* (Interpersonal).

The LPFS was constructed as a unitary scale designed for improving clinical ease and utility in assessing personality psychopathology. However, to guide more detailed inquiry and empirical research, a semi-structural interview was developed, the Structured Clinical Interview for the DSM-5 Alternative Model for Personality Disorders (SCID-5-AMPD, used in this study) (First, Skodol, Bender, & Oldham, 2018). In the SCID-5-AMPD Model I, used to assess the LPFS, the four Self and Interpersonal elements are renamed *domains*, and each of these is characterized further by *subdomains*, consisting of the phrases within each domain that are separated by semi-colons (First et al., 2018), each of these are characterized further by *subdomains*, consisting of phrases within each domains that are separated by semi-colons (First et al., 2018). For example, the three subdomains of *Identity* are 1; the experience of oneself as unique, with clear boundaries between self and others (*Sense of self*), 2; stability of self-esteem and accuracy of self-appraisal (*Self-esteem*) and 3; the capacity for, and ability to regulate, a range of emotional experience (*Emotional regulation*). The degree of impairment in each of these 12 subdomains is differentiated into five *levels* of severity, ranging from 0 (little or no impairment) to 4 (extreme impairment) in the SCID-5-AMPD.. Furthermore, since routine clinical assessment with the LPFS provides a single dimensional measure of severity, the SCID-5-AMPD refers to the *global* LPFS to capture the overall level of impairment in personality functioning.

While the use of the LPFS is likely influenced by clinicians' preferred models of practice across the theoretical spectrum, some authors have speculated that, an individual's *level of impairment* (Criterion A) in personality functioning could indicate the appropriate level of care, while the *stylistic expression* (Criterion B) provides additional useful

information about the choice of intervention (Bach & Bernstein, 2019; Hopwood, 2018; Simonsen & Simonsen, 2014; Skodol, Morey, Bender, & Oldham, 2015) . Of note, the structure of the LPFS is not an outcome of empirically derived factor analytic models, like the Criterion B. While there was empirical support for understanding the five domains of the trait model as separable, the four domains of personality functioning were expected to be inter-correlated. Because of lack of sufficient empirical support, the AMPD was placed in *Section III* in the DSM-5, as an alternative to the standard approach in Section II and also to stimulate for further research. To the best of our knowledge, only one study has explored the relationship between clinician-rated LPFS and psychosocial functioning (Morey, Bender, & Skodol, 2013). In this on-line study, often referred to as the “Morey survey”, data was collected from 337 mental health clinicians based on their knowledge of one of their patients. A questionnaire was developed for this study, asking for information about demographic data, ratings of psychosocial functioning, as well as diagnostic information pertinent to *DSM-IV* and the AMPD. Based on the information provided by the clinicians, the authors found a significant correlation between global LPFS and impaired psychosocial functioning in a composite of occupational, social, and leisure areas ($r = .471$). The LPFS demonstrated greater increment as a predictor of psychosocial function compared with total number of *DSM-IV* criteria rated as present or not. The results should be interpreted with care due to the lack of direct assessment of the patients, and further research was asked for by the authors.

When the Morey survey was conducted, no instrument for measurement of the LPFS existed. Later studies have focused on relationship between LPFS and psychological symptoms (Bach & Hutsebaut, 2018; Few et al., 2013; Hutsebaut, Kamphuis, Feenstra, Weekers, & De Saeger, 2017), but there is still a lack of studies of the relationship between LPFS and psychosocial function after the online Morey survey. Also, more generally, research into the possible predictors of functionality in PD samples has been scarce.

Borderline (BPD) has been the main diagnostic category studied, and most studies have focused on demographic and clinical variables (Gunderson et al., 2011; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2006). That said, some of the instruments related to LPFS constructs have been validated against measurements of psychosocial functioning, though primarily in BPD-samples. One example is the Structured Interview of Personality Organization (Clarkin, Caligor, Stern, & Kernberg, 2003) which dimensionally assesses eight domains of personality organization. Esguevillas et al (2018) evaluated predictors for impaired psychosocial functioning in a sample of 43 patients with BPD, finding that among the six domains of personality in this scale, identity was the strongest predictor for psychosocial impairment assessed by Global Assessment of Functioning (GAF, American Psychiatric Association, 1994). In another study of 99 women with BPD, self-reported emotional dysregulation demonstrated a strong association with psychosocial functioning (Wilks, Korslund, Harned, & Linehan, 2016). However, as far as we can see, studies are lacking that are based on clinician-rated instruments developed for assessing the LPFS, evaluating the impact impairment in personality functioning on psychosocial dysfunction and based on a broader sample of PDs.

The Current Study

The multi-site Norwegian Study of the AMPD (Nor-AMP) aims to examine the reliability, clinical utility, and validity of the AMPD in a representative clinical sample that captures the range of severity of personality pathology. The main emphasis is on the LPFS, assessed by the new Structured Clinical Interview for the *DSM-5* AMPD, Module I (SCID-5-AMPD Module I; Bender, Skodol, First, & Oldham, 2018). The current study evaluates the association between the LPFS as a measure of PD severity and psychosocial functioning.

We first evaluate how the different levels of personality functioning relate to concurrent psychosocial functioning as measured by the Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear, & Greist, 2002) and the Global Assessment Scale (GAF; American Psychiatric Association, 1994). We expect that the degree of psychosocial impairment will increase as the impairment of personality functioning increases. Our second aim is to identify the better predictor of psychosocial functioning, the mean LPFS or the sum of *DSM-IV* PD criteria. Based on prior research (Morey et al., 2013; Morey et al., 2012) we hypothesize that the mean LPFS will be the stronger predictor.

Finally, we evaluate the components and domains within the LPFS as predictors of concurrent functional impairment. We hypothesize that the Self component will demonstrate stronger ability to predict psychosocial functioning than the Interpersonal. This hypothesis is primarily derived from related research focused on BPD (Esguevillas et al., 2018; Wilks et al., 2016), but is also supported by some research related to the most frequent PD in our sample, Avoidant PD (AVPD) (see e.g., Lampe & Malhi, 2018 for a review). We aimed to investigate this hypothesis.

Methods

Participants and Procedures

This study sample (N = 317) comprised 282 participants currently undergoing treatment (the clinical sample) and a non-clinical sample of 35 participants. We recruited the clinical sample from different clinical sites, representing general mental health inpatient and outpatient departments, group psychotherapy outpatient and day treatment units, and one substance abuse unit also serving incarcerated patients. The non-clinical sample, defined as individuals not having had any clinical mental health treatment during the last 5 years, was

recruited through an information poster made available to students and employees at the University of Agder, University of Oslo, and the Hospital of Sorlandet. In this paper, the non-clinical sample is included only in analyses related to the first aim.

Exclusion criteria were as follows: schizophrenia spectrum disorder (except schizotypal PD), sequelae after brain injury, pervasive developmental disorders, intellectual disability, severe ongoing substance abuse, and inability to understand Norwegian.

For referrals, we invited all therapists at the recruitment sites to refer patients to the study, with the aim of capturing the whole range of severity of personality pathology. Referring therapists evaluated symptom disorders according to the *DSM-IV* using the Mini International Neuropsychiatric Interview (MINI; Sheehan & Lecrubier, 1994) and personality pathology through Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, Spitzer, Gibbon, & Williams, 1995). In the non-clinical sample, participants were screened for PD using the Iowa Personality Disorder Screen (IPDS, Langbehn et al., 1999).

There was a maximum interval of 5 weeks between the SCID-II assessment and the SCID-5-AMPD Module I assessment, and the rater of personality functioning was blind to the results of the diagnostic evaluation. Patients were not to be referred if they were judged to be in an acute crisis.

Samples

Clinical sample. The clinical sample ($N = 282$) comprised 182 females (64.5%), and ranged in age from 16 to 72 years ($M = 32.5$; $SD = 10.1$). About one half (50.4%) of the participants were married or lived with a partner, 43.2% were employed or full-time students, and the average education level was 4.1 ($SD = 2.8$) years post-secondary school.

The mean number of diagnostic criteria according to SCID-II was 11.1 ($SD = 8.1$; $range = 0-49$). Concerning PD diagnosis, 192 (68.1%) participants fulfilled criteria for one or more diagnoses, including PD-NOS (not otherwise specified). For seven of the participants in the clinical sample (2.5%), information regarding the SCID-II evaluation was missing. The prevalences of PDs were as follows: avoidant (AVPD) 42.2 % ($n = 81$), BPD 36.5 % ($n = 70$), PD-NOS 23.4 % ($n = 45$), antisocial and paranoid 15.6 % (both $n = 30$), obsessive–compulsive 10.9 % ($n = 21$), and dependent 7.4 % ($n = 14$). Schizotypal, schizoid, histrionic, and narcissistic PDs each occurred in less than 2 % of the sample.

For the 158 participants with one or more specific PD, the mean number of specific *DSM-IV* PD criteria was 14.1 ($SD = 7.8$), and the mean number of specific PD diagnoses was 1.5 ($SD = 1$). If PD-NOS was included, the mean number of specific criteria was 13.6 ($SD = 7.8$). In the clinical sample, 83.7% had one or more symptom disorder ($M = 1.6$; $SD = 1.4$; missing 2.5%; $n = 7$). Most frequent were major depression (27%), social phobia (19%), post-traumatic stress disorder (13%), substance abuse (12%), generalized anxiety disorder and dysthymia (both 10%), and panic disorder with agoraphobia (9%).

Non-clinical sample. The non-clinical sample ($n = 35$) comprised 25 females (71%) and 10 men, with ages ranging from 19 to 58 ($M = 30$; $SD = 12$). Almost half (46%) were married or lived with a partner, all were students or employed, and their average years of education after secondary school was 6.5.

Instruments

Clinician-Rated psychosocial functioning: Observer based assessment of psychosocial functioning was measured by the Global Assessment of Functioning (GAF, American Psychiatric Association, 1994). GAF scores ranges from 1 to 100, representing

symptom severity and social and occupational impairment, with higher scores representing better functioning. According to guidelines (Aas, 2011), the rater is instructed to rate the lowest function during the last week. In the Nor-AMP study, the GAF-Split version (Karterud, Pedersen, Loevdahl, & Friis, 1998) was used, assessing symptom (GAF-S) and function (GAF-F) separately. This version is commonly used in clinical practice and research in Norway, although substantial differences between the dimensions rarely occur (Pedersen & Karterud, 2012). Inter-rater reliability is acceptable, especially if raters are trained and in research situations (Pedersen, Hagtvet, & Karterud, 2007; Vatnaland, Vatnaland, Friis, & Opjordsmoen, 2007). The referring therapists were trained through courses arranged by the Department of Personality Psychiatry (DPP), which included a 1-day GAF training workshop based on video interviews. Good psychosocial functioning is often defined as a total GAF score above 70 (Esguevillas et al., 2018).

Self-reported psychosocial functioning: Self-report of psychosocial functioning was measured by the Work and Social Adjustment Scale (WSAS; Mundt et al., 2002). WSAS is a 5-item questionnaire measuring the level of impairment on a scale from 0 to 8, with 0 indicating no impairment at all and 8 indicating very severe impairment. The scores on the five items are summarized into a total score ranging from 0 to 40. The five aspects of functioning are ability to work and study, home management, social and private leisure activities, and ability to form and maintain close relationships with others. Higher scores mean more severe impairment. The time frame is the last 4 weeks. The scale has demonstrated sensitivity to clinical changes in different clinical groups, including individuals with PDs (Pedersen, Kvarstein, & Wilberg, 2017) and high test–retest reliability (Jansson-Frojmark, 2014). According to a study by Mundt et al. (2002), scores above 20 indicate moderate to severe disability.

Personality functioning: SCID-5-AMPD Module I. The Structured Clinical Interview for the *DSM-5* AMPD Module I is a semi-structured interview covering the 12 subdomains of the LPFS. The instrument starts with eight general overview questions addressing how the respondent relates to self and others. The assessment for each of the subdomains starts with one or more screening questions. The rater is instructed to ask questions for each subdomain corresponding to the level at which the interviewee may be functioning, based on clinical judgment. For each level, there are one to six specific questions. The rater explores increasing levels of impairment until the interviewee clearly does not qualify for that level.

The SCID-5-AMPD 1 was administered by seven psychiatrists or clinical psychologists, with a mean of experience of 13.9 years ($SD = 5.9$). Before the study, the seven raters were trained by one of the authors of the instrument, Dr. Donna Bender. There was a maximum interval between the SCID-II and SCID-5-AMPD Module I interviews of 5 weeks, and the raters performing the SCID-5-AMPD Module I were blinded to the SCID-II results. Evaluation of inter-rater reliability in a former Nor-AMP sub-study (Buer Christensen et al., 2018) revealed no statistically significant difference between experienced and inexperienced raters. Inter-rater reliability evaluated by test–retest and different raters was acceptable, with intra-class correlations of .59 to .90 for domains and of .75 for the global LPFS.

Diagnostic instrument for symptom disorders: *Mini International Neuropsychiatric Interview (MINI)*. Referring therapists performed this brief structured diagnostic interview for symptom disorders. The reliability and validity of the MINI are considered to be good (Sheehan et al., 1998). In this study, we used the Norwegian version

5.0, which has moderate to good test–retest reliability (Mordal, Gundersen, & Bramness, 2010).

Diagnostic instrument for personality disorder: *Structured Clinical Interview for Axis II disorders (SCID-II)*. The SCID-II (First et al., 1995) is a semi-structured interview to assess the 10 *DSM-IV* PDs including PD-NOS. The SCID-II has good inter-rater and test–retest reliability in PD samples (Maffei et al., 1997; Weertman, Arntz, Dreesen, van Velzen, & Vertommen, 2003). Referring clinicians were trained in performing the SCID-II through courses arranged by the DPP. A study from the DPP demonstrated good reliability estimates of PD diagnoses established according to the SCID-II (Arnevik et al., 2010). The quality of the SCID-II assessments was ascertained by consensus training of all referring therapists, using video-recorded interviews. During both the initial training and the video sessions, independent ratings and discrepancies were discussed, but no test of inter-rater reliability was performed. However, a study by Arnevik and colleagues (Arnevik et al., 2009), based on a similar training procedure, reported kappa coefficients for the three evaluated PDs as follows: AVPD, 0.75; BPD, 0.66; and paranoid PD, 0.71. These values indicated acceptable diagnostic reliability within the network from which 45% of the clinical sample was recruited.

Statistical Analysis

In our analysis, mean LPFS was based on the average scores from ratings of all 12 subdomains. The different levels of personality functioning were defined as follows: Level 0: mean LPFS 0–0.49; Level 1: 0.5–1.49; Level 2: 1.5–2.49; Level 3: 2.5–3.49; and Level 4: 3.5–4.0 (see Buer Christensen et al., (Submitted 2019) for more details)

To evaluate the ability for the LPFS to explain variation in functional outcome measured by WSAS and GAF-F, we conducted a series of multiple linear regression analyses. The non-clinical sample was excluded from these analyses because no evaluation of PD criteria was performed in this group.

The linear regression model assumptions (homoscedasticity, linear relationship, normality, lack of auto-correlation and multicollinearity) were checked (for the Self and Interpersonal components Variation Inflation Factor (VIF) were 2.6; for the four domains 2.7, 2.7, 2.8 and 3.4.). Then we analyzed the associations between age, number of symptom disorders, and functional impairment. The association was significant only for number of symptom disorders. Furthermore, from an independent t-test, there was found no significant gender differences for any of the two outcome variables. As described above, there is empirically support for expecting a more negative impact on psychosocial functioning for PDs than for symptom disorders. Hence, we entered number of symptom disorders in a first block of a hierarchical regression analysis.

Then we entered our independent variables of interest: the sum of *DSM-IV* criteria in the second block and the mean LPFS in the third block. Here, *DSM-IV* PD criteria were rated as present or not, by defining sub-threshold as not present. Because we expected the mean LPFS to have the strongest ability to explain psychosocial impairment we entered this variable in last block. This assumption was in line with the results of the Morey survey (Morey et al., 2013). The orders of predictors were also reversed to evaluate if the total number of PD criteria was able to obtain incremental validity over the mean LPFS.

To evaluate components and domains within the LPFS as predictors of impairment measured as measured by WSAS and GAF-F, we conducted similar regression analysis, still for the clinical sample. The variables were entered according to our expectations regarding the ability to explain variance in psychosocial impairment: Number of symptom disorders in

the first, and number of *DSM-IV* PD criteria in the second block. Regarding the two components of the LPFS, self and interpersonal, we entered both in the third block. When the four domains were evaluated, we conducted a similar analysis with all four entered in the third block, after symptom disorders and PD criteria.

We conducted these regression analyses for each of the two outcome variables, WSAS and GAF.

For all statistical analyses, we used IBM SPSS Statistics 23.0 (IBM Corporation, Armonk, New York, USA).

Results

Descriptives and Distribution of Impairment

For all 317 participants, mean LPFS was 1.7 ($SD = 1.01$), while for the clinical sample ($n = 282$), it was 1.9 ($SD = 0.9$). For the 192 participants fulfilling criteria for one or more *DSM-IV* PD diagnoses, including PD-NOS, the mean LPFS was 2.2 ($SD = 0.7$). For clinical participants with no PD diagnosis ($n = 85$), mean LPFS was 1.1 ($SD = 0.8$), while for the non-clinical sample ($n = 35$), it was 0.1 ($SD = 0.1$). In the total sample, 16.1% were rated with little or no impairment (Level 0); 24% some impairment (Level 1); 35% moderate impairment (Level 2); 21% severe impairment (Level 3); and 4% with extreme impairment (Level 4). Regarding the different variables of psychosocial functioning, there was a clear tendency: the more impaired personality functioning rated by the LPFS, the more severe psychosocial impairments were indicated by all other clinical variables (Table 1). As to impaired functioning indicated by WSAS and GAF scores, the main difference in rating was between Level 0 and Level 1. For the other sociodemographic variables, the main differences

were between 0 and 1 and between 3 and 4. For participants scored at Level 4, the probability of living alone and receiving a disability pension were substantially higher than for Level 3 and lower. We also found the greatest increase in number of DSM-IV PD criteria between Level 3 and Level 4.

– Insert table 1 approx. here –

Correlation analyses

There were no significant gender differences on neither WSAS nor GAF-F. All correlations were significant at the .01-level (table 2). We found a significant correlation between mean LPFS and number of PD criteria ($r = .672$), and number of PD criteria had a significant association with scores on WSAS ($r = .323$) and GAF-F ($r = -.396$). However, the mean LPFS score revealed stronger associations with both WSAS and GAF-F ($r = .416$ and $-.444$, respectively). All domains were highly inter-correlated ($r = .602 - .773$); regarding their correlations with measures of psychosocial impairment, Identity was the only domains which demonstrated correlation substantially higher than the other three (WSAS; $r = .487$).

- Insert table 2 approx. here –

LPFS as predictor for psychosocial dysfunction: Mean LPFS

From a hierarchical multiple regression analysis, LPFS contributed to explained variance in both WSAS and GAF-F beyond variance accounted for by the number of symptom disorders and the number of PD criteria. As showed in Table 2 the variance of both WSAS and GAF-F to some degree was accounted for by the number of symptom disorders and PD criteria, with higher impact from PD criteria. However, when LPFS was added to the model, the explained variance increased substantially. Furthermore, in this last model, common variance between symptom disorders, PD criteria and LPFS were partialled out, and only LPFS revealed significant unique contribution to the explained variance of both WSAS and GAF-F.

In order to evaluate to which degree the total number of *DSM-IV* PD criteria was able to obtain incremental validity over the mean LPFS, we also reversed the order of these predictors for both analyses; For WSAS, when mean LPFS was entered in the second step, explained variance was substantially increased ($R^2 = .174$; $\Delta R^2 = .149$, $p < .001$). When number of PD criteria were added in the third step, there was still a small increase in explained variance, but not significant ($\Delta R^2 = .003$, $p = .39$). Regarding the GAF-F, the tendency was the same; when number of PD criteria was entered in the third step, there was a small but not significant increase in explained variance ($\Delta R^2 = .012$; $p = .057$).

– Insert table 2 approx. here –

LPFS as predictor for psychosocial dysfunction: Self and Interpersonal

To evaluate the two “main components” of the LPFS (Self and Interpersonal), a variant of the former regression analysis was conducted, in that the total LPFS in the third block (step) was replaced with these two components. As shown in Table 2, this model

accounted for more variance in both WSAS and GAF-F than the former step 3-model. However, when common variance of the independent variance was partialled out, only the Self-component revealed significant unique contribution to the model.

LPFS as predictor for variance in psychosocial dysfunction: The four domains

In a further variation of step 3 of the regression analysis, the Self and Interpersonal components were replaced by their two domains; Identity and Self-direction, and Empathy and Intimacy, respectively. As shown in Table 2, the total model in this step 3 accounted for more variance of both WSAS and GAF-F than the two former alternative step 3s. Moreover, among the six independent variables, unique contributions to the variance of WSAS were from the Identity and Intimacy components, with strongest contribution from Identity. Accounting for variance of GAF-F, Empathy was the only component with unique and significant contribution in the model.

Discussion

In this study of a representative sample of personality pathology, LPFS outperformed the number of *DSM-IV* PD criteria in explaining the amount of variance in concurrent psychosocial impairment when rated by both self-report (WSAS) and by clinicians (GAF-F). When LPFS was divided into two components, only the Self-component demonstrated a significant contribution to variance in both outcome variables. When the four domains were evaluated, Identity was a strong and significant contributor to variance in the WSAS ratings, Intimacy less strong but significant, while for the GAF-F ratings, Empathy was the only

domain that significantly added explained variance, though less strongly. The level of PD severity evaluated by the number of *DSM - IV* PD criteria increased as the impairment in personality function increased from Level 0 (little or no impairment) to Level 4 (extreme impairment). The strongest increase was found for the step between Level 0 to Level 1, and from Level 3 to Level 4. For psychosocial impairment rated by WSAS and GAF-F, the main difference was demonstrated between Level 0 and Level 1.

Sociodemographic and Clinical Characteristics

The significant correlation found between the mean LPFS score and the sum of *DSM-IV* PD criteria, was consistent with other relevant studies of PD samples (Few et al., 2013; Hutsebaut et al., 2017; Morey et al., 2013; Zimmermann et al., 2014). Also, in line with the study of Morey et al (2013), we found that impairment in psychosocial function demonstrated stronger association with LPFS-score than with the number of *DSM-IV* PD criteria. For WSAS and GAF-F, the main decline in functioning was found between groups of participants rated with little or no impairment in personality functioning (Level 0), and groups of participants rated with some impairment (Level 1). This is reasonable because most participants in the non-clinical group were rated according to Level 0, in accordance with the intention of the LPFS to include non-pathological functioning as part of its range. In the clinical sample, most participants were ranked from level 1 to 3. There was a slight increase in psychosocial impairment from level 1 to 3, although there was substantial variance within each level.

Only 12 participants (4.2%) were rated according to Level 4 (extreme impairment). This proportion is lower than in the Morey survey (6.8%). It is worth emphasizing that in our study, this level includes only participants with a mean LPFS ranging from 3.5 to 4.0. This might also be related to a real lack of the most impaired individuals in active treatment in our

recruitment sites, but it could also reflect conscious or unconscious recruitment bias among therapists, perhaps concerned that these patients should be protected against participating in a study.

The increase of the number of symptom disorders, as well as the number of *DSM-IV* PD criteria, was relatively large for the shift from level 3 to 4. Furthermore, almost one half of the level 4 patients received disability pension, whereas this number is only 9% for level 2 and level 3 patients. These results support those found in another Nor-AMP study (Hummelen, 2019, submitted), in which item response was used to assess the psychometric properties of the SCID-5-AMPD Module I. Relatively large threshold parameters were found for the shift from level 3 to 4, indicating a larger increase in severity than for the other intervals. Of interest, in the current study, the large shift between levels 3 and 4 was not reflected for the self-reported WSAS. This could indicate that these participants have adapted their lives to their limited personality functioning, reporting relatively good psychosocial functioning despite their impairment. Another explanation is that these individuals are less aware of their impairment.

Correlation analyses

As we expected, the two components and the four domains were all highly inter-correlated. This is in line with the assumptions behind the scale; that the four domains represents inter-related elements of a single, global dimension. However, the inter-correlation found in our study were weaker than reported in self-report in a non-clinical sample (Hopwood, Good, & Morey, 2018; Morey, 2017). While studies based on self-report measures have demonstrated similar correlation with criterion variables across the domains (Hopwood, Good, et al., 2018; Huprich et al., 2017); the Identity domain diverged somewhat from the other domain with is strong correlation with the WSAS score

LPFS accounting for variance of WSAS and GAF-F

LPFS outperformed number of *DSM-IV* PD criteria as an explanatory variable of impairment in social functioning. The LPFS demonstrated almost similar explanatory strength for variance in self-rating by WSAS and clinicians rating of GAF-F, both measures of impairment in social and occupational functioning related to psychological conditions. This finding is in agreement with the results in the only previous published evaluation of LPFS as a predictor of psychosocial functioning (Morey et al., 2013), strengthening the evidence in support of the predictive validity of the LPFS.

The Different Components and Domains in LPFS accounting for variance of WSAS and GAF-F

Self and Interpersonal

For both measures of disability, a strong difference between the two components of LPFS was found. While the Self component demonstrated a strong and significant ability to explain variance in psychosocial functioning over and above *DSM-IV* PD criteria and symptom disorders, the Interpersonal component did not significantly contribute to any variance. Although no comparable studies are known to us, there is an emerging amount of research on the internal relationship between the two components. The results diverge, as some authors have argued for a two-factor solution, although these two factor were highly related. (Bach & Hutsebaut, 2018; Hutsebaut, Feenstra, & Kamphuis, 2015; Zimmermann et al., 2015), Others have demonstrated that the LPFS can be considered as a unidimensional construct (Hummelen, 2019; Morey, 2017). Dynamically, Self and Interpersonal are strongly related and mutually interwoven, and there has been a discussion in the field of personality to which degree one of these can be viewed as secondary to the other (Tice & Baumeister,

2001). Our findings can also be seen as concordant with one assumption behind LPFS, that the interpersonal component is not to be seen as a separate component, but describes representations of self-in-relation-to-others. According to this view, a mature self is required for healthy relationships with others as well as for positive psychosocial functioning: How an individual relates to other people, will intuitively depend on the ability to regulate feelings, degree of sense of self, and self-esteem. This relationship is reciprocal; fluctuations in personality pathology will often continue throughout the life-span as a result of the dynamic interplay between personality and external factors (Pagano et al., 2004; Sansone & Sansone, 2008).

The four domains as predictor for WSAS

When the four domains were evaluated, Identity was the only domain accounting for significant variance in psychosocial impairment measured by WSAS. This domain describes impairment in self-esteem, sense of self and emotional regulation. In our sample, these subdomains were significantly correlated ($r = .684 - .738, p < .001$). However, these elements are all regarded as important for the development of meaningful relationships, for making important decisions, and achieving life goals (Schwartz et al., 2011). Our results are in concordance with the view of identity as fundamental in driving interpersonal functioning (Kernberg & Caligor, 1996). Of note, there is also a mutual relationship between identity and psychosocial functioning. For example, in the Identity domain in the LPFS, dependence on positive external validation is a crucial part of the description of moderate impairment across subdomains, an acknowledgement of the impact of psychosocial function has on our sense of identity.

The most frequent diagnostic category in our sample was AVPD, and there are several relevant studies which have informed our understanding of the relationship between avoidant

psychopathology and psychosocial functioning.. Individuals with AVPD are characterized as “active-detached” (Millon, 1981) and social inhibition is a part of the description for this diagnostic category in the *DSM-IV*. Avoidance might be seen as a coping strategy, mediating the self-pathology described for these patients, such as negative self-concept and psychosocial impairment (Johansen et al., 2018; Lampe & Malhi, 2018). There is also good empirical evidence that identity problems, including low self-esteem, low self-respect, unstable self-image and affective instability, are associated with AVPD (Eikenaes, Hummelen, Abrahamsen, Andrea, & Wilberg, 2013; Lynum, Wilberg, & Karterud, 2008; Snir, Bar-Kalifa, Berenson, Downey, & Rafaeli, 2017). In one of these studies, psychosocial dysfunction measured by WSAS was associated with AVPD beyond other psychopathology (both symptom disorders and other PDs) (Eikenaes et al., 2013). In another recently published Norwegian qualitative study, help-seeking patients with AVPD were interviewed about their everyday life experiences (Sørensen, Råbu, Wilberg, & Berthelsen, 2019). The authors concluded the followings: “*Overall, the findings revealed how the participants’ efforts at sense-making of their own experiences sometimes resulted in the questioning of their identity and sense of agency – leaving them bereft of options for resolving their rational problems*” (p. 675). Like BPD, AVPD might also be understood as a disorder of identity with extensive consequences for both interpersonal and psychosocial functioning. This is also consistent with the LPFS assumption that identity disturbance is one of the core elements defining all personality psychopathology.

Although Identity accounted for most variance in the WSAS ratings, the interpersonal domain Intimacy was also significant.. A reason for this might be that one of the five questions in WSAS directly relates to close relationships: “*Forming and maintaining close relationships with others including the people I live with*”. It could also reflect the large

portion of patients with AVPD, in which problems in intimate relationships is a diagnostic *DSM-IV* criterion.

The four domains as predictor for GAF-F

For personality functioning measured by the more global GAF-F, the findings were less conclusive. Among the four domains, only Empathy emerged as a unique significant contributor to variance. The results diverge from the results found in the study by Esguevillas et al. (2018), which identified Identity as the only significant predictor for psychosocial functioning rated by GAF-F. It is though important to note that the subjects of that study were patients with BPD. The psychosocial impairment reported by the substantial proportion of individuals with an AVPD in our study could be less obvious for the rater, explaining a lower impact on GAF-F ratings. However, the contribution related to this subdomain was not substantial, and further research is needed to evaluate the LPFS as a predictor for psychosocial impairment measured by different instruments.

Limitations and Future Directions

A few limitations call for comment. Regarding the sample, we recruited the non-clinical group among students and employees, all with a high degree of reported functioning, probably highly influencing the results regarding our “level 0” group. However, this group was not included in the main analysis, and we will argue that our clinical sample is representative for a clinical sample representing the whole range of severity. Regarding the SCID-II, a limitation of our study is the lack of evaluation of inter-rater reliability. However, all therapists were in general highly experienced raters and were thoroughly trained as in previous studies demonstrating satisfactory reliability. The GAF-F is criticized for

demanding training to be scored reliably (Clements, Murphy, Eisen, & Normand, 2006), but all raters were trained and experienced in the use of this instrument.

As aforementioned, previous research of the latent construct of the LPFS has demonstrated that the components of Self and Interpersonal can be viewed as two highly correlated factors (Bach & Hutsebaut, 2018; Clark & Ro, 2014; Hopwood, Good, et al., 2018; Zimmermann et al., 2015). In our study the Self-component predicted psychosocial functioning over and above the Interpersonal component when the SCID-5-AMPD Module I was used to measure the LPFS. In the validation study of the other instrument for clinician rating of the LPFS, the STiP 5.1 instrument, Self was the only component demonstrating significant correlation with distress related to psychological symptoms (Hutsebaut et al., 2017). In another study evaluating the association between LPFS and drop-out from psychotherapy in a clinical population, the authors concluded that the low Self-functioning was strongly associated with drop-out, while interpersonal functioning did not have any impact (Busmann et al., 2019). Taken together, these findings support the decision to finally include self-pathology in the severity measure for PDs in the ICD-11 (Reed, 2018; Tyrer, Mulder, Kim, & Crawford, 2019). Our findings also provides some empirical support for the inclusion of impairment in psychosocial function as a part of the assessment of severity in the ICD proposal. Further research is needed regarding all elements in the LPFS and in other samples, which will hopefully provide a stronger empirical support for refinement of the model towards *DSM-5.1* and beyond.

Conclusion

In this study of the association between the LPFS and psychosocial impairment, using tailored instruments in a clinical sample, LPFS outperformed number of *DSM-IV* PD criteria regarding ability to explain variance. The Self-component explained more variance than the

Interpersonal component for both WSAS and GAF-F, while the domain of Identity was a strong predictor for impairment measured by WSAS. For impairment rated by GAF-F the results were less clear; only Empathy contributed significantly as a predictor. While several of our findings supported the incremental utility of using the LPFS to inform various aspects of psychosocial functioning, there is a need for further pending replication in other samples, evaluating both domains and subdomains of the LPFS as predictors of psychosocial impairment.

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Table 1 Psychosocial functioning for the sample and distribution according to levels of personality functioning* (SD)									
	Non-Clinical sample	Clinical Sample	PD sample	N = 317					
				Overall	Level 0	Level 1	Level 2	Level 3	Level 4
<i>N</i>	35	282	192	317	52	75	111	67	12
<i>GAF-S, mean (SD)</i>	86.7 (4.8)	55.3 (8.0)	53.7 (7.4)	58.8 (12.5)	79.3 (11.6)	58.0 (8.7)	55.3 (7.1)	51.3 (5.7)	46.7 (4.9)
<i>GAF-F, mean (SD)</i>	88.2 (5.0)	54.2 (9.0)	52.5 (7.7)	58.0 (13.7)	80.3 (12.6)	56.4 (10.4)	54.1 (7.8)	50.7 (7.0)	45.2 (4.2)
<i>WSAS, mean (SD)</i>	2.7 (4.4)	21.1 (10.3)	23.1 (9.3)	19.0 (11.4)	4.4 (6.7)	17.6 (10.7)	21.5 (9.1)	25.6 (8.1)	26.4 (11.6)
<i>Living alone %</i>	23.5	32.7	33.5	31.6	23.4	31.4	30.5	34.9	58.3
<i>Marital status, single %</i>	42.4	53.8	56.2	52.5	37.0	49.3	52.4	63.1	75.0
<i>Education^a, Mean (SD)</i>	6.2 (2.8)	4.1 (2.8)	3.8 (2.7)	4.4 (2.8)	6.1 (2.6)	5.0 (3.2)	4.0 (2.7)	3.4 (2.2)	2.7 (1.5)
<i>Months in work^b, mean (SD)</i>	10.3 (3.8)	4.4 (4.9)	4.0 (4.9)	5.1 (5.1)	9.9 (4.1)	5.4 (4.7)	3.8 (4.7)	3.8 (5.0)	1.5 (3.1)
<i>Disability pension %</i>	0	9.2	10.3	8.1	2.1	5.3	9.0	9.0	41.7
<i>Symptom disorders**</i>	-	1.7 (1.3)	1.9 (1.5)	1.7 (1.3)	1.4 (0.8)	1.4 (0.9)	1.6 (1.1)	2.3 (1.6)	3.8 (2.6)
<i>PD criteria Mean (SD)**</i>	-	11.1 (8.1)	13.6 (7.8)	11.1 (8.1)	1.4 (2.7)	6.5 (4.9)	10.7 (5.5)	16.2 (8.7)	26.5 (7.2)

*Ratings of levels of personality functioning are based on average LPFS scores when all 12 subdomains were rated.

**No assessment in the non-clinical group

a) Years of education after primary school

b) During last 12 months, mean number of months in more than 50 % work or studies

For seven participants, SCID-II protocols missing

Table 2
Inter-correlations between mean LPFS, components, domains, WSAS and GAF-F

	Mean LPFS	Self	Inter-personal	Identity	Self-direction	Empathy	Intimacy	PD crit	WSAS	GAF
Mean LPFS		.922	.943	.858	.896	.874	.885	.672	.416	-.444
Self	.932		.758	.943	.941	.701	.712	.624	.443	-.435
Interpersonal	.943	.758		.649	.749	.928	.937	.635	.341	-.401
Identity	.858	.943	.679		.773	.603	.662	.569	.487	-.397
Self-direction	.896	.941	.749	.773		.719	.680	.605	.343	-.423
Empathy	.874	.701	.928	.603	.719		.739	.602	.257	-.413
Intimacy	.885	.712	.937	.662	.682	.739		.583	.377	-.336
PD crit	.632	.624	.635	.569	.605	.602	.583		.323	-.396
WSAS	.416	.443	.342	.487	.343	.257	.377	.323		-.335
GAF-f	-.444	-.435	-.401	-.397	-.423	-.413	-.336	-.396	-.335	

Notes:

All correlations significant at the .01-level, Mean LPFS = average of ratings all 12 subdomains, PD crit. = total number DSM-IV PD criteria

Table 3 Hierarchical regression analysis, sum of DSM-IV PD criteria and mean LPFS components as explanatory variables of psychosocial impairment rated by WSAS and GAF-F

Step	Independent variable	WSAS			GAF-F		
		R ²	ΔR ² a)	Std. β b)	R ²	ΔR ² a)	Std. β b)
1		.025			.053**		
	No. symptom disorders			.159*			-.230**
2		.106	.081**		.166**	.113**	
	No. symptom disorders			.049			-.100
	No. DSM-IV PD criteria			.305**			-.360**
3		.177	.070**		.210	.055**	
	No. symptom disorders			.027			-.081
	No. DSM-IV PD criteria			.071			-.154
	Mean LPFS			.360**			-.317**
<i>Alternative Step 3 – replacing LPFS with Self and Interpersonal</i>							
Alt. 3		.201	.095**		.224	.059**	
	No. symptom disorders			.029			-.082
	No. DSM-IV PD criteria			.072			-.154
	Self			.407**			-.247*
	Interpersonal			-.021			-.093
<i>Alternative Step 3 – replacing Self and Interpersonal with its sub-components</i>							
Alt. 3		.261	.155**		.236	.070**	
	No. symptom disorders			.022			-.087
	No. DSM-IV PD criteria			.089			-.146

	Identity			.481**			-.137
	Self-direction			-.103			-.128
	Empathy			-.156			-.202*
	Intimacy			.186*			-.099
<p>*$P < .05$ **$P < .01$</p> <p>a) The p-value relates to the improvement of the model; how much the model has improved the prediction of the outcome compared to the previous model</p> <p>b) The p-value relates to the explanatory variable; how significant its unique contribution is</p> <p>Note: No. = number of (symptom disorders / PD criteria).</p>							