Journal of Personality Disorders, Volume 33(1), 101-118, 2019


# THE *DSM-5* TRAIT MEASURE IN A PSYCHIATRIC SAMPLE OF LATE ADOLESCENTS AND EMERGING ADULTS: STRUCTURE, RELIABILITY, AND VALIDITY

Elien De Caluwé, PhD, Lize Verbeke, PhD, Marcel van Aken, PhD, Paul T. van der Heijden, PhD, and Barbara De Clercq, PhD

The inclusion of a dimensional trait model of personality pathology in *DSM-5* creates new opportunities for research on developmental antecedents of personality pathology. The traits of this model can be measured with the Personality Inventory for DSM-5 (PID-5), initially developed for adults, but also demonstrating validity in adolescents. The present study adds to the growing body of literature on the psychometrics of the PID-5, by examining its structure, validity, and reliability in 187 psychiatric-referred late adolescents and emerging adults. PID-5, Big Five Inventory, and Kidscreen self-reports were provided, and 88 non-clinical matched controls completed the PID-5. Results confirm the PID-5's five-factor structure, indicate adequate psychometric properties, and underscore the construct and criterion validity, showing meaningful associations with adaptive traits and quality of life. Results are discussed in terms of the PID-5's applicability in vulnerable populations who are going through important developmental transition phases, such as the step towards early adulthood.

During the preparation of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association [APA], 2013), the Personality and Personality Disorders Workgroup members developed a maladaptive trait model and corresponding assessment instrument, the Personality Inventory for DSM-5 (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012). Although this signified a first step towards a more dimensionally oriented personality disorder (PD) assessment, the importance of additional refinement prior to the publication of the *DSM-5* was strongly recommended (Krueger et al., 2012). Since the release of *DSM-5*, a fast increase in research on the structure and psychometric properties of the PID-5 has been observed (Al-Dajani, Gralnick, & Bagby, 2016).

From Ghent University, Belgium (E. D. C., L. V., B. D. C.); Utrecht University, the Netherlands (M. v. A.); and Reinier van Arkel Mental Health Institute, 's-Hertogenbosch, the Netherlands (P. T. v. d. H.).

The current study was supported by a grant provided by the Research Foundation Flanders (FWO.3E0.2015.0019.01), awarded to the first author.

Address correspondence to Elien De Caluwé, Department of Developmental Psychology, Tilburg University, Prof. Cobbenhagenlaan 225, mailbox 90153, 5000 LE Tilburg, the Netherlands. E-mail: Elien.DeCaluwe@uvt.nl

In order to further elaborate a life-span perspective on personality pathology, Krueger and colleagues (2012) also highlighted the need for research on the validity of the PID-5 in younger age groups. In a related vein, the importance of evaluating the PID-5 in clinical samples prior to its use as a clinical tool has been systematically put forward as an important objective (Al-Dajani et al., 2016; De Fruyt et al., 2013; Hopwood, Thomas, Markon, Wright, & Krueger, 2012; Thomas et al., 2013; Wright et al., 2012). The current study addresses both suggestions, and will examine the structure, reliability, and validity of the PID-5 in a clinical sample of individuals who are transitioning from late adolescence to emerging adulthood. This age group can be considered particularly important, given previous evidence on significant trait development during these late adolescent and emerging adult years (Roberts, Walton, & Viechtbauer, 2006), as well as evidence pointing towards significant environmental and demographic changes associated with this age period (Arnett, 2000) that may be relevant triggers of personality pathology manifestations (Kessler et al., 2005). Although previous developmental PID-5 research relied on similar samples in terms of age, the current study adds to the existing literature by focusing on vulnerable young people with an actual psychiatric status at the moment of assessment, thus exploring the psychometric behavior of a tool with high potential for clinical use in target audiences such as the current sample.

## STRUCTURE, RELIABILITY, AND VALIDITY OF THE PID-5 MEASURE: CURRENT STATUS

The PID-5 is the official copyrighted measure of APA (2013) and measures the *DSM-5* traits of adult personality pathology (Krueger et al., 2012) included in Section III of the *DSM-5* (APA, 2013). Scale development relied on established (maladaptive) personality models (e.g., Widiger & Simonsen, 2005), resulting in 25 reliable maladaptive trait facets structured in the five broad higher-order domains of Negative affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism (Krueger et al., 2012).

Wright and colleagues (2012) were the first to replicate the originally proposed five-factor structure of the PID-5 in an undergraduate sample, followed by De Fruyt and colleagues (2013) and Fossati, Krueger, Markon, Borroni, and Maffei (2013), who confirmed the PID-5 five-factor structure in an undergraduate and community adult sample, respectively. Wright and colleagues (2012) also suggested that the structural hierarchy of the PID-5 traits may provide a framework for the metastructure of psychopathology and may even have the potential to integrate the currently competing personality models. One essential issue at this point relates to the empirical association of the PID-5 traits with general trait equivalents. Towards this end, Thomas and colleagues (2013), De Fruyt and colleagues (2013), and Griffin and Samuel (2014) conducted conjoint factor analyses of the PID-5 with general personality measures, respectively the Five Factor Model of Personality Rating Form (FFMRF; Mullins-Sweatt, Jamerson, Samuel, Olson, & Widiger, 2006), the NEO Personality Inventory 3 (NEO-PI-3; Costa &

McCrae, 2010), and the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). Each of these studies showed that both normative and maladaptive personality traits can be subsumed under five or six major personality domains that basically reflect the Five Factor Model (FFM) structure. Also more recently, Suzuki, Samuel, Phalen, and Krueger (2015) found evidence for the continuity between the PID-5 and the International Personality Item Pool NEO by means of item response theory (IRT) analysis. This result is in line with earlier IRT studies, providing evidence for the dimensionality hypothesis stating that PD pathology can be considered a maladaptive variant of normative FFM traits (e.g., Samuel, Simms, Clark, Livesley, & Widiger, 2010; Stepp et al., 2012; Walton, Roberts, Krueger, Blonigen, & Hicks, 2008). Additional psychometric research focused on the reliability and validity of the PID-5 (for an overview, see Al-Dajani et al., 2016), underscoring adequate internal consistencies and unidimensionality of the PID-5 domains and facets (Roskam et al., 2015), as well as meaningful relations with the *DSM-IV* PDs (Hopwood et al., 2012; Samuel, Hopwood, Krueger, Thomas, & Ruggero, 2013), the Personality Pathology five (Anderson et al., 2013), and general FFM instruments (e.g., Gore & Widiger, 2013; Griffin & Samuel, 2014; Wright & Simms, 2014). Given that the PID-5 is in essence developed for use in clinical (research) settings, an increasing number of researchers have been focusing on patient samples (for an overview, see Al-Dajani et al., 2016), and provided evidence for the PID-5's empirical structure and reliability in referred groups, as well as its significant associations with other general and maladaptive personality scales (e.g., Bastiaens et al., 2016; Few et al., 2013; Quilty, Ayearst, Chmielewski, Pollock, & Bagby, 2013; Watson, Stasik, Ro, & Clark, 2013).

In order to fully elaborate a life-span perspective on personality pathology, evidence supporting the quality of the PID-5's psychometrics across age groups is a necessary prerequisite. Towards this end, a couple of studies examined the psychometric properties of the PID-5 in younger age groups. De Clercq and colleagues (2014) explored the applicability of the PID-5 in community adolescents (11–17 years old), indicating a hierarchical structure comparable to the adult structure, acceptable reliabilities, and convergent validity of the PID-5 facets with age-specific facets of personality pathology, as measured by the Dimensional Personality Symptom Item Pool (DIPSI; De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006), though with somewhat lower discriminant validity. Recently, acceptable reliabilities and support for the construct validity of the PID-5 was also found in a sample of 85 adolescent inpatients between 12 and 17 years old, hence underscoring initial validity of the PID-5 in referred populations of youth (Somma et al., 2016). The current study will add to this growing amount of evidence on the PID-5 in clinical samples by examining its psychometric qualities in late adolescents and emerging adults[1] (17–23 years old) with a referred status. As outlined above, this age range is particularly important because of significant transitions in various life domains (Bleidorn & Schwaba, 2017; Specht, 2017), and

1. According to WHO guidelines, the age range of 17–19 years reflects late adolescence (World Health Organization, http://apps.who.int/adolescent/second-decade/section2/page2/age-not-the-whole-story.html). The age range of 20–23 refers to emerging adulthood (Youth Advisory Council Act, 1989).

because it represents a life stage in which manifestations of psychopathology notably evolve (Kessler et al., 2005). Although previous studies already covered this age range (e.g., De Fruyt et al., 2013 [18–52 years old], Griffin & Samuel, 2014 [18–45 years old], Hopwood et al., 2012 [18–40 years old], Wright et al., 2012 [18–56 years old]), a specific focus on late adolescents and emerging adults with a clinical status is an important aspect of the ongoing validation process of the PID-5. In a first objective, it will be explored whether a similar five-factor *structure* of the PID-5 can be empirically found and how this structure converges with the FFM structure, relying on conjoint factor analysis of the PID-5 and an FFM measure (i.e., the Big Five Inventory [BFI]; John, Donahue, & Kentle, 1991), hence examining *construct validity*. Further, *criterion validity* will be examined by exloring the associations of both the PID-5 and BFI domains with quality of life (QoL), a clinically relevant construct (Widiger & Presnall, 2013) that already has been associated with the FFM (Mullins-Sweatt & Widiger, 2010), but not yet with its maladaptive counterpart (e.g., the PID-5). Here, it is expected that across these maladaptive and general trait instruments, a similar correlational pattern will be obtained with QoL. This objective also corroborates the suggestion of Al-Dajani and colleagues (2016) to examine the associations between the PID-5 and clinically important constructs that are conceptually distinct from the PID-5 (such as QoL). Finally, the *differentiating value* of the PID-5 will be evaluated by means of ANOVAs, where we expect that all PID-5 domains and facets will be able to differentiate between clinical and non-clinical groups, with the latter scoring significantly lower. This objective addresses the PID-5's clinical utility, a topic that remained understudied to date (Al-Dajani et al., 2016), with only a limited amount of studies comparing patients to non-clinical matched controls (e.g., Quilty et al., 2013).

## METHOD

### PARTICIPANTS AND PROCEDURE

*Referred Group*. Patients ($N$ = 223) were recruited from two mental health clinics in the Netherlands (also see Verbeke, De Clercq, Van der Heijden, Hutsebaut, & van Aken, 2017). After agreement, they received an information letter including a login code to access the online assessment tool. Participants with an IQ less than 85 were excluded, as well as those older than 23 and younger than 17 because the current study focuses on late adolescents and emerging adults. The remaining participants ($N$ = 187; 69% females) were between 17–23 years old, with a mean age of 20.06 years ($SD$ = 1.94); 95.7% were Dutch; 50.3% reported an onset of their problems longer than five years ago, 31.6% situated this between two and five years ago, 11.8% reported an onset between one and two years ago, and 6.4% described an onset of less than one year ago. The minority (3.2%) considered their problems as not severe at all, 43.3% considered them as moderately severe, 44.4% as severe, and 9.1% as extremely severe.

*Non-clinical Matched Control Group*. To compare the PID-5 mean scores of the clinical group with those of a control group, we randomly selected a non-clinical subset of existing data (see De Caluwé, De Clercq, De Bolle, & De Wolf, 2014), matching the clinical group on age range. Given that this non-clinical data set did not include participants older than 20, the oldest participants from the clinical group were excluded for the comparative analysis (ANOVA), which resulted in 88 referred participants between 17 and 20 years old ($M$ = 18.59 years old, $SD$ = 1.13; 78.4% females). The non-clinical matched control group consisted of 88 community participants between 17 and 20 years old ($M$ = 17.92 years old, $SD$ = 0.62; 71.6% females). The sample, including these two matched groups ($n$ = 88 referred + 88 control = 176; $M$ = 18.26 years old, $SD$ = 0.97; 75% females), was solely used to investigate the PID-5 group differences. All remaining analyses exclusively rely on the clinical group ($N$ = 187).

## MEASURES

*Personality Inventory for DSM-5 (PID-5)*. All participants completed self-ratings on the PID-5 (Krueger et al., 2012), consisting of 220 items to be rated on a 4-point Likert scale, ranging from *very false* (0) to *very true* (3). In the current study, the PID-5 facets show good to excellent reliabilities, with Cronbach's alpha coefficients ranging between .75 (Irresponsibility) and .94 (Depressivity). Also the PID-5 domains show good to excellent reliabilities, ranging between .89 (Disinhibition) and .96 (Detachment).

*Big Five Inventory (BFI)*. Participants of the referred group provided self-ratings on the BFI (Denissen et al., 2008; John et al., 1991), a commonly used and brief assessment tool that measures the Big Five factors of personality, represented as Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to experience. The BFI consists of 44 short phrases that have to be rated on a 5-point Likert scale, from *strongly disagree* (1) to *strongly agree* (5). John, Naumann, and Soto (2008) provided evidence for the psychometric characteristics of the BFI. In the current study, the Cronbach's alpha values were good and ranged from .78 (Agreeableness) to .84 (Extraversion).

*Kidscreen-27*. Participants of the referred group completed the Kidscreen-27 (Kidscreen Group Europe, 2006), a QoL measure for youth. This scale contains 27 items rated on a 5-point Likert scale ranging from *never* (1) to *always* (5), with higher scores representing higher QoL. Besides a global QoL score, there are also five QoL domains: physical well-being, psychological well-being, autonomy & parents, social support & peer relations, and school environment. The Cronbach's alpha values in the present study were good to excellent and ranged from .79 (autonomy & parents) to .93 (psychological well-being).

**TABLE 1. CF–Equamax Rotated Loadings of the PID-5 Three-Factor Solution**

| PID-5 Facet | F1 | F2 | F3 |
|---|---|---|---|
| Emotional lability | .19 | –.14 | **.69** |
| Anxiousness | .48 | –.25 | **.54** |
| Separation insecurity | .11 | –.08 | **.36** |
| Perseveration | .15 | .10 | **.55** |
| Restricted affectivity | **.48** | .44 | –.34 |
| Submissiveness | **.42** | –.15 | .01 |
| Withdrawal | **.63** | .05 | .13 |
| Anhedonia | **.91** | .03 | –.03 |
| Depressivity | **.79** | .01 | .20 |
| Intimacy avoidance | **.41** | .03 | .08 |
| Suspiciousness | **.41** | .17 | .32 |
| Manipulativeness | –.12 | **.66** | .16 |
| Deceitfulness | .10 | .79 | –.01 |
| Callousness | .10 | **.74** | .02 |
| Hostility | .22 | **.53** | .21 |
| Grandiosity | –.26 | **.34** | .29 |
| Attention seeking | –.19 | **.42** | .30 |
| Irresponsibility | .28 | **.64** | .09 |
| Impulsivity | –.14 | **.56** | .24 |
| Distractibility | **.29** | .21 | .19 |
| Risk taking | –.14 | **.65** | –.01 |
| Rigid perfectionism | .05 | –.11 | **.55** |
| Unusual beliefs | –.15 | .16 | **.64** |
| Eccentricity | .13 | .34 | **.54** |
| Perceptual dysregulation | .11 | .18 | **.74** |

*Note*. PID-5 facets are ordered according to the original PID-5 structure. F1 = Detachment; F2 = Antagonism + Disinhibition; F3 = Negative affectivity + Psychoticism. Highest factor loading of each PID-5 trait is marked in bold.

## STATISTICAL ANALYSES

To decide upon the number of factors to retain, we relied on four different strategies. First, we carried out a parallel analysis. Second, we conducted the Velicer's Minimum Average Partial (MAP) test. Third, we conducted an exploratory factor analysis (EFA), relying on Mplus Version 7.3 (Muthén & Muthén, 1998–2015). Here, we modeled different factor solutions and chose between these alternative structures based on multiple fit statistics. Following the PID-5 construction paper (Krueger et al., 2012), we used a CF–equamax oblique rotation since the PID-5 facets are assumed to be correlated. Finally, we also relied on a conceptual approach/theory (i.e., interpretability), in line with others who investigated the factor structure of the PID-5 (e.g., De Clercq et al., 2014; Wright et al., 2012). Factor congruence coefficients were calculated between the obtained structure and previously proposed structures (e.g., Krueger et al., 2012), relying on the factor congruence package in R (https://www.personality-project.org/r/html/factor.congruence.html).

**TABLE 2. CF–Equamax Rotated Loadings of the PID-5 Four-Factor Solution**

| PID-5 Facet | F1 | F2 | F3 | F4 |
|---|---|---|---|---|
| Emotional lability | **.71** | –.04 | .00 | .25 |
| Anxiousness | **.66** | .27 | –.13 | .14 |
| Separation insecurity | **.55** | –.12 | .14 | –.06 |
| Perseveration | .31 | .14 | .06 | **.44** |
| Restricted affectivity | –.37 | **.66** | .26 | .00 |
| Submissiveness | .25 | **.31** | –.07 | –.16 |
| Withdrawal | .00 | **.75** | –.17 | .31 |
| Anhedonia | .33 | **.75** | .06 | –.15 |
| Depressivity | .52 | **.61** | .11 | –.09 |
| Intimacy avoidance | –.05 | **.50** | –.13 | .23 |
| Suspiciousness | .22 | **.41** | .09 | .30 |
| Manipulativeness | –.07 | –.06 | **.59** | .26 |
| Deceitfulness | –.08 | .13 | **.74** | .09 |
| Callousness | –.29 | .28 | **.54** | .33 |
| Hostility | .08 | .24 | **.46** | .24 |
| Grandiosity | –.28 | –.06 | .08 | **.62** |
| Attention seeking | .19 | –.26 | **.50** | .15 |
| Irresponsibility | .20 | .20 | **.74** | –.05 |
| Impulsivity | .15 | –.19 | **.66** | .10 |
| Distractibility | .26 | .20 | **.27** | .03 |
| Risk taking | –.12 | –.10 | **.67** | .04 |
| Rigid perfectionism | .21 | .09 | –.22 | **.51** |
| Unusual beliefs | .06 | –.05 | –.05 | **.79** |
| Eccentricity | .28 | .10 | .31 | **.44** |
| Perceptual dysregulation | .43 | .05 | .17 | **.57** |

*Note*. PID-5 facets are ordered according to the original PID-5 structure. F1 = Negative affectivity; F2 = Detachment; F3 = Antagonism + Disinhibition; F4 = Psychoticism. Highest factor loading of each PID-5 trait is marked in bold.

Further, we computed the intercorrelations between the obtained PID-5 factors. Subsequently, we examined the higher-order convergence of the *DSM-5* pathological trait model and the FFM by conducting conjoint analyses on the 25 PID-5 traits and the 5 BFI domains (parallel, MAP, and joint EFA). Here, we also relied on a conceptual approach. Pearson product-moment correlations were computed between the Kidscreen and both the BFI and PID-5 domains. One-way analysis of variance (ANOVA) was used to examine differences between the referred and the non-clinical matched control group in terms of mean PID-5 scores. Finally, reliability was examined by calculating Cronbach's alpha coefficients.

## RESULTS

### FACTOR STRUCTURE OF THE PID-5

The parallel analysis and MAP test both suggested retaining four factors, which was used to determine the range of factors to explore (including the exploration of fewer and more factors than suggested). Three-, four-, and

five-factor structures were compared in terms of interpretability and fit indices, relying on EFA with CF–equamax oblique rotation. In the three-factor structure (Table 1), the first factor signifies a Detachment factor, but three other facets also have their highest loading on this factor. The second factor represents a combination of the Antagonism and Disinhibition factors, including two facets that have their highest loading on other factors. Finally, the third factor represents a combination of the Negative affectivity and Psychoticism factors, also including two facets with their highest loading on a different factor.

In the four-factor structure (Table 2), the first factor signifies Negative affectivity, including three facets with their highest loading on another factor. The second factor represents a pure Detachment factor, whereas Factor 3 represents both Antagonism and Disinhibition. Here, Grandiosity and Rigid perfectionism primarily load on another factor. Finally, the fourth factor represents Psychoticism.

In the five-factor solution (Table 3), the first factor signifies Negative affectivity. Three facets, however, have their highest loading on a different factor. For Restricted affectivity for instance (with its primary loading on Detachment), this can be explained by the finding that this facet can be situated under both Negative affectivity and Detachment according to Section III of *DSM-5* (APA, 2013). Factor 2 represents a pure Detachment factor. Antagonism is the third factor, with Grandiosity not primarily loading on this factor (but on Psychoticism). The fourth factor is Disinhibition, with Rigid perfectionism not primarily loading on this factor (but on Psychoticism). The last factor represents Psychoticism, as it includes the facets Unusual beliefs, Eccentricity, and Perceptual dysregulation. In addition, Perseveration, Grandiosity, and Rigid perfectionism also load on this factor. However, the range of these loadings (.39–.44) is lower than the range of the loadings of the expected facets (.53–.85). Further, the secondary loadings of these three additional facets are situated on their expected factors, with Perseveration showing its secondary loading on Negative affectivity, Grandiosity on Antagonism, and Rigid perfectionism on Disinhibition.

In line with the five-factor structure of Krueger and colleagues (2012) and others (e.g., De Clercq et al., 2014), some facets are pure markers of factors (e.g., Manipulativeness) whereas others (e.g., Restricted affectivity) are situated in between factors, which is also reflected in Section III of *DSM-5* (APA, 2013). Further, some factor loadings are somewhat lower (Submissiveness [.32], Suspiciousness [.38], Attention seeking [.32], Distractibility [.26], and Rigid perfectionism [.39]); however, they all exceed the cutoff of .32 (Tabachnick & Fidell, 2001), except for Distractibility. Though, also in the study of Krueger and colleagues (2012), the highest factor loading that was found for a facet was situated below .32 (i.e., Submissiveness with .27). In addition, the observation that these five loadings are somewhat lower is again in line with previously reported PID-5 five-factor structures (e.g., Bastiaens et al., 2016; De Fruyt et al., 2013, Krueger et al., 2012; Wright et al., 2012), indicating that this is not a sample-specific pattern, but rather a general finding across studies.

**TABLE 3. Reliabilities and CF–Equamax Rotated Loadings of the Final PID-5 Five-Factor Solution**

| PID-5 Facet | α | F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|---|
| Emotional lability | .88 | **.68** | –.06 | .07 | .00 | .30 |
| Anxiousness | .88 | **.67** | .25 | .02 | –.10 | .18 |
| Separation insecurity | .76 | **.59** | –.14 | .15 | .04 | –.08 |
| Perseveration | .78 | .27 | .12 | .17 | –.01 | **.40** |
| Restricted affectivity | .80 | –.41 | **.67** | .11 | .23 | –.01 |
| Submissiveness | .77 | .21 | **.32** | –.21 | .09 | –.04 |
| Withdrawal | .91 | .04 | **.74** | .20 | –.26 | .22 |
| Anhedonia | .91 | .35 | **.73** | .05 | .07 | –.11 |
| Depressivity | .94 | .45 | **.61** | –.14 | .28 | .06 |
| Intimacy avoidance | .86 | –.12 | **.51** | –.11 | .00 | .29 |
| Suspiciousness | .77 | .24 | **.38** | .31 | –.07 | .21 |
| Manipulativeness | .86 | .03 | –.14 | **.76** | .13 | .01 |
| Deceitfulness | .87 | –.04 | .06 | **.62** | .37 | –.06 |
| Callousness | .91 | –.28 | .24 | **.52** | .24 | .18 |
| Hostility | .88 | .18 | .17 | **.68** | .06 | .02 |
| Grandiosity | .76 | –.27 | –.08 | .40 | –.17 | **.44** |
| Attention seeking | .85 | .17 | –.28 | .32 | **.32** | .10 |
| Irresponsibility | .75 | .13 | .18 | .28 | .61 | .01 |
| Impulsivity | .82 | .07 | –.21 | .25 | .54 | .13 |
| Distractibility | .90 | .21 | .20 | .08 | .26 | .07 |
| Risk taking | .89 | –.26 | –.09 | .07 | .69 | .13 |
| Rigid perfectionism | .88 | .23 | .08 | .18 | –.29 | **.39** |
| Unusual beliefs | .84 | –.08 | –.06 | .04 | –.04 | **.85** |
| Eccentricity | .93 | .13 | .10 | .06 | .34 | **.53** |
| Perceptual dysregulation | .86 | .25 | .03 | –.06 | .28 | **.75** |

*Note*. PID-5 facets are ordered according to the original PID-5 structure. F1 = Negative affectivity; F2 = Detachment; F3 = Antagonism; F4 = Disinhibition; F5 = Psychoticism. Highest factor loading of each PID-5 trait is marked in bold.

Given that the five-factor solution showed better fit indices[2] (BIC = 6318.03, $\chi^2/df$ = 2.31, RMSEA = .09, CFI = .89, SRMR = .04) compared to the three-factor solution (BIC = 6433.24, $\chi^2/df$ = 3.36, RMSEA = .12, CFI = .75, SRMR = .07) and four-factor solution (BIC = 6353.10, $\chi^2/df$ = 2.78, RMSEA = .10, CFI = .83, SRMR = .05), and was also easiest to interpret and similar to previously reported matrices (e.g., De Clercq et al., 2014; De Fruyt et al., 2013, Krueger et al., 2012; Wright et al., 2012), five factors were retained (Table 3).

## FACTOR CONGRUENCES OF THE PID-5

Based on the guidelines of Lorenzo-Seva and ten Berge (2006), the factor congruence coefficients supported fair similarity between the current five-factor loading matrix and several five-factor matrices of previous studies, as

2. Including a lower Bayesian information criterion (BIC; Schwarz, 1978), a lower chi square/degrees of freedom ($\chi^2/df$; Kline, 2005), a lower root-mean-square error of approximation (RMSEA; Steiger, 1990), a higher comparative fit index (CFI; Bentler, 1990), and a lower standardized root mean square residual (SRMR; Hu & Bentler, 1999).

indicated by the following coefficients for Negative affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism, respectively: .94, .95, .88, .81, and .93 (Krueger et al., 2012); .96, .94, .91, .85, and .93 (Wright et al., 2012); .93, .95, .95, .88, and .94 (De Fruyt et al., 2013); .91, .94, .85, .88, and .92 (De Clercq et al., 2014); and .90, .94, .93, .85, and .92 (Bastiaens et al., 2016).

In four of the five comparisons, the lowest factor congruence coefficient is obtained for Disinhibition, a pattern that was also found in other studies (Bastiaens et al., 2016; De Clercq et al., 2014; De Fruyt et al., 2013). Rather than attribute this to differences in samples (De Fruyt et al., 2013), we believe that this lower congruence can be explained by the fact that Disinhibition is the only factor that includes a reversed facet, that is, "*lack of* Rigid perfectionism," hence showing a negative loading on Disinhibition. However, the highest loading of Rigid perfectionism is—as in the current study—not always observed on the home factor Disinhibition (F4), but shifts to other factors across studies and, hence, is also the sign of the factor loading shifts: that is, negative when on Disinhibition (as the case in the studies of De Fruyt et al. [2013], Krueger et al. [2012], and Wright et al. [2012], with loadings of –.57, –.38, and –.40, respectively) versus positive when not on Disinhibition (as is the case in the studies of Bastiaens et al. [2016], De Clercq et al. [2014], and Roskam et al. [2015], with loadings of .39 [F1], .42 [F3], and .46 [F1], respectively). These differences in negative versus positive loadings of Rigid perfectionism across factor matrices may result in a lower congruence for Disinhibition.

## FACTOR CORRELATIONS OF THE PID-5

The results of the CF–equamax factor correlations indicate that all four factors (and especially Antagonism) are significantly correlated with Psychoticism (range $r = .16–.32$, $p < .05$). Also substantial is the correlation between Negative affectivity and Detachment ($r = .24$, $p < .05$), as well as between Antagonism and Disinhibition ($r = .36$, $p < .05$).

## JOINT FACTOR STRUCTURE OF THE PID-5 AND BFI

The parallel analysis of the 25 PID-5 traits and the 5 BFI domains indicated that four factors had to be retained, whereas the MAP test indicated that five factors had to be retained. We explored fewer and more factors than suggested, resulting in the comparison of a three-, four-, five-, and six-factor structure in terms of fit indices and interpretability, relying on a joint EFA with CF–equamax oblique rotation. The five-factor solution showed better fit indices (BIC = 7389.04, $\chi^2/df = 2.42$, RMSEA = .09, CFI = .85, SRMR = .05) compared to the three-factor solution (BIC = 7659.24, $\chi^2/df = 3.61$, RMSEA = .12, CFI = .68, SRMR = .08) and the four-factor solution (BIC = 7497.61, $\chi^2/df = 2.99$, RMSEA = .11, CFI = .78, SRMR = .06), but slightly less good fit indices compared to the six-factor solution (BIC = 7420.71, $\chi^2/$

**TABLE 4. CF–Equamax Rotated Loadings of the PID-5 and BFI Joint Five-Factor Solution**

| PID-5 Facet | F1 | F2 | F3 | F4 | F5 |
|---|---|---|---|---|---|
| Emotional lability | **.69** | –.06 | .03 | .01 | .31 |
| Anxiousness | **.73** | .21 | .01 | –.02 | .13 |
| Separation insecurity | **.48** | –.12 | –.01 | .13 | .03 |
| Perseveration | .27 | .16 | .13 | .00 | **.44** |
| Restricted affectivity | –.39 | **.55** | .20 | .27 | .03 |
| Submissiveness | .11 | **.43** | –.34 | .18 | .05 |
| Withdrawal | .06 | **.74** | .30 | –.16 | .15 |
| Anhedonia | .29 | **.67** | .04 | .26 | –.07 |
| Depressivity | .39 | **.57** | –.09 | .31 | .13 |
| Intimacy avoidance | –.03 | **.46** | .06 | –.04 | .21 |
| Suspiciousness | .26 | .32 | **.33** | .00 | .21 |
| Manipulativeness | –.02 | –.24 | **.54** | .20 | .19 |
| Deceitfulness | –.14 | –.02 | **.39** | .51 | .15 |
| Callousness | –.28 | .14 | **.64** | .21 | .19 |
| Hostility | .31 | –.06 | **.83** | .15 | –.08 |
| Grandiosity | –.23 | –.08 | .34 | –.19 | **.47** |
| Attention seeking | .08 | –.32 | .06 | **.34** | **.34** |
| Irresponsibility | .04 | .08 | .16 | **.73** | .16 |
| Impulsivity | .06 | –.32 | .20 | **.48** | .25 |
| Distractibility | .22 | .12 | .02 | **.44** | .07 |
| Risk taking | –.29 | –.17 | .12 | **.48** | .29 |
| Rigid perfectionism | .29 | .10 | .18 | **–.38** | **.41** |
| Unusual beliefs | .01 | .03 | .12 | **–.15** | **.73** |
| Eccentricity | .10 | .11 | .00 | .28 | **.67** |
| Perceptual dysregulation | .28 | .09 | .01 | .16 | **.70** |
| Neuroticism | **.74** | .07 | .21 | .02 | –.13 |
| Extraversion | –.06 | **–.80** | .06 | .10 | .06 |
| Agreeableness | .00 | –.13 | **–.90** | .01 | .02 |
| Conscientiousness | –.05 | –.05 | –.07 | **–.79** | .24 |
| Openness to experience | –.10 | –.18 | –.19 | –.06 | **.58** |

*Note.* F1 = Negative affectivity–Neuroticism; F2 = Detachment–Extraversion; F3 = Antagonism–Agreeableness; F4 = Disinhibition–Conscientiousness; F5 = Psychoticism–Openness. Highest factor loading of each PID-5 trait and BFI domain is marked in bold.

*df* = 2.28, RMSEA = .08, CFI = .88, SRMR = .04). However, given the finding that the five-factor solution was better interpretable compared to the six-factor solution (as well as to the three- and four-factor solution), five factors were retained (Table 4). In addition, it was clear that in this five-factor solution, all BFI domains have the strongest loadings on their conceptually related factor. More specifically, the Neuroticism, Extraversion (opposite pole), Agreeableness (opposite pole), Conscientiousness (opposite pole), and Openness to experience domains group together with the (majority of) facets that represent Negative affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism, respectively. These results reflect that the general BFI and

**TABLE 5. Pearson Correlations Between the Kidscreen and Both the BFI and PID-5 Domain Scores**

| | Kidscreen (QoL) | | | | | |
|---|---|---|---|---|---|---|
| | Physical | Psychological | Autonomy/ Parents | Social/Peers | School | Total |
| BFI | | | | | | |
| Neuroticism | –.35*** | –.45*** | –.24** | –.07 | –.15 | –.45*** |
| Extraversion | .32*** | .49*** | .19* | .37*** | .21 | .42*** |
| Agreeableness | .10 | .21* | .28** | .12 | .41*** | .32*** |
| Conscientiousness | .08 | .14 | .14 | .04 | .34** | .21* |
| Openness to experience | .05 | .11 | .01 | .05 | .23* | .13 |
| PID-5 | | | | | | |
| Negative affectivity (F1) | –.22* | –.43*** | –.26** | –.07 | –.11 | –.38*** |
| Detachment (F2) | –.30*** | –.71*** | –.36*** | –.33*** | –.43*** | –.63*** |
| Antagonism (F3) | .02 | –.03 | –.16 | –.07 | –.29* | –.13 |
| Disinhibition (F4) | –.00 | –.11 | –.26** | .07 | –.43*** | –.23** |
| Psychoticism (F5) | –.14 | –.21* | –.26** | .01 | –.14 | –.26** |

QoL = Quality of Life; BFI = Big Five Inventory. *$p < .05$. **$p < .01$. ***$p < .001$.

maladaptive PID-5 traits can be subsumed under an overarching five-factor structure and underscore the construct validity of the PID-5.

## CRITERION VALIDITY OF THE PID-5

Table 5 reports the Pearson correlations between QoL and both the BFI and PID-5 domains. Across these general and maladaptive trait instruments, the same correlational pattern is obtained with QoL, supporting the validity of the PID-5. More specifically, Neuroticism/Negative affectivity and Extraversion/Detachment are the strongest associated with psychological QoL, whereas Agreeableness/Antagonism and Conscientiousness/Disinhibition are the strongest associated with school-related QoL. Openness to experience is largely not associated with QoL, in contrast to its maladaptive equivalent Psychoticism, which is negatively associated with several QoL domains.

## DIFFERENTIATING VALUE OF THE PID-5

ANOVAs revealed that the referred group has significantly higher scores than the non-clinical matched control group on all PID-5 domains and facets ($p < .001$, large effect size [ES] range from $\eta^2_p = .46$ [Manipulativeness] to .81 [Detachment]), except for the facet Impulsivity, showing no significant differences across groups. Scores for the Irresponsibility facet also differ from the overall pattern, with slightly higher scores for the control group compared to the referred group ($\eta^2_p = .09$). Overall, these results support the PID-5's ability to differentiate between a referred and a control sample of late adolescents and emerging adults.

## DISCUSSION

The present study contributes to the ongoing research on the maladaptive trait model that was adopted in Section III of the *DSM-5* (APA, 2013) by examining the underlying structure and psychometric properties of the PID-5 (Krueger et al., 2012) in a clinical sample of late adolescents and emerging adults. The focus on such a sample is valuable given the need for psychometric research underscoring the reliability and validity of the PID-5 across ages in both community and referred samples.

The current results confirm the PID-5's underlying *factor structure* in clinically referred individuals who are transitioning from adolescence to adulthood, including five factors that show relatively good fit indices and are fairly similar to previously obtained structures (Bastiaens et al., 2016; De Clercq et al., 2014; De Fruyt et al., 2013; Krueger et al., 2012; Wright et al., 2012). In addition, the pattern of the correlations between the PID-5 factors resembles the pattern that was found in adults (Krueger et al., 2012; Wright et al., 2012) and adolescents (De Clercq et al., 2014), underscoring a similar interrelatedness of PID-5 factors across age groups.

Corroborating the suggestion of Griffin and Samuel (2014) on the importance of the replicability of the *lower-level PID-5 structure*, the current research indicates—in line with others (e.g., De Clercq et al., 2014; Krueger et al., 2012)—that some facets are pure markers of factors (e.g., Manipulativeness) whereas others (e.g., Restricted affectivity) are situated in between, what is also reflected in Section III of *DSM-5*, including four interstitial facets. Parallel to the current results, the first facet, *Restricted affectivity*, appears to be an indicator of both Detachment and Negative affectivity, with the highest loading on Detachment (Anderson et al., 2013; Ashton, Lee, de Vries, Hendrickse, & Born, 2012; Bastiaens et al., 2016; De Clercq et al., 2014; Griffin & Samuel, 2014; Quilty et al., 2013; Roskam et al., 2015; Thomas et al., 2013; Wright et al., 2012). *Hostility* has been suggested to primarily indicate Negative affectivity, with a cross-loading on Antagonism (Krueger et al., 2012; Quilty et al., 2013). This is in line with the general FFM tradition, where Angry hostility is a facet of Neuroticism (Costa & McCrae, 1992), but contrasts most studies (including the current) on the PID-5's structure, evidencing a primary loading of Hostility on antagonism (Bastiaens et al., 2016; De Fruyt et al., 2013; Griffin & Samuel, 2014; Roskam et al., 2015; Thomas et al., 2013; Wright et al., 2012). *Depressivity* is the third interstitial facet with conflicting evidence on its primary placement on Negative affectivity (Ashton et al., 2012; Bastiaens et al., 2016; De Clercq et al., 2014; De Fruyt et al., 2013; Griffin & Samuel, 2014; Quilty et al., 2013; Roskam et al., 2015; Thomas et al., 2013) versus Detachment (De Fruyt et al., 2013; Krueger et al., 2012; Wright et al., 2012), with the current results underscoring the latter. Also *Suspiciousness* is interstitial as shown by evidence for its placement on Negative affectivity (Bastiaens et al., 2016; De Fruyt et al., 2013; Griffin & Samuel, 2014; Quilty et al., 2013; Roskam et al., 2015; Thomas et al., 2013) versus Detachment (Bastiaens et al., 2016;

De Clercq et al., 2014; De Fruyt et al., 2013; Krueger et al., 2012; Wright et al., 2012), with our results underscoring the latter. Although evidence—including our results—might support the allocation of these four facets on one or another factor, these facets' interstitial nature inherently results in a lower-order structure that is less easy to replicate, and future research should continue to clarify their placement.

From a *conjoint perspective* on the structure of the PID-5 and BFI, it was clear that all general BFI domains have their strongest loading on their conceptually related maladaptive PID-5 domain, reflecting *construct validity*. Hence, the current results indicated—in line with studies relying on other FFM measures (De Fruyt et al., 2013; Griffin & Samuel, 2014; Thomas et al., 2013)—an overarching five-factor structure (Costa & McCrae, 2010), confirming that normal and disordered traits have a shared content (Markon, Krueger, & Watson, 2005). The current findings are hence in line with others that signify the potential to apply normative trait research to PD classification (e.g., Livesley, 2007; Lynam & Widiger, 2001; Widiger & Lowe, 2007), but also indicate that the PID-5 can to some extent be understood as an FFM measure (Griffin & Samuel, 2014).

The *criterion validity* is supported by meaningful and similar associations between the FFM/PID-5 domains and various QoL domains, especially situated in the psychological domain. This is in line with the *DSM-5* stating that in order to diagnose personality pathology, not only do heightened maladaptive traits have to be present, but also impaired functioning, observable in two or more aspects (identity, self-direction, empathy, and intimacy), thus reflecting aspects of psychological functioning. The current results also indicate that especially with regard to the fifth domain of Openness-related traits, the maladaptive construct of Psychoticism is uniquely related to impairment-related constructs whereas the adaptive trait equivalent of Openness to experience shows less significant relations. This finding may be sample-specific, but may also point out an important difference between both constructs in terms of their clinical value. For Psychoticism, for instance, it is known to be highly associated with a broad range of psychopathology (Hopwood et al., 2013).

Further, the PID-5's *differentiating value* was supported by its capacity to differentiate between clinical and non-clinical participants, with the latter scoring significantly lower on all domains and facets, except for Impulsivity. Also, others compared the PID-5 in patients versus controls (Quilty et al., 2013), revealing that patients have higher scores than controls, which is in line with the current results in clinically referred late adolescents and emerging adults, including even higher effect sizes.

Finally, good to excellent *reliabilities* were found for the PID-5 facets and domains, indicating that clinical late adolescents and emerging adults are able to report on their maladaptive personality traits in a coherent and reliable way. In addition, the range of the coefficients was in line with those reported in adults (Al-Dajani et al., 2016). The lowest internal consistency

($\alpha = .75$) was found for Irresponsibility, confirming previous findings indicating that Irresponsibility is situated at the lower end of the range of reliability coefficients (De Clercq et al., 2014; Sellbom, Anderson, & Bagby, 2013; Somma et al., 2016).

Although this study shows several strengths—such as the inclusion of a clinical sample of late adolescents and emerging adults, as well as analyses that were not conducted before (e.g., conjoint factor structure with BFI)—this study also has limitations. First, the fit of the five-factor structure was relatively good, but not perfect. However, this can be understood from the contrast between the theoretically proposed perfect structure versus the empirical evidence indicating that such simple structures are often too difficult to reach given the complexity of personality pathology data (cf. the interstitial nature of four facets; Krueger et al., 2012). In addition, obtaining such a perfect structure might be even more difficult in clinical studies (such as the current study), where maladaptive traits are typically more strongly connected, leading to higher cross-loadings and a less distinctive factor matrix (Kaszynski et al., 2014; Quilty et al., 2013; Verbeke, De Caluwé, & De Clercq, 2017). A second limitation concerns the exclusive use of self-reports, and despite the fact that this may be the best way to assess maladaptive traits, other informants (e.g., parents) could also provide extra information (Markon, Quilty, Bagby & Krueger, 2013). Third, the current study used the BFI, but future studies can rely on the recently published BFI-2 (Soto & John, 2017). The BFI-2 offers a robust hierarchical structure including 15 facets, providing greater bandwidth, fidelity, and predictive power than the original BFI, hence offering more opportunities for further research. Finally, the current study did not examine the PID-5's measurement invariance as the sample was too small, but future studies can rely on larger samples to investigate this.

Summarized, the PID-5's structure and psychometric properties have been examined in various samples across the life span, and the importance of evaluating the PID-5 in clinical samples prior to its use as a clinical tool has been systematically put forward as a suggestion for future research. The present study adds to this research line by investigating the structure, validity, and reliability of the PID-5 in a clinical sample of late adolescents and emerging adults. The results replicate the previously published five-factor structure of the PID-5, and the conjoint PID-5/BFI five-factor structure suggests that the structure of the *DSM-5* personality traits corresponds to the structure of the FFM, reflecting the PID-5's construct validity. Further, the results support the PID-5's criterion validity and differentiating capacity as well as its reliability. All these findings thus extend the applicability of the PID-5 to psychiatric samples of late adolescents and emerging adults.

## REFERENCES


Al-Dajani, N., Gralnick, T. M., & Bagby, M. (2016). A psychometric review of the Personality Inventory for DSM-5 (PID-5): Current status and future directions. *Journal of Personality Assessment, 98*, 62–81. doi:10.1080/00223891.2015.1107572

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Anderson, J. L., Sellbom, M. R., Bagby, R. M., Quilty, L. C., Veltri, C. O. C., Markon, K. E., & Krueger, R. F. (2013). On the convergence between PSY-5 domains and PID-5 domains and facets: Implications for assessment of DSM-5 personality traits. *Assessment, 20*, 286–294. doi:10.1177/1073191112471141

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469–480. doi:10.1037//0003-066X.55.5.469

Ashton, M. C., Lee, K., de Vries, R. E., Hendrickse, J., & Born, M. P. (2012). The maladaptive personality traits of the Personality Inventory for DSM-5 (PID-5) in relation to the HEXACO personality factors and schizotypy/dissociation. *Journal of Personality Disorders, 26*, 641–659. doi:10.1521/pedi.2012.26.5.641

Bastiaens, T., Claes, L., Smits, D., De Clercq, B., De Fruyt, F., Rossi, G., … De Hert, M. (2016). The construct validity of the Dutch Personality Inventory for *DSM-5* Personality Disorders (PID-5) in a clinical sample. *Assessment*, *26*, 42–51. doi:10.1177/1073191115575069

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238–247. doi:10.1037/0033-2909.107.2.238

Bleidorn, W., & Schwaba, T. (2017). Personality development in emerging adulthood. In J. Specht (Ed.), *Personality development across the lifespan* (pp. 39–51). London, UK: Elsevier. doi:10.1016/B978-0-12-804674-6.00004-1

Costa, P. T., & McCrae, R. (1992). *NEO-PI-R professional manual: Revised NEO personality and NEO Five-Factor Inventory (NEO-FFI)*. Odessa, FL: Psychological Assessment Rescources.

Costa, P. T., Jr., & McCrae, R. R. (2010). *NEO inventories professional manual: NEO PI-3, NEO-FFI-3, NEO PI-R*. Lutz, FL: Psychological Assessment Rescources.

De Caluwé, E., De Clercq, B., De Bolle, M., & De Wolf, T. (2014). A general and maladaptive personality perspective on youth obsessive-compulsive symptoms. *Journal of Personality Assessment, 96*, 495–502. doi:10.1080/00223891.2013.856315

De Clercq, B., De Fruyt, F., De Bolle, M., Van Hiel, A., Markon, K. E., & Krueger, R. F. (2014). The hierarchical structure and construct validity of DSM-5 personality traits in adolescence. *Journal of Personality, 82*, 158–169. doi:10.1111/jopy.12042

De Clercq, B., De Fruyt, F., Van Leeuwen, K., & Mervielde, I. (2006). The structure of maladaptive personality traits in childhood: A step toward an integrative developmental perspective for DSM-V. *Journal of Abnormal Psychology, 115*, 639–657. doi:10.1037/0021-843X.115.4.639

De Fruyt, F., De Clercq, B., De Bolle, M., Wille, B., Markon, K., & Krueger, R. F. (2013). General and maladaptive traits in a five-factor framework for DSM-5 in a university student sample. *Assessment, 20*, 295–307. doi:10.1177/1073191113475808

Denissen, J. J., Geenen, R., van Aken, M. A., Gosling, S. D., & Potter, J. (2008). Development and validation of a Dutch translation of the Big Five Inventory (BFI). *Journal of Personality Assessment, 90*, 152-157. doi:10.1080/00223890701845229

Few, L. R., Miller, J. D., Rothbaum, A. O., Meller, S., Maples, J., Terry, D. P., … MacKillop, J. (2013). Examination of the Section III DSM-5 diagnostic system for personality disorders in an outpatient clinical sample. *Journal of Abnormal Psychology, 122*, 1057–1069. doi:10.1037/a0034878

Fossati, A., Krueger, R. F., Markon, K. E., Borroni, S., & Maffei, C. (2013). Reliability and validity of the Personality Inventory for DSM-5 (PID-5): Predicting DSM-IV personality disorders and psychopathy in community-dwelling Italian adults. *Assessment, 20*, 689–708. doi:10.1177/1073191113504984

Gore, W. L., & Widiger, T. A. (2013). The DSM-5 dimensional trait model and five-factor models of general personality. *Journal of Abnormal Psychology, 122*, 816–821. doi:10.1037/a0032822

Griffin, S. A., & Samuel, D. B. (2014). A closer look at the lower-order structure of the personality inventory for DSM-5: Comparison with the five-factor model. *Personality Disorders: Theory Research and Treatment, 5*, 406–412. doi:10.1037/per0000074

Hopwood, C. J., Thomas, K. M., Markon, K. E., Wright, A. G. C., & Krueger, R. F. (2012). DSM-5 personality traits and DSM-IV personality disorders. *Journal of Abnormal Psychology, 121*, 424–432. doi:10.1037/A0026656

Hopwood, C. J., Wright, A. G. C., Krueger, R. F., Schade, N., Markon, K. E., & Morey,

L. C. (2013). DSM-5 pathological personality traits and the Personality Assessment Inventory. *Assessment, 20*, 269–285. doi:10.1177/1073191113486286

Hu, L., & Bentler, P. M. (1999). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling concepts issues and applications* (pp. 76–99). Thousand Oaks, CA: Sage.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory–Versions 4a and 54*. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big-Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). New York, NY: Guilford.

Kaszynski, K., Kallis, D. L., Karnik, N., Soller, M., Hunter, S., Haapanen, R., ... Steiner, H. (2014). Incarcerated youth with personality disorders: Prevalence, comorbidity and convergent validity. *Personality and Mental Health, 8*, 42–51. doi:10.1002/pmh.1241

Kessler, R., Berglund, P., Demler, O., Jin, R. Merikangas, K. R., & Walters, E. F. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 593–602.

Kidscreen Group Europe. (2006). *The Kidscreen questionnaires. Quality of life questionnaires for children and adolescents—Handbook*. Lengerich, Germany: Papst Science.

Kline, R. B. (2005). *Principles and practice of structural equation modeling*. New York, NY: Guilford.

Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. (2012). Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine, 42*, 1879–1890. doi:10.1017/S0033291711002674

Livesley, W. J. (2007). A framework for integrating dimensional and categorical classifications of personality disorder. *Journal of Personality Disorders, 21*, 199–224. doi:10.1521/pedi.2007.21.2.199

Lorenzo-Seva, U., & ten Berge, J. M. F. (2006). Tucker's congruence coefficient as a meaningful index of factor similarity. *Methodology, 2*, 57–64.

Lynam, D. R., & Widiger, T. A. (2001). Using the five-factor model to represent the DSM-IV personality disorders: An expert consensus approach. *Journal of Abnormal Psychology, 110*, 401–412. doi:10.1037//0021-843X.110.3.401

Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. *Journal of Personality and Social Psychology, 88*, 139–157. doi:10.1037/0022-3514.88.1.139

Markon, K. E., Quilty, L. C., Bagby, R. M., & Krueger, R. F. (2013). The development and psychometric properties of an informant-report form of the personality inventory for DSM-5 (PID-5). *Assessment, 20*, 370–383. doi:10.1177/1073191113486513

Mullins-Sweatt, S. N., Jamerson, J. E., Samuel, D. B., Olson, D. R., & Widiger, T. A. (2006). Psychometric properties of an abbreviated instrument of the five-factor model. *Assessment, 13*, 119–137. doi:10.1177/1073191106286748

Mullins-Sweatt, S. N., & Widiger, T. A. (2010). Personality-related problems in living: An empirical approach. *Personality Disorders: Theory Research and Treatment, 1*, 230–238. doi:10.1037/a0018228

Muthén, L. K., & Muthén, B. O. (1998–2015). *Mplus user's guide (7.3)*. Los Angeles, CA: Muthén & Muthén.

Quilty, L. C., Ayearst, L., Chmielewski, M., Pollock, B. G., & Bagby, R. M. (2013). The psychometric properties of the personality inventory for DSM-5 in an APA DSM-5 field trial sample. *Assessment, 20*, 362–369. doi:10.1177/1073191113486183

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132*, 3–27. doi:10.1037/0033-2909.132.1.1

Roskam, I., Galdiolo, S., Hansenne, M., Massoudi, K., Rossier, J., Gicquel, L., & Rolland, J. P. (2015). The psychometric properties of the French version of the personality inventory for DSM-5. *PLoS One, 10*, e0133413. doi:10.1371/journal.pone.0133413

Samuel, D. B., Hopwood, C. J., Krueger, R. F., Thomas, K. M., & Ruggero, C. J. (2013). Comparing methods for scoring personality disorder types using maladaptive traits in DSM-5. *Assessment, 20*, 353–361. doi:10.1177/1073191113486182

Samuel, D. B., Simms, L. J., Clark, L. A., Livesley, W. J., & Widiger, T. A. (2010). An item response theory integration of normal and abnormal personality scales. *Personality Disorders, 1*, 5–21. doi:10.1037/a0018136

Schwarz, G. E. (1978). Estimating the dimension of a model. *Annals of Statistics, 6*, 461–464. doi:10.1214/aos/1176344136

Sellbom, M., Anderson, J. L., & Bagby, R. M. (2013). Assessing DSM-5 section III personality traits and disorders with the

MMPI-2-RF. *Assessment, 20*, 709–722. doi:10.1177/1073191113508808

Somma, A., Fossati, A., Terrinoni, A., Williams, R., Ardizzone, I., Fantini, F., … Ferrara, M. (2016). Reliability and clinical usefulness of the personality inventory for DSM-5 in clinically referred adolescents: A preliminary report in a sample of Italian inpatients. *Comprehensive Psychiatry, 70*, 141–151. doi:10.1016/j.comppsych.2016.07.006

Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology, 113*, 117–143. doi:10.1037/pspp0000096

Specht, J. (2017). Personality development in reaction to major life events. In J. Specht (Ed.), *Personality development across the lifespan* (pp. 341–356). London, UK: Elsevier. doi:10.1016/B978-0-12-804674-6.00021-1

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*, 173–180. doi:10.1207/s15327906mbr2502_4

Stepp, S. D., Yu, L., Miller, J. D., Hallquist, M. N., Trull, T. J., & Pilkonis, P. A. (2012). Integrating competing dimensional models of personality: Linking the SNAP, TCI, and NEO using item response theory. *Personality Disorders: Theory Research and Treatment, 3*, 107–126. doi:10.1037/A0025905

Suzuki, T., Samuel, D. B., Pahlen, S., & Krueger, R. F. (2015). DSM-5 alternative personality disorder model traits as maladaptive extreme variants of the five-factor model: An item-response theory analysis. *Journal of Abnormal Psychology, 124*, 343–354. doi:10.1037/abn0000035

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston, MA: Allyn & Bacon.

Thomas, K. M., Yalch, M. M., Krueger, R. F., Wright, A. G. C., Markon, K. E., & Hopwood, C. J. (2013). The convergent structure of DSM-5 personality trait facets and five-factor model trait domains. *Assessment, 20*, 308–311. doi:10.1177/1073191112457589

Verbeke, L., De Caluwé, E., & De Clercq, B. (2017). A five-factor model of developmental personality pathology precursors. *Personality Disorders: Theory, Research and Treatment, 2*, 130–139. doi:10.1037/per0000178

Verbeke, L., De Clercq, B., Van der Heijden, P., Hutsebaut, J., & van Aken, M. A. G. (2017). The relevance of schizotypal traits for understanding interpersonal functioning in adolescents with psychiatric problems. *Personality Disorders: Theory, Research and Treatment, 8*, 54–63. doi:10.1037/per0000163

Walton, K. E., Roberts, B. W., Krueger, R. F., Blonigen, D. M., & Hicks, B. M. (2008). Capturing abnormal personality with normal personality inventories: An item response theory approach. *Journal of Personality, 76*, 1623–1647. doi:10.1111/j.1467-6494.2008.00533.x

Watson, D., Stasik, S. M., Ro, E., & Clark, L. A. (2013). Integrating normal and pathological personality: Relating the DSM-5 trait-dimensional model to general traits of personality. *Assessment, 20*, 312–326. doi:10.1177/1073191113485810

Widiger, T. A. & Lowe, J. R. (2007). Five-factor model assessment of personality disorder. *Journal of Personality Assessment, 89*, 16–29.

Widiger, T. A., & Presnall, J. R. (2013). Clinical application of the five-factor model. *Journal of Personality, 81*, 515–527. doi:10.1111/jopy.12004

Widiger, T. A., & Simonsen, E. (2005). Alternative dimensional models of personality disorder: Finding a common ground. *Journal of Personality Disorders, 19*, 110–130. doi:10.1521/pedi.19.2.110.62628

Wright, A. G. C., & Simms, L. J. (2014). On the structure of personality disorder traits: Conjoint analyses of the CAT-PD, PID-5, and NEO-PI-3 trait models. *Personality Disorders: Theory Research and Treatment, 5*, 43–54. doi:10.1037/per0000037

Wright, A. G. C., Thomas, K. M., Hopwood, C. J., Markon, K. E., Pincus, A. L., & Krueger, R. F. (2012). The hierarchical structure of DSM-5 pathological personality traits. *Journal of Abnormal Psychology, 121*, 951–957. doi:10.1037/a0027669