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**Dimensions of Normal and Abnormal Personality:
Elucidating DSM-IV Personality Disorder Symptoms in
Adolescents**

Journal of Personality, in press

Introduction

There is growing interest in the developmental antecedents of adult personality pathology. Research increasingly indicates that personality pathology is not limited to adulthood, supporting its validity as a construct in both clinical and non-clinical adolescent populations (for a review, see Johnson, Bromley, Bornstein, & Sneed, 2006). Questions remain about the optimal way to conceptualize personality pathology. Dissatisfaction with the currently used categorical classification system of personality disorder (PD), the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*; American Psychiatric Association [APA], 2000), is widespread among researchers and clinicians alike (Bernstein, Iscan, & Maser, 2007). It has been argued repeatedly that personality pathology is better conceptualized with a dimensional model (Clark, 2007; Trull & Durrett, 2005).

Although the debate on categories versus dimensions is mostly confined to adult psychiatry, the dimensional approach may also be valuable for describing adolescent personality pathology. First, relatively little is known on the structure of adolescent personality pathology (but see Chapter 2 and De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006). When the *DSM* criteria and thresholds are applied to adolescent populations, questions on this structure remain unanswered. Second, in applying the *DSM* classifications to adolescents, symptomatology is most likely not interpreted in the context of adolescent psychological development. For example, behaviors that are considered pathological in adults may be - at least temporarily - part of normal development in adolescents (e.g., shyness, identity problems, emotional instability). Finally, the *DSM* classification has frequently been criticized for its inability to classify subthreshold traits and symptoms. Especially for those adolescents who score less extremely on symptom criteria (but who could be at risk for developing full-blown pathology), the related subthreshold level of impairment may be overlooked in applying the *DSM*-criteria. Dimensional models retain important information concealed in subthreshold symptom levels (Trull & Durrett, 2005).

Dimensions of Normal Personality and Personality Pathology

Dimensional models that have been employed frequently in an attempt to understand personality pathology are the Big Five (John, Donahue, & Kentle, 1991) and the Five-Factor Model (FFM) of normal personality (Digman, 1990). Many studies have shown that normal personality dimensions (particularly high Neuroticism and low Agreeableness and Conscientiousness) are underlying PDs in clinical and nonclinical adult samples (Widiger & Costa, 2002; Saulsman & Page, 2004), and a few have done so in nonclinical adolescent samples (De Clercq & De Fruyt, 2003; De Clercq, De Fruyt, & Van Leeuwen, 2004). When the adolescent and meta-analytic adult data (Saulsman & Page, 2004) on correlation patterns between FFM dimensions and *DSM-IV* PDs are compared, a noteworthy difference can be observed. Adolescent PDs seem to have more normal personality dimensions in common than adult PDs, suggesting that adolescent PDs are less differentiated than those in adults. Such smaller degrees of differentiation in adolescent disordered personality possibly indicate that personality pathology, if present, is still in a developing stage at this age. This may suggest that personality

traits in the normal range can contribute substantially to the description of disordered personality in adolescence.

In addition to investigating its relations with *DSM*-defined PDs, studies have related dimensions of normal personality to dimensional models of abnormal personality. Findings in adult populations have indicated that dimensions of normal and abnormal personality are essentially congruent at the higher-order level, suggesting a substantial common ground, with four broad factors that have been labelled Emotional (In)stability, Extraversion/Introversion, (Dis)agreeableness, and Conscientiousness/Compulsivity (Clark & Livesley, 2002; Larstone, Jang, Livesley, Vernon, & Wolf, 2002; Widiger & Simonsen, 2005). This structure has also been proposed as a common dimensional model to integrate adaptive and maladaptive individual differences in childhood and adolescence (Mervielde, De Clercq, De Fruyt, & Van Leeuwen, 2005). Research has thus underscored the relevance of dimensions of normal personality in describing personality pathology, despite its exclusive reliance on adaptive personality traits.

Notwithstanding this evidence, an important issue must be addressed to determine whether personality pathology is sufficiently covered by normal personality dimensions. In addition to defining PDs as involving inflexible and maladaptive traits, the *DSM* also requires that these traits cause “clinically significant distress or impairment in social, occupational, or other important areas of functioning” (APA, 2000, p. 689). Distress or dysfunction is inherent in the notion of disorder. The Big Five is a purely descriptive and structural framework of personality traits found within the natural language, indicating the relative presence of each trait. While extreme scores on these normal traits may indicate abnormal personality, disordered personality encompasses more than pure statistical deviance. Extreme scores do not necessarily imply distress or dysfunction, required for disordered personality. A supplementary model may be needed to capture the dysfunctional characteristics inherent in disordered personality.

Considering a Supplement: Livesley’s Model

A potential answer to this issue can be found within Livesley’s (2006) conceptualization of personality pathology, which includes explicit referral to dysfunction. Livesley and colleagues proposed a definition of PD as involving the failure to achieve adaptive solutions to major life tasks relating to identity or self (intrapersonal), intimacy and attachment (interpersonal), and prosocial behavior (Livesley, 2007; Livesley & Jang, 2000; Livesley, Schroeder, Jackson, & Jang, 1994). It can be argued that the complexity of disordered personality is conceptually more completely encompassed in Livesley and colleagues’ definition of PD, possibly when used in addition to normal personality traits. For example, intrapersonal characteristics highly relevant to disordered personality such as identity problems (Marcia, 2006), are not covered by the dimensions of normal personality. In addition, interpersonal characteristics such as disturbances in attachment and autonomy receive little attention within the normal personality traits, although interpersonal impairment is an important aspect of disordered personality (APA, 2000; Clark, Livesley, Schroeder, & Irish, 1996). Also, dysfunctional behavioral characteristics associated with disordered personality, such as self harm (Klonsky, Oltmanns, & Turkheimer, 2003) and cognitive distortion (Livesley & Schroeder, 1990), are not represented in models of normal

personality (Clark, Vorhies, & McEwen, 2002; Costa & McCrae, 1990; Schroeder, Wormworth, & Livesley, 2002).

Empirical studies in adult populations have supported the additional contribution of models of abnormal personality to an adequate description of the dysfunction associated with disordered personality. These studies have demonstrated that higher-order dimensions of abnormal personality provided a significant incremental contribution to the variance accounted for in *DSM-IV* PD symptoms, above and beyond variance accounted for by the five-factor domains (Bagby, Marshall, & Georgiades, 2005b; Reynolds & Clark, 2001). In a recent study, Nestadt et al. (2008) concluded that the breadth of PD pathology is not completely captured by the FFM domains, although the lower-order facets of the FFM improved the extent to which the FFM explained PD pathology. The authors further concluded that additional clinical material may be necessary to describe PD pathology, proposing the Dimensional Assessment of Personality Pathology – Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2009), the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993a), or the Structured Interview for the FFM (SIFFM; Trull, Widiger, & Burr, 2001) as potential useful alternatives. From the viewpoint of these conceptual and empirical issues, the most valuable model to understand the dimensional representation of disordered personality may be one that supplements dimensions of normal personality with those of abnormal personality.

The evidence that normal personality dimensions are underlying PDs in nonclinical adolescents (De Clercq & De Fruyt, 2003; De Clercq et al., 2004), has, to our knowledge, not been replicated in a clinical adolescent sample, nor have dimensional models of normal and abnormal personality been investigated in parallel in terms of their relations with adolescent PDs. In view of the growing interest in the developmental antecedents of adult personality pathology, and the substantial evidence favoring dimensional over categorical models, it may be interesting to study the relations of dimensional models to *DSM-IV* PD symptoms in an adolescent sample. During this age period, when personality pathology may still be in development and thus show a more diffuse structure than during adulthood, a dimensional approach may provide differentiation and understanding in addition to that provided by the *DSM* categorical classification system.

The promising psychometric qualities of an age-appropriate operationalization of Livesley's model of personality pathology (DAPP-BQ for Adolescents [DAPP-BQ-A]) were demonstrated for use in adolescent populations (see Chapter 2). Moreover, in Chapter 3 it was demonstrated that higher- and lower-order dimensions of the DAPP-BQ-A correlated as predicted with PD symptoms assessed with a semi-structured interview. In addition, these dimensions predicted specific PD symptomatology above and beyond gender, age, and co-occurring PD symptoms. Elaborating on these previous studies, the present study includes an assessment of normal personality dimensions, which have been shown to relate to PDs in adults and nonclinical adolescents (De Clercq & De Fruyt, 2003; De Clercq et al., 2004; Saulsman & Page, 2004). Specifically, this is the first study to elucidate dimensions derived from the Big Five and Livesley's model underlying interview-based *DSM-IV* PD symptoms in adolescents referred to mental health services. It is hypothesized that both models include dimensions relevant to

disordered personality, and capture substantial amounts of variance in adolescent PD symptoms. It is further hypothesized that the full complexity of disordered personality is more completely captured by a supplementary model including, in addition to the higher-order Big Five dimensions of normal personality, the dimensions of abnormal personality proposed by Livesley's model. Subsequently, the present study investigates which lower-order dimensions within Livesley's model may provide differentiation of adolescent personality pathology above and beyond individual differences accounted for by the higher-order dimensions of normal personality.

Method

Participants

The sample consisted of 168 adolescents (35% male), with a mean age of 15.9 years ($SD = 2.3$; range 12 to 22 years), referred to youth mental health services in one of four collaborating centres for in- and outpatient treatment in The Netherlands. The adolescents were referred for various reasons, not specifically for personality pathology. Axis I disorders, assessed with the Structured Clinical Interview for *DSM-IV* Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) and the attention-deficit/hyperactivity, oppositional defiant, and conduct disorder modules of the Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997), were present in 77% of the sample at the time of assessment. The prevalence rates for Axis I disorders were: ADHD 7%, ODD 9%, CD 7%, mood disorder 49%, anxiety disorder 39%, psychotic disorder 15%, substance use disorder 10%, somatoform disorder 6%, and eating disorder 15%. Gender was equally distributed across the inpatient ($n = 89$) and outpatient ($n = 79$) subsamples. On average, outpatients were slightly older than inpatients (Cohen's $d = .44$). Inpatients scored significantly higher than outpatients ($p < .05$) on several dimensions of normal and abnormal personality, and on all but one (Obsessive-Compulsive) PD symptom scales. Outpatients scored significantly higher only on BFI Agreeableness.

The proportions of *DSM-IV* PD diagnoses, as assessed with the Structured Clinical Interview for *DSM-IV* Personality Disorders (SCID-II; First, Spitzer, Gibbon, & Williams, 1997), in the sample were: Paranoid 11%, Schizoid 3%, Schizotypal 1%, Antisocial 14%, Borderline 17%, Histrionic 0%, Narcissistic 1%, Avoidant 15%, Dependent 4%, Obsessive-Compulsive 8%, Depressive 20%, and Passive-Aggressive 7%. The distribution of the number of PD diagnoses in this sample was: 58% had no diagnosis, 18% one, 8% two, 5% three, 6% four, 1% five, 2% six, and 1% had seven PD diagnoses. Finally, with regard to co-occurrence of Axis I and Axis II disorders, 17% of the sample did not qualify for a diagnosis on Axis I or II, 38% qualified for diagnoses on both Axis I and II, 41% qualified for a diagnosis on Axis I but not on Axis II, and 6% qualified for a diagnosis on Axis II but not on Axis I.

Measures

All participants completed the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991), an instrument designed to measure the Big Five higher-order dimensions of normal personality: Neuroticism, Extraversion, Openness/Intellect, Agreeableness, and Conscientiousness. Each dimension was assessed by 7 items. The resulting 35 items are scored on a Likert-type scale, ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). The 35-item BFI is a slightly shortened version of the Dutch BFI-44 for which good psychometric properties were recently reported, including factorial equivalence to the English original and other BFI translations and relative independence and internal consistency of the five dimensions (Denissen, Geenen, Van Aken, Gosling, Potter, 2008). Factor analysis in a Dutch population ($N = 233$) using the 35-item version replicated the original five-factor structure, and yielded alpha coefficients ranging from .48 for Agreeableness to .81 for Neuroticism (mean = .69) (Eileen M. Donahue, personal communication, April 3rd 1995). For the present study, the wording of the items was slightly modified by the researchers to ensure age-appropriate assessment. Words that were deemed difficult for adolescents (e.g., aesthetic, efficient, sophisticated) were replaced with more comprehensible wordings, and all items were altered into full sentences in first-person form. In the present sample, principal components analysis with varimax rotation extracting five factors yielded a structure that closely resembled the original five-factor structure. Reliability coefficients (Cronbach's alphas) found in the present study were .87 for Neuroticism, .76 for Extraversion, .70 for Openness/Intellect, .62 for Agreeableness, and .55 for Conscientiousness. Research has shown that the BFI-items captured the same five factors as the NEO-PI-R (Costa & McCrae, 1992), the predominant measure of the FFM (Reynolds & Clark, 2001; see also Goldberg, 1993).

In addition, participants completed the Dimensional Assessment of Personality Pathology – Basic Questionnaire for Adolescents (DAPP-BQ-A), an age-appropriate operationalization of Livesley's model of personality pathology. This self-report questionnaire assesses four higher-order dimensions, which are labelled Emotional Dysregulation (170 items, mean interitem correlation [M_{IIC}] = .25, Cronbach's α in the present sample = .98), Dissocial Behavior (64 items, M_{IIC} = .20, α = .84), Inhibitedness (32 items, M_{IIC} = .08, α = .73), and Compulsivity (16 items, M_{IIC} = .29, α = .87). In addition, the DAPP-BQ-A assesses 18 lower-order dimensions with mean interitem correlations ranging from .11 for Restricted Expression to .72 for Self Harm (median = .33): Submissiveness (α = .91), Cognitive Distortion (α = .91), Identity Problems (α = .78), Affective Instability (α = .90), Oppositionality (α = .87), Anxiety (α = .94), Social Avoidance (α = .91), Suspiciousness (α = .88), Insecure Attachment (α = .93), Narcissism (α = .88), Self Harm (α = .97), Stimulus Seeking (α = .86), Callousness (α = .86), Rejection (α = .87), Conduct Problems (α = .89), Restricted Expression (α = .67), Intimacy Problems (α = .71), and Compulsivity (α = .87). Each of the lower-order dimensions is measured by 16 items, except the scales for Self Harm and Suspiciousness, which contain 12 and 14 items, respectively. In addition, eight items are included to measure social desirability. The 290 items are scored on a Likert-type scale, ranging from 1 (*very unlike me*) to 5 (*very like me*). The DAPP-BQ-A was translated and adapted from its adult predecessor, the DAPP-BQ (Livesley & Jackson, 2009). The translation and adaptation procedures are reported in more detail in Chapter 2.

Subsequently, all participants were interviewed using the Dutch version of the SCID-II (Weertman, Arntz, Dreessen, Van Velzen, & Vertommen, 2003; Weertman, Arntz, & Kerkhofs, 2000) by one of two trained research psychologists, who were blind to adolescents' BFI and DAPP-BQ-A scores. Although the SCID-II was primarily designed for the assessment of PDs in adults, empirical findings on the reliability and validity of structured clinical interviews in adolescent samples suggest that the SCID-II is a useful instrument at this age (Brent, Zelenak, Bukstein, & Brown, 1990; Brent et al., 1993; Grilo, Becker, Edell, & McGlashan, 2001). PD symptom counts were obtained by computing for each PD the total number of criteria that were met. The reliability coefficients for the twelve PD scales were .73 for Paranoid, .59 for Schizoid, .51 for Schizotypal, .78 for Antisocial, .84 for Borderline, .40 for Histrionic, .53 for Narcissistic, .76 for Avoidant, .76 for Dependent, .59 for Obsessive-Compulsive, .82 for Depressive, and .61 for Passive-Aggressive.

Procedure

As was described in Chapter 3, participants completed the questionnaires at home or at the mental health centre in paper-and-pencil format (68%) or via internet (32%). These groups did not differ on either age or gender. However, they did differ significantly on the BFI dimension Agreeableness (Cohen's $d = .54$), indicating higher scores for the adolescents in the internet group, and on the DAPP-BQ-A dimensions Dissocial Behavior ($d = .37$) and Inhibitedness ($d = .35$), indicating higher scores for the paper-and-pencil group. These differences did not seem to represent systematic methodological effects, as ANOVA's showed that the effects were attributable to the scores of inpatients, the large majority of whom (87%) used paper-and-pencil format. Only for Dissocial Behavior a small but significant interaction effect of assessment format by referral status was found ($\eta^2 = 0.03$), indicating that the effect of assessment format was only significant for inpatients. Subsequently, the SCID-II was administered at the mental health centre. In addition, instruments to assess demographic characteristics, Axis I disorders, IQ, and childhood trauma were administered but not used for the present study. After completing all assessments, adolescents received a voucher worth €15,- as acknowledgement of their participation. Study procedures were approved in accordance with appropriate Dutch national guidelines by the Central Committee on Research involving Human Subjects.

Statistical Analyses

Because several cross-loadings appeared in the factor structure of the DAPP-BQ-A, factor scores were computed on each higher-order dimension for each participant based on the factor structure in a sample of 1,798 clinical and nonclinical adolescents (see Chapter 2). Because considerable gender and some age differences in the number of PD symptoms and the scores on dimensions of normal and abnormal personality were observed, all analyses controlled for gender and age. Partial correlations were computed between the five BFI and four DAPP-BQ-A higher-order dimensions. Next, three series of multiple hierarchical regressions were conducted following similar analytic procedures as used in Chapter 3 that evaluated the incremental variance

in PD symptom counts accounted for by DAPP-BQ-A dimensions over and above gender, age, and general PD severity. Specifically, in the first series, after entering gender and age into the model, the DAPP-BQ-A higher-order dimensions were entered as one block, followed by the BFI higher-order dimensions to determine if the latter explained an incremental proportion of variance in PD symptom counts. In the second series the entry sequence was reversed in order to test the incremental contribution of the DAPP-BQ-A higher-order dimensions. Gender and age were entered first, followed by a block including the BFI higher-order dimensions, which in turn was followed by a block including the DAPP-BQ-A higher-order dimensions. In the final series of multiple hierarchical regressions, after entering gender and age into the model, the BFI higher-order dimensions were entered as one block, followed by a block including the DAPP-BQ-A lower-order dimensions that showed significant univariate correlations with the symptom counts for each respective PD (cf. Chapter 3). Individual beta weights of the BFI and DAPP-BQ-A dimensions were evaluated to see which predictors uniquely ($p < .05$) contributed to the regression models.

Results

Correlation Results

The correlations between the BFI and DAPP-BQ-A higher-order dimensions are presented in Table 4.1. The correlations for conceptually related dimensions were in the predicted directions. In terms of Cohen's (1988) criteria, a high correlation ($> |.50|$) was found between BFI Neuroticism and DAPP-BQ-A Emotional Dysregulation (.69), and medium ($> |.30|$) correlations were found between BFI Extraversion and DAPP-BQ-A Inhibitedness (-.49), BFI Agreeableness and DAPP-BQ-A Dissocial Behavior (-.39), and BFI Conscientiousness and DAPP-BQ-A Compulsivity (.36). Table 4.1 also shows two additional medium correlations: BFI Agreeableness and DAPP-BQ-A Inhibitedness (-.34), and BFI Conscientiousness and DAPP-BQ-A Emotional Dysregulation and Dissocial Behavior (both -.35). In terms of Cohen's criteria, all other correlations were small ($\leq |.30|$).

Table 4.1 - **Partial correlations between BFI and DAPP-BQ-A higher-order dimensions**

DAPP-BQ-A	BFI				
	N	E	O	A	C
Emotional Dysregulation	.69***	-.30***	.00	-.08	-.35***
Dissocial Behavior	.06	.23**	-.07	-.39***	-.35***
Inhibitedness	.17*	-.49***	.01	-.34***	-.02
Compulsivity	-.05	.13	.20**	-.01	.36***

Note. Analyses controlled for gender and age. BFI = Big Five Inventory (John, Donahue, & Kentle, 1991); DAPP-BQ-A = Dimensional Assessment of Personality Pathology - Basic Questionnaire for Adolescents. N=Neuroticism, E=Extraversion, O=Openness, A=Agreeableness, C=Conscientiousness * $p < .05$, ** $p < .01$, *** $p < .001$.

Regression Results

First, regression analyses were conducted at the higher-order level. Table 4.2 reports (in the first column) the proportion of variance in PD symptom counts explained by the full model, including gender, age, BFI and DAPP-BQ-A higher-order dimensions. As the multicollinearity statistics yielded non-significant results (all variance inflation factors [VIF] < 10, and mean VIF = 1.87 [Bowerman & O'Connell, 1990; Myers, 1990]), all higher-order dimensions were included as predictor variables. On average, all predictors together accounted for a total adjusted R^2 of .30 (range .07 for Histrionic to .55 for Depressive).

The incremental contribution of the BFI higher-order dimensions over and above the higher-order dimensions of the DAPP-BQ-A was examined. The DAPP-BQ-A higher-order dimensions accounted for a significant proportion of variance in all PDs, with a mean value for adjusted R^2 change of .26 (range .07 for Schizoid to .44 for Depressive). The BFI higher-order dimensions provided a significant incremental contribution for 4 of the 12 PDs. The mean adjusted R^2 change was .01, with significant increments for Schizoid (.03), Avoidant (.02), Obsessive-Compulsive (.04), and Depressive (.04) PDs. Examination of the individual beta weights of the BFI higher-order dimensions showed that Neuroticism uniquely ($p < .05$) contributed to explained variance in Obsessive-Compulsive ($\beta = .25$) and Depressive PD (.19) symptoms, Extraversion to Avoidant (-.16), Conscientiousness to Schizoid (.21) and Obsessive-Compulsive (.20), and Openness to Depressive (.13).

Subsequently, the entry sequence was reversed. Table 4.2 shows that the BFI higher-order dimensions accounted for a significant proportion of variance in all but 1 (Histrionic) of the 12 PDs. The mean value for adjusted R^2 change was .16 (range .01 for Histrionic to .32 for Depressive). Table 4.2 further shows that the DAPP-BQ-A higher-order dimensions provided a significant incremental contribution for all but one PD (Schizoid). The mean adjusted R^2 change was .11 (range .02 for Schizoid to .25 for Antisocial). Examination of the individual beta weights of the DAPP-BQ-A higher-order dimensions showed that Emotional Dysregulation uniquely ($p < .05$) contributed to explained variance in Paranoid, Schizotypal, Borderline, Avoidant, Dependent, Depressive, and Passive-Aggressive PD symptoms; Dissocial Behavior to Antisocial, Borderline, Histrionic, Narcissistic, Obsessive Compulsive, and Passive-Aggressive; Inhibitedness to Paranoid, Antisocial, Avoidant, and Depressive; and Compulsivity (negatively) to Antisocial, Borderline, and Depressive.

The third series of regression analyses included DAPP-BQ-A lower-order dimensions as predictor variables. As the multicollinearity statistics yielded non-significant results (all variance inflation factors [VIF] < 10, and mean VIF ranged from 3.10 to 3.74 [Bowerman & O'Connell, 1990; Myers, 1990]), all lower-order dimensions that showed significant univariate correlations with the symptoms counts of each respective PD (cf. Chapter 3) were included as predictor variables. The right panel of Table 4.2 shows that the DAPP-BQ-A lower-order dimensions provided a significant incremental contribution to variance in symptom counts for all but one PD (Schizoid). The mean adjusted R^2 change was .15 (range .00 for Schizoid to .28 for Antisocial). Examination of the individual beta weights of the DAPP-BQ-A lower-order dimensions showed that Suspiciousness uniquely ($p < .05$) contributed to variance in Paranoid, Schizotypal, and Depressive PD; Cognitive Distortion to Schizotypal; Conduct Problems to Antisocial; Callous-

Table 4.2 - Hierarchical multiple regressions of *DSM-IV* personality disorder (PD) symptom counts: DAPP-BQ-A higher-order and lower-order dimensions over BFI higher-order dimensions

PD symptom counts (total R ² /adj)	BFI		I: DAPP-BQ-A higher-order		II: DAPP-BQ-A lower-order	
	ΔR^2 /adj	ΔF^a	Predictors (β)	ΔR^2 /adj	ΔF^b	Predictors (β)
PAR (.29)	.20	8.99***	N (.33), A (-.25)	.10	6.73***	ED (.39), IH (.18)
SZD (.15)	.09	4.33**	E (-.19), A (-.18), C (.16)	.02	1.74	
SZT (.25)	.16	7.50***	N (.27), C (-.19), E (-.15)	.07	4.82**	ED (.37)
ANT (.42)	.12	5.65***	A (-.27), C (-.20), E (.18)	.25	18.26***	DB (.51), CP (-.24), IH (.16)
BPD (.47)	.24	11.97***	N (.39), C (-.21), A (-.17)	.20	15.68***	ED (.44), DB (.27), CP (-.21)
HIS (.07)	.01	1.18		.07	4.10**	DB (.23)
NAR (.22)	.10	4.84***	A (-.30)	.10	5.88***	DB (.35)
AVID (.43)	.25	13.51***	N (.35), E (-.33)	.10	7.99***	ED (.53), IH (.15)
DEPT (.28)	.11	5.40***	N (.27), C (-.23)	.10	6.42***	ED (.56)
OC (.22)	.12	5.53***	N (.36), A (-.15)	.07	4.75**	DB (.33)
DEPR (.55)	.32	18.52***	N (.52), E (-.15), O (.14)	.16	15.02***	ED (.53), IH (.15), CP (-.13)
PA (.28)	.17	7.90***	N (.30), A (-.25)	.10	6.58***	ED (.36), DB (.29)
Mean - R ² /adj (.30)	.16			.11		

Note. Analyses controlled for gender and age. I=incremental contribution of DAPP-BQ-A higher-order dimensions over BFI higher-order dimensions. II=incremental contribution of DAPP-BQ-A lower-order dimensions over BFI higher-order dimensions. PAR=Paranoid, SZD=Schizoid, SZT=Schizotypal, ANT=Antisocial (A criteria), BPD=Borderline, HIS=Histrionic, NAR=Narcissistic, AVID=Avoidant, DEPT=Dependent, OC=Obsessive Compulsive, DEPR=Depressive, PA=Passive-Aggressive, N=Neuroticism, E=Extraversion, O=Openness, A=Agreeableness, C=Conscientiousness. ED=Emotional Dysregulation, DB=Dissocial Behavior, IH=Inhibitedness, CP=Compulsivity. β =standardized regression coefficient. All β 's significant at $p < .05$. ^aDegrees of freedom (5, 160). ^bDegrees of freedom (4, 156). * $p < .05$, ** $p < .01$, *** $p < .001$.

ness to Antisocial and Histrionic; Self Harm to Borderline, Histrionic, Narcissistic, Dependent, Avoidant, and Depressive; Stimulus Seeking to Borderline; Submissiveness to Borderline, Histrionic, and Dependent; Anxiety to Borderline (negatively); Narcissism to Histrionic and Narcissistic; Identity Problems to Narcissistic (negatively); Social Avoidance to Avoidant; and Rejection to Obsessive-Compulsive.

Discussion

The aim of the present study was to elucidate dimensions derived from two models - the Big Five of normal personality and Livesley's conceptualization of personality pathology - underlying *DSM*-defined PD symptoms in a clinical sample of adolescents referred for inpatient and outpatient mental health services. In Chapter 3 it was demonstrated that dimensions derived from Livesley's model showed significant, substantial, and conceptually meaningful relations to *DSM-IV* PDs. The present study expands this focus and includes a parallel examination of the Big Five and Livesley's model, as assessed by the BFI and DAPP-BQ-A, respectively. The results showed that higher-order dimensions of both models contributed significantly to variance in adolescent PDs. However, at the higher-order level Livesley's model afforded significant and substantial improvement over the Big Five in predicting symptoms of almost all PDs. More interestingly, lower-order dimensions within Livesley's model showed unique and conceptually meaningful relations to adolescent PD symptoms, over and above the effects of higher-order dimensions of normal personality. The findings suggest that adolescent PDs are more than extreme, maladaptive variants of higher-order normal personality traits, and encompass characteristics that may be more completely covered by dimensions of abnormal personality.

Relations between the higher-order dimensions of normal and abnormal personality showed meaningful patterns largely consistent with the four higher-order dimensions reported in the literature (Mervielde et al., 2005; Widiger & Simonsen, 2005). However, according to Cohen's criteria (1988), most correlations were moderate, suggesting that each model captures substantial unique variance not captured by the other model. Nevertheless, regression analyses did not support this contention. Although Livesley's model afforded additional explained variance over the Big Five for almost all PDs, the reverse did not hold, with increments in explained variance afforded by the Big Five dimensions minimal both in number and in magnitude.

The correlations between the higher-order dimensions of normal and abnormal personality showed one value that merits special attention. BFI Neuroticism and DAPP-BQ-A Emotional Dysregulation correlated .69, which seems to suggest that the constructs are overlapping considerably. However, in the regression analyses Emotional Dysregulation appeared as a unique predictor, after accounting for the effects of Neuroticism and the other BFI dimensions, for symptoms of 7 out of 12 PDs. Neuroticism uniquely contributed to symptoms of only 2 PDs. Thus, Emotional Dysregulation seems to capture core features of disordered personality that are not included in Neuroticism or any of the other BFI dimensions. This conclusion is in agreement with results from an examination of the phenotypic and genetic higher-order structure of PD in adults which also suggested that Emotional Dysregulation, although similar, has more extensive coverage than Neuroticism (Livesley, Jang, & Vernon, 1998).

Similar to a previous study in adolescents (De Clercq & De Fruyt, 2003) and to meta-analytic findings in adults (Saulsman & Page, 2004), the present regression analyses yielded two prominent dimensions common across adolescent PDs: high BFI Neuroticism/DAPP-BQ-A Emotional Dysregulation and low BFI Agreeableness/high DAPP-BQ-A Dissocial Behavior. Also consistent with the two previous studies is the lack of relations between the normal personality dimension Openness and symptoms of any of the PDs, with the exception of Depressive PD for which Openness was found to be a small positive predictor. The value of BFI Openness as a dimension of disordered personality thus seems negligible. The consistency in findings between the previous studies (De Clercq & De Fruyt, 2003; Saulsman & Page, 2004) and the present study is particularly notable considering the differences between these studies in sample (nonclinical versus clinical), measure of normal personality dimensions (NEO-PI-R and others versus BFI), as well as in explanatory model (Big Five versus Livesley's model).

Despite the consistencies between the meta-analytic findings reported for adults (Saulsman & Page, 2004) and the present adolescent findings, there also was a difference. The results of the regression analyses showed that low BFI Extraversion/high DAPP-BQ-A Inhibitedness was characteristic of several PDs, with the exception of Antisocial PD. In contrast, adult correlation findings showed directionally mixed relations for Extraversion (e.g., positive for Histrionic and negative for Schizoid PD). Interestingly, the present pattern did align with previous findings in nonclinical adolescents, which also demonstrated consistently negative correlations of PDs with Extraversion (De Clercq & De Fruyt, 2003; De Clercq et al., 2004). In sum, in addition to high Neuroticism/Emotional Dysregulation and low Agreeableness/high Dissocial Behavior, the higher-order dimension low Extraversion/high Inhibitedness was common across many PDs in adolescents. From a developmental perspective, the adolescent findings indicate smaller degrees of differentiation and specialization of disordered personality compared to adult populations. In a study comparing within-category cohesiveness of PD criteria and between-category criterion overlap of PD categories in small samples of adolescent and adult inpatients, Becker and colleagues (1999) also concluded that PD diagnoses seem to be less sharply differentiated among adolescents. As indicated in the introduction, the more diffuse structure of personality pathology in adolescence may be partly due to the possibility that disordered personality, if present, still is in a developing stage at this age. Also, some behavioral features that are considered indicative of specific types of pathology in adulthood may reflect normative behavior at this developmental stage (e.g., Identity Problems as a feature of Borderline PD). Research has indeed shown that PD symptoms may be more numerous during adolescence than during adulthood (Johnson et al., 2006). Higher overall PD symptom levels may result in higher overlap of these symptoms in adolescents.

Whereas examination of the regression results across the PDs showed uniformity, examination within the PDs provided some differentiation between PDs showing somewhat unique patterns of associations with BFI and DAPP-BQ-A higher-order dimensions. For example, whereas both Antisocial and Borderline PD symptoms displayed a positive relation with DAPP-BQ-A Dissocial Behavior and a negative relation with Compulsivity, Antisocial showed an additional positive relation with Inhibitedness, and Borderline showed an additional positive relation with Emotional Dysregulation. Nevertheless, several PDs that form distinct categories within the *DSM*-system (and even fall within different *DSM*-clusters) showed similar BFI and

DAPP-BQ-A profiles. For example, Paranoid, Obsessive-Compulsive, and Passive-Aggressive PDs were all characterized by high BFI Neuroticism and low Agreeableness. Similarly, Schizotypal, Avoidant, and Depressive PDs were characterized by high DAPP-BQ-A Emotional Dysregulation and high Inhibitedness. Thus, at the higher-order level of the Big Five and Livesley's model, it seemed difficult to differentiate between adolescent PDs.

Regression analyses at the lower-order level of the DAPP-BQ-A yielded interesting findings that could improve the differentiation and understanding of adolescent personality pathology. The analyses showed that specific dimensions of abnormal personality are uniquely and in conceptually meaningful ways related to adolescent PDs. In line with Livesley's definition of PDs, intrapersonal (e.g., Identity Problems) and interpersonal characteristics (e.g., Submissiveness), traits indicating disturbed prosocial behavior (e.g., Callousness), as well as dysfunctional behavioral traits (e.g., Self Harm, Cognitive Distortion) appeared as unique predictors of adolescent PD symptoms, above and beyond variance accounted for by normal personality traits. As indicated before, DAPP-BQ-A Emotional Dysregulation seemed to capture core features of disordered personality not captured by BFI Neuroticism. Lower-order dimensions within this DAPP-BQ-A dimension, such as Identity Problems, Submissiveness, Self Harm, and Cognitive Distortion, may account for the additional value of Emotional Dysregulation. Self Harm appeared as a significant predictor for symptoms of six PDs, thereby possibly functioning as a more common indicator of the severity of personality pathology. However, Self Harm was always accompanied by other more specific characteristics that seemed to be indicators of specific dysfunctional traits within the PDs (e.g., Social Avoidance of Avoidant PD, and Submissiveness of Dependent PD). Similarly, whereas both Paranoid and Obsessive-Compulsive PDs were characterized by high Neuroticism and low Agreeableness within the Big Five, Paranoid was characterized by the Suspiciousness dimension and Obsessive-Compulsive by the Rejection dimension within the lower-order level of Livesley's model. The lower-order dimensions within Livesley's model thus seem to offer a valuable supplement to the higher-order normal personality traits in the differentiation between adolescent PDs.

Limitations and Implications

Several limitations may qualify the findings reported in this paper, the majority of which regard the operationalization of normal and abnormal personality. First, the BFI with its 35 items could have an a priori psychometric disadvantage compared to the 290-item DAPP-BQ-A. The limited number of items could result in restriction of range in a clinical sample due to uniformly high or low scores. However, post-hoc Shapiro-Wilk tests of normality only showed negligible negative skewness for Neuroticism and Openness. Moreover, the incremental contribution of the DAPP-BQ has also been shown in relation to the 240-item NEO-PI-R, suggesting that the additional explained variance can not be ascribed to a larger number of items (Bagby et al., 2005b).

Another limitation regards the psychometric properties of the administered Dutch versions of the BFI and SCID-II. The moderate Cronbach's alphas for two of the BFI dimensions, Agreeableness and Conscientiousness, may qualify conclusions on the differences in predictive power between the DAPP-BQ-A and the BFI. In addition, the consequences of the modifications applied to the BFI-items to ensure age-appropriate assessment were not

investigated. However, it should be noted that only slight modifications were applied. Furthermore, it is noteworthy that the relations between the BFI dimensions and *DSM-IV* PD symptoms found in the present sample were comparable to those found previously between dimensions of FFM-measures and *DSM-IV* PD symptoms in adolescents (De Clercq & De Fruyt, 2003; De Clercq et al., 2004). With regard to the SCID-II, inter-rater reliability estimates were not available. Both research psychologists who administered the interviews were trained extensively by the same experienced diagnostician, before the data collection of the present study started. The first twenty interviews were scored jointly by both interviewers to arrive at consensus scores at the symptom level. Unfortunately, separate scores were not preserved to examine inter-rater reliability.

Third, it may be suggested that the incremental contribution of DAPP-BQ-A over the BFI dimensions in the prediction of PD symptoms could be attributable to criterion contamination. The research that led to the development of the DAPP-BQ was originally intended to validate *DSM* PDs. However, the DAPP-BQ was not designed to assess *DSM* syndromes, and its items do not correspond to *DSM* criteria. The *DSM-III* criteria, argued by Livesley (2006) to have been developed on the basis of informal and unsystematic samplings of clinical opinion rather than systematic definitions of diagnoses, were not adopted but only used to provide a preliminary theoretical taxonomy. A modification of the lexical approach, also used to explicate the Big Five, was used to develop definitions of each PD, and included extensive content analyses of interviews with PD patients and the clinical literature (Livesley, 2006).

A fourth limitation regards the operationalization of normal personality, which did not allow for analyses using the lower-order dimensions of normal personality. Research has demonstrated that analyses at the lower-order level provided substantial increase in specificity and discrimination between PDs as well as richer description of the PDs compared to analyses at the higher-order level (Bagby, Costa, Widiger, Ryder, & Marshall, 2005a; Reynolds & Clark, 2001). This may be particularly true for adolescent PDs, which show somewhat smaller degrees of differentiation than adult PDs. Specific PDs characterized by the same pattern of personality dimensions (for example, in the present sample, Paranoid, Obsessive-Compulsive, and Passive-Aggressive PDs) may be more easily discriminated based on the composing lower-order dimensions. Further research is needed to investigate the relevance of lower-order dimensions of abnormal personality, above and beyond the lower-order dimensions of normal personality. If such research can replicate the conclusions of the present study, the appropriateness of Livesley's (2006) conceptualization of personality pathology for describing PD symptoms will be further underscored.

A final limitation of the present study concerns the criterion against which the explanatory value of the dimensional models was tested. *DSM-IV* based PD descriptions are increasingly criticized (Trull & Durrett, 2005). The prediction of *DSM*-defined PD symptoms should therefore not be the ultimate goal of dimensional models. However, no good alternatives are currently available and the *DSM*-system still is the most widely used taxonomy in research and clinical practice.

Despite these limitations, the present study has several important implications. The findings suggest that a major point of critique on the categorical *DSM*-system in adulthood, that is, the excessive diagnostic overlap among PDs, is equally, possibly even more, applicable in

adolescence. Dimensional models of personality may provide a solution to this problem by allowing traits to be continuously distributed and by including assessment based on trait-continua instead of diagnostic categories.

Another implication concerns theories on the developmental trajectories of temperament, personality, and psychopathology. Shiner and Caspi (2003) presented a conceptual model of possible ways in which temperament/personality and psychopathology are associated. Their taxonomy of temperament/personality in children and adolescents, further elaborated in a subsequent article (Caspi, Roberts, & Shiner, 2005), shows clear correspondence to the Big Five dimensions. However, the present findings suggest that efforts to find empirical support for the developmental trajectories into psychopathology should incorporate dimensions of abnormal personality. This is in line with the proposal of Mervielde et al. (2005) that adaptive and maladaptive personality traits can be integrated in a common dimensional model that can be used to clarify the associations between personality and psychopathology in children and adolescents. Due to the cross-sectional design of the present study, the findings did not provide insight into the developmental course of adolescent disordered personality. Future studies utilizing longitudinal designs, and examining both normal and abnormal personality traits, could offer empirical evidence for the developmental pathways into disordered personality. It seems likely that dimensions of normal personality are informative predictors of later-appearing disordered personality.

From the perspective of the empirical findings presented in the present paper, a supplementary model to describe adolescent disordered personality including higher-order dimensions of normal and abnormal personality seems redundant, since adding dimensions of normal personality to those of abnormal personality offered little extra explanatory value to the model. A practical implication following from this is that diagnostic procedures to assess personality pathology in adolescent clinical settings could be limited to the assessment of abnormal personality. This will result in a smaller burden, valuable especially for patients of younger ages. On the other hand, it may be useful from a clinical perspective to include assessment of normal personality traits to enhance insight in the patient's strengths, beyond the pathological trait characteristics. As Livesley and Jang (2000) stated, 'a definition of personality disorder as a harmful dysfunction requires an understanding of the adaptive functions of personality and how these functions are impaired' (p. 143). Assessment of the abnormal dimensions within Livesley's model, in addition to assessment of normal personality, may improve diagnostic procedures as well as provide specific indications for treatment interventions, through a more complete description of the deviant characteristics of adolescent personality pathology.

In conclusion, the present findings suggest that adolescent PDs are more than extreme, maladaptive variants of higher-order normal personality traits, and encompass characteristics that may be more completely covered by dimensions of abnormal personality. Future studies would be well served by applying longitudinal designs to shed light on the developmental pathways of normal into disordered personality. Finally, future studies may attempt to extend knowledge on adolescent personality pathology by investigating more comprehensive assessment methods including independent assessment of dysfunction and using multiple informants (cf. Clark, 2007).

