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## **DIMENSIONS OF PERSONALITY PATHOLOGY IN ADOLESCENCE: LONGITUDINAL ASSOCIATIONS WITH BIG FIVE PERSONALITY DIMENSIONS ACROSS CHILDHOOD AND ADOLESCENCE**

Alithe L. van den Akker, PhD, Peter Prinzie, PhD, and Geertjan Overbeek, PhD

To investigate validity of the dimensions that underlie pathological personality in adolescence, we delineated the hierarchical structure of the Dimensional Assessment of Personality Pathology–Short Form–Adolescent version (DAPP-SF-A; Tromp & Koot, 2008) and examined longitudinal associations with Big Five personality dimensions assessed four times from middle childhood to late adolescence. A total of 426 adolescents provided self-reports on the DAPP-SF-A (age  $M = 18.6$ ,  $SD = 1.17$ ; 53% female). Mothers provided information on their child's personality eleven, eight, five, and three years earlier. Previous findings on the hierarchical structure of the DAPP-BQ replicated up to the four-component solution (emotional dysregulation, dissocial behavior, inhibition, and compulsivity). In the solution, a thought disturbance component emerged. Interestingly, the five-component solution already showed most differentiated associations with childhood personality in middle childhood. Childhood personality dimensions predicted four out of five adolescent pathological personality traits, indicating continuity of normal and abnormal personality across childhood and adolescence.

Although a categorical model for personality disorder diagnoses was retained in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (*DSM-5*; American Psychiatric Association, 2013), a dimensional trait model was added to Section III for further empirical study, including traits of negative affectivity, antagonism, detachment, compulsivity, and psychoticism. Categorical models of personality disorders are problematic in that diagnostic thresholds are relatively arbitrary, and that they result in excessive comorbidity and heterogeneity of symptoms within disorders (Widiger, 2011). Dimensional models of personality pathology do not introduce these problems, and they have the added advantage of allowing for the integration of models of normal and pathological personality (Krueger, 2005). Further, they fit better within a developmental perspective than categorical models (Shiner, 2009). In this study, we investigate the validity of

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a dimensional model of personality pathology, the Dimensional Assessment of Personality Pathology (DAPP; Livesley & Jackson, & Schroeder, 1989) in late adolescence, by examining longitudinal associations with Big Five personality dimensions across childhood and adolescence.

## CONTINUITY OF NORMAL AND PATHOLOGICAL PERSONALITY

In an integrative model of normal and pathological personality, dimensions of personality pathology may be considered extreme variants of normal personality dimensions, with differences between the two quantitative rather than qualitative (Krueger, 2005). The Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2009) assesses 18 dimensions of personality pathology: affective lability, anxiousness, callousness, cognitive distortions, compulsivity, conduct problems, identity problems, insecure attachment, intimacy problems, narcissism, oppositionality, rejection, restricted expression, self-harming behavior, social avoidance, stimulus seeking, submissiveness, and suspiciousness. Exploratory factor analyses of the 18 lower order scales have mostly provided evidence for a higher-order structure consisting of four factors: emotional dysregulation, dissocial behavior, inhibition, and compulsivity (Bagby, Marshall, & Georgiades, 2005; Bagge & Trull, 2003; Brezo, Paris, Tremblay, Vitaro, & Turecki, 2008; Pukrop, Gentil, Steinbring, & Steinmeyer, 2001; Van Kampen, 2002). A five-factor structure of the DAPP-BQ has also been found. However, rather than that a factor similar to the *DSM-5* psychoticism factor emerges, the dissocial behavior factor splits into two factors: psychopathy and antisocial behavior (Clark, Livesley, Schroeder, & Irish, 1996; Gutiérrez-Zotes et al., 2008; Larstone, Jang, Livesley, Vernon, & Wolfe, 2002; Wang, Du, Wang, Livesley, & Jang, 2004).

The validity of the higher order factors has been demonstrated in their association with personality disorder symptom counts in non-clinical samples (Bagby et al., 2005; Bagge & Trull, 2003) as well as in clinical samples of adults (Kushner, Quilty, Tackett, & Bagby, 2011) and adolescents (Tromp & Koot, 2009). Further evidence for the validity of the DAPP-BQ dimensions comes from studies examining associations with normal personality dimensions. Emotional dysregulation has been shown to be most strongly associated to high neuroticism, dissocial behavior to low agreeableness, inhibition to low extraversion, and compulsivity to conscientiousness (Larstone et al., 2002; Van Kampen, 2006). In addition to indicating the validity of the higher-order structure of the DAPP-BQ, these studies provide evidence for the continuity of normal and abnormal personality structure.

## A DEVELOPMENTAL PERSPECTIVE ON PERSONALITY PATHOLOGY

In addition to allowing for an integration of models of normal and pathological personality, an advantage of dimensional over categorical models of

personality pathology is that they are more congruent with a developmental perspective (Shiner, 2009). Although personality disorders have traditionally been largely neglected in younger populations, likely due to clinicians' fear of stigmatizing youth when diagnosing personality disorders under the age of 18 (De Clercq et al., 2014), evidence showing that personality pathology appears well before adulthood has started to accumulate. Findings indicate that personality disorder symptoms are moderately stable in early adolescence already (for a review, see Tackett, Balsis, Oltmanns, & Krueger, 2009), and studies of dimensional personality pathology structure have revealed a highly similar structure in childhood (De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006) and adolescence (De Clercq et al., 2014; Tromp & Koot, 2010) to the previously described structure in adulthood.

In contrast to research of personality pathology in younger age groups, which has recently begun to accumulate, research on normal personality has provided a large body of evidence indicating that the same five dimensions that describe normal personality in adulthood apply to personality in childhood and adolescence (Mervielde & De Fruyt, 1999; Shiner & Caspi, 2003). In line with the continuity perspective, a pathological personality structure can be hypothesized to develop out of earlier-appearing normal personality traits (Caspi, 2000; Shiner, 2009). Children may start out with a set of five dimensional personality traits which become more extreme through transactional processes that involve environmental reinforcers of the original personality dispositions. These processes may take the form of active selection, or unintentional evocation of and differential response to environments based on personality characteristics, with experiences of these environments subsequently promoting further entrenchment of these initial personality dispositions across development (Caspi, Bem, & Elder, 1989). For instance, maltreatment has been shown to be longitudinally associated to maladaptive personality organization in children, which remained stable into early adolescence (Rogosch & Cicchetti, 2009). Additionally, child personality has been shown to evoke overreactive parenting, which in turn impacted the child's developing personality (Van den Akker, Deković, Asscher, & Prinzie, 2014). Thus, from a developmental perspective, normal personality assessed in childhood can be expected to be associated with later dimensions of personality pathology.

The dimensional model of personality pathology as assessed with the DAPP-BQ has also been extended downward to adolescence. As the original DAPP-BQ is quite extensive, including 290 items, the Dimensional Assessment of Personality Pathology–Short Form was derived from the basic questionnaire, retaining 136 of the original items to assess the same 18 scales (Van Kampen, De Beurs, & Andrea, 2008). For each of the 18 scales, a single unrotated general component was extracted. The items with the highest loadings were identified, and as many items as was necessary to secure sufficient reliability for the scale ( $\alpha > .75$ ) were retained in the short form. An adolescent version of the DAPP-BQ-SF has been developed by modifying the wording of items that proved too difficult for adolescents (e.g., "I am destined for greatness" became "It is on my path to become an important person") and by making items on sexual experience more age appropriate (i.e., including masturbation) (Tromp & Koot, 2008). The four-factor structure of the adolescent version of

the DAPP-BQ has been shown to be highly similar to that of the adult version, with the notable exception that narcissism did not appear to be as clearly differentiated in adolescents (Tromp & Koot, 2008).

Like in adulthood, the four higher order factors have been shown to be associated with the Big Five personality dimensions in adolescence cross-sectionally: emotional dysregulation is associated with higher neuroticism, and lower extraversion and conscientiousness; dissocial behavior with lower agreeableness and conscientiousness, and higher extraversion; inhibition with lower extraversion and agreeableness, and higher neuroticism; and compulsivity with higher conscientiousness as well as openness (Tromp & Koot, 2010). However, although it is clear that both normal and pathological personality are moderately stable from childhood onwards (De Clercq, Van Leeuwen, Van den Noortgate, De Bolle, & De Fruyt, 2009; Roberts & DelVecchio, 2000), it remains unknown whether Big Five personality characteristics assessed as young as middle childhood are longitudinally predictive of adolescent traits of personality pathology.

Previous studies of associations between the DAPP factors and normal personality dimensions in adolescence have first extracted an optimal number of personality pathology components, and subsequently investigated their associations with dimensions of normal personality (Tromp & Koot, 2010). Although this may be a useful approach, personality pathology can also be seen as having a hierarchical structure, where different levels of the hierarchy may be relevant for different outcomes (Tackett, Quilty, Sellbom, Rector, & Bagby, 2008). Kushner, Quilty, Tackett, and Bagby (2011) explored the hierarchical structure of the DAPP-BQ. Following a procedure outlined by Goldberg (2006), they extracted an increasing number of components. Rather than attempting to identify a single optimal number of components, this procedure uncovers how general underlying components can be differentiated into narrower traits. In this hierarchical structure of the DAPP-BQ, incremental predictive validity for personality disorder symptoms of additionally extracted components was found up to a fifth component (Kushner et al., 2011). Delineating the hierarchical structure of the DAPP-SF-A would allow for the investigation of which level of the hierarchy is optimal for representing associations with the Big Five dimensions of normal personality.

## THE CURRENT INVESTIGATION

In this study, we had two aims: (1) to investigate the hierarchical structure of the DAPP-SF-A in adolescence, and (2) to assess the validity of the hierarchical structure of the DAPP-SF-A by examining longitudinal associations between the extracted components and mother reports of Big Five dimensions of normal childhood personality as assessed by the HiPIC when children were 7, 10, 13, and 15 years old. With regard to our first aim, we expected that a general personality pathology component would split into components of emotional dysregulation and dissocial behavior, with components of compulsivity, and inhibition emerging at the next two levels (Bagby et al., 2005; Bagge & Trull,

2003; Brezo et al., 2008; Pukrop et al., 2001; Van Kampen, 2002). At the fifth level, we expected either that a need for approval component would emerge (Kushner et al., 2011) or that the dissocial behavior component would split into two subcomponents: psychopathy and antisocial behavior (Larstone et al., 2002; Wang et al., 2004). With regard to our second aim, we expected that (low) childhood benevolence would be most associated with adolescent dissocial behavior components, that (low) childhood emotional stability would be most associated with adolescent emotional dysregulation components, that (high) childhood conscientiousness would be associated with adolescent compulsivity, and that (low) childhood extraversion would be associated with adolescent inhibition (Tromp & Koot, 2010). As personality is relatively stable from childhood already, we expected that these associations would be apparent from this age on and would remain consistent across late childhood, early adolescence, and mid-adolescence.

## METHOD

### PARTICIPANTS

This study is part of an ongoing longitudinal study on parenting, personality, and development (FSPPD; Prinzie et al., 2003). In 2012 (T5), 426 adolescents provided data on personality pathology dimensions (age $M$  = 18.6 years,  $SD$  = 1.17, range = 17–20 years; 53% female). Adolescents were e-mailed a link to an online questionnaire and were eligible to win one of five tablet computers by participating. For these participants, Big Five personality information was provided by 420 mothers in 2001 (T1, age $M$  = 7.6 years), 399 mothers in 2004 (T2, age $M$  = 10.6 years), 408 mothers in 2007 (T3, age $M$  = 13.6 years), and 391 mothers in 2009 (T4, age $M$  = 15.6 years). At each of these waves, paper-and-pencil questionnaires were mailed to the mothers. Mothers did not receive an incentive for their participation. As Little's MCAR test (Little, 1998) indicated data were missing at random ( $\chi^2(290) = 272.28$ ,  $p = .765$ ), we imputed missing values using Expectation Maximization (Schafer & Graham, 2002).

### MEASURES

#### *Dimensional Assessment of Personality Pathology–Short Form (DAPP-SF-A).*

To assess personality disorder traits, participants provided self-reports on the Dutch translation of the adolescent self-report version of the DAPP-SF-A (Tromp & Koot, 2008). The questionnaire consists of 136 items covering 18 scales: submissiveness (8 items), cognitive distortion (6 items), identity problems (6 items), affective lability (8 items), oppositionality (10 items), anxiousness (6 items), social avoidance (6 items), suspiciousness (8 items), insecure attachment (6 items), narcissism (8 items), self-harm (6 items), stimulus seeking (8 items), callousness (10 items), rejection (8 items), behavioral problems (8 items), restricted expression (8 items), intimacy problems (8 items), and compulsivity (8 items). Items are rated on a five-point Likert-type scale ranging

from 1 (very unlike me) to 5 (very like me). Cronbach's alphas ranged from .71 to .87, with a median of .86.

*Hierarchical Personality Inventory for Children (HiPIC)*. Mothers reported on their child's Big Five personality dimensions by filling out the HiPIC (Mervielde & De Fruyt, 1999). The HiPIC is an empirically derived questionnaire based on an extensive analysis of free parental descriptions of their children. This instrument includes 144 items, 8 items per facet, assessing 18 facets that are hierarchically structured under five higher order domains. The higher order domains are labeled as follows: (1) extraversion (32 items); (2) benevolence, which is closely related to the adult dimension of agreeableness but includes compliance (40 items); (3) conscientiousness (32 items); (4) emotional stability (16 items); and (5) imagination, which is the domain most related to openness to experience in adults, including facets of fantasy, curiosity, and intellect (24 items). Items were rated on a five-point Likert-type scale, ranging from 1 (barely characteristic) to 5 (highly characteristic). The HiPIC's factor structure and high internal consistencies of domains have been established (Mervielde & De Fruyt, 1999). In this study, Cronbach's alphas ranged from .88 to .93, with a median of .91.

## STATISTICAL ANALYSES

We examined the hierarchical structure of the DAPP-SF-A in adolescents, using Goldberg's (2006) Bass-Ackwards method. This method entails extracting an increasing number of components. As previous investigations of the higher order structure of the DAPP-BQ have indicated either a four-component solution (Bagby et al., 2005; Bagge & Trull, 2003; Brezo et al., 2008; Pukrop et al., 2001; Van Kampen, 2002) or a five-component solution (Clark et al., 1996; Gutiérrez-Zotes et al., 2008; Larstone et al., 2002; Wang et al., 2004), and a study extracting more components found incremental validity of the components up to the five-component level (Kushner et al., 2011), we extracted up to five components. For each analysis (i.e., the one-, two-, three-, four-, and five-component solutions), regression-based factor scores are saved and correlated with those from the solution extracting one additional component, that is, the next "level" of the hierarchy. We extracted components through principal components analyses with oblique rotation (oblimin with Kaiser normalization) in SPSS 20. Oblique rotation was chosen as the extracted factors were correlated. For each component, dimensions with loadings greater than |.55| were considered when interpreting the component (Tabachnik & Fidell, 2007). To examine associations between the adolescent personality disorder traits and Big Five personality traits, we performed a series of multiple linear regression analyses predicting the saved factor scores for each level of the DAPP-SF-A hierarchy by maternal reports of the HiPIC. We predicted adolescent self-reported personality pathology dimensions by maternal reports of their child's personality to rule out informant bias. By investigating these associations for four assessments (i.e., middle childhood, late childhood, early adolescence, middle adolescence), we were able to investigate how associations change across childhood and adolescence.

## RESULTS

Descriptives and correlations between the 18 original DAPP-SF-A scales and maternal reports of the HiPIC dimensions at each of the four waves are presented in Table 1.

### HIERARCHICAL COMPONENT ANALYSIS

An initial exploratory analysis indicated that four components had an eigenvalue of greater than 1. However, inspection of the scree plot indicated either a two- or a five-component solution (Figure 1). We extracted components up to level 5 of the hierarchy. Component loadings and amounts of explained variance of the extracted components for each level of the hierarchy are shown in Table 2. For a visual representation of the hierarchical structure of the DAPP-SF-A components and path coefficients between components, see Figure 2.

*Level 1.* At the highest level, where a single personality pathology factor was extracted, all scales of the DAPP-SF-A had significant loadings, except stimulus seeking, rejection, intimacy problems, behavior problems, self-harm, and compulsivity.

*Level 2.* At the second level of the hierarchy, an emotional dysregulation component appeared that was defined by submissiveness, cognitive distortion, identity problems, affective lability, oppositionality, anxiousness, social avoidance, suspiciousness, insecure attachment, self-harm, and restricted expression. The second component was a dissocial behavior component defined by narcissism, stimulus seeking, callousness, rejection, and behavior problems.

*Level 3.* At the third level, the emotional dysregulation (submissiveness, cognitive distortion, identity problems, affective lability, oppositionality, anxiousness, social avoidance, suspiciousness, self-harm, restricted expression) and dissocial behavior components (narcissism, stimulus seeking, callousness, rejection, and behavior problems) were replicated, with the exception that insecure attachment (reversed) now had the highest loadings on the newly extracted component rather than the emotional dysregulation component. The third component was further defined by intimacy problems and compulsivity (reversed), and we called it *inhibition/compulsivity*.

*Level 4.* At the fourth level, the emotional dysregulation and dissocial behavior components were again replicated, and the inhibition/compulsivity component of level three split into two separate components: an inhibition component that was defined by intimacy problems and insecure attachment (reversed), and compulsivity formed a separate component.

*Level 5.* At the fifth level, cognitive distortion and self-harm split off from the *emotional dysregulation* component to form a separate component. As this component also had high loadings of suspiciousness and identity problems and the items of all these facets are related to disturbed thought processes (i.e.,



TABLE 1. Correlations Between the DAPP-SF-A Scales and the HiPIC Dimensions

DAPP-SF-A	M (SD)	Time 1					Time 2				
		HiPIC					HiPIC				
		EXT	BEN	CON	ES	IM	EXT	BEN	CON	ES	IM
Submissiveness	2.28 (.73)	-.15	-.06	-.02	-.15	-.06	-.24	-.05	-.04	-.18	-.07
Cognitive distortion	1.81 (.67)	-.05	-.08	-.05	-.05	-.05	-.05	-.09	-.10	-.03	-.05
Identity problems	2.12 (.87)	-.02	-.05	-.03	.00	.03	-.11	-.05	-.03	-.10	.03
Affective lability	2.48 (.83)	-.01	-.09	-.02	-.10	-.00	-.00	-.08	-.01	-.13	.03
Oppositionality	2.40 (.71)	-.05	-.12	-.13	-.04	-.01	-.06	-.09	-.16	-.00	.02
Anxiousness	2.48 (.90)	-.06	-.09	-.01	-.14	.03	-.10	-.06	.02	-.21	.06
Social avoidance	2.16 (.85)	-.14	-.11	-.02	-.08	.01	-.22	-.10	-.04	-.12	.05
Suspiciousness	1.89 (.68)	.02	-.09	-.04	-.05	.04	-.08	-.11	-.06	-.11	.04
Insecure attachment	2.41 (.94)	.01	.08	.07	-.04	-.01	-.00	-.01	.11	-.04	.01
Narcissism	2.50 (.71)	.06	-.12	.06	.02	.12	.12	-.10	.07	.08	.15
Self-harm	1.22 (.50)	-.07	-.01	-.05	-.07	-.06	-.10	-.05	-.05	-.10	-.05
Stimulus seeking	2.52 (.79)	.13	-.13	-.05	.05	.05	.13	-.14	-.10	.08	.00
Callousness	1.96 (.60)	.07	-.15	-.01	.07	.09	.07	-.18	-.06	.14	.06
Rejection	2.62 (.71)	.14	-.15	.04	.14	.11	.21	-.17	.02	.16	.11
Behavior problems	1.60 (.52)	.04	-.13	-.06	.04	-.04	.00	-.14	-.16	-.01	-.09
Restricted emotional expression	2.47 (.83)	-.20	-.18	-.07	-.06	-.03	-.27	-.15	-.13	-.11	-.03
Intimacy problems	2.30 (.70)	-.07	-.03	-.13	.01	-.04	-.07	-.04	-.16	-.02	-.02
Compulsivity	2.70 (.76)	-.04	-.08	.14	-.08	.04	-.04	-.05	.17	-.12	.04
M		3.64	3.45	3.38	3.46	3.87	3.52	3.50	3.35	3.42	3.78
(SD)		(.50)	(.43)	(.50)	(.62)	(.57)	(.51)	(.40)	(.52)	(.62)	(.57)

TABLE 1. (continued)

DAPP-SF-A	HIPIC									
	Time 3					Time 4				
	EXT	BEN	CON	ES	IM	EXT	BEN	CON	ES	IM
Submissiveness	<b>-.28</b>	-.01	-.03	<b>-.21</b>	-.10	<b>-.27</b>	-.04	.01	<b>-.23</b>	-.07
Cognitive distortion	-.09	-.07	-.06	-.09	-.07	-.10	-.10	-.04	-.09	-.06
Identity problems	<b>-.18</b>	-.06	-.02	-.15	-.01	<b>-.21</b>	-.07	.00	<b>-.19</b>	-.00
Affective lability	-.05	-.08	.06	<b>-.21</b>	-.01	-.10	-.11	.06	<b>-.22</b>	-.02
Oppositionality	-.15	-.16	<b>-.28</b>	-.02	-.06	-.15	<b>-.19</b>	<b>-.30</b>	-.05	-.08
Anxiousness	-.13	-.06	.09	<b>-.24</b>	.03	<b>-.18</b>	-.07	.09	<b>-.26</b>	.03
Social avoidance	<b>-.30</b>	-.11	-.03	<b>-.19</b>	-.01	<b>-.32</b>	-.08	.03	<b>-.18</b>	-.01
Suspiciousness	-.13	-.15	-.06	-.17	-.00	-.17	-.15	-.01	<b>-.19</b>	-.03
Insecure attachment	-.02	-.01	.09	-.10	-.00	-.05	-.03	.07	-.12	-.01
Narcissism	.06	-.12	.07	.00	.08	.09	-.14	.06	.01	.06
Self-harm	-.12	-.02	-.04	-.07	-.08	<b>-.19</b>	-.08	.00	.10	-.07
Stimulus seeking	.13	-.12	-.16	.13	.00	-.12	<b>-.22</b>	<b>-.19</b>	.14	-.04
Callousness	.01	<b>-.18</b>	-.10	.12	.02	.02	<b>-.24</b>	-.09	.15	-.01
Rejection	.17	<b>-.18</b>	.01	.14	.11	<b>.18</b>	<b>-.22</b>	-.04	<b>.18</b>	.05
Behavior problems	-.03	-.17	<b>-.24</b>	.02	-.12	-.01	<b>-.26</b>	<b>-.25</b>	.08	-.12
Restricted emotional expression	<b>-.34</b>	-.14	-.13	-.10	-.06	<b>-.38</b>	-.13	-.10	-.14	-.07
Intimacy problems	-.10	-.06	<b>-.11</b>	-.07	.04	-.12	-.06	-.08	-.06	-.04
Compulsivity	-.03	-.00	<b>.27</b>	.12	.04	-.08	.02	<b>.28</b>	-.13	.02
M	3.43	3.44	3.27	3.43	3.63	3.35	3.44	3.24	3.52	3.54
(SD)	(.53)	(.42)	(.55)	(.65)	(.58)	(.55)	(.40)	(.56)	(.61)	(.58)

Note. EXT = extraversion; BEN = benevolence; CON = conscientiousness; ES = emotional stability; IM = imagination. Correlations > |.17| are significant at  $p < .0001$  (significance level after Bonferroni correction) and are indicated in bold.

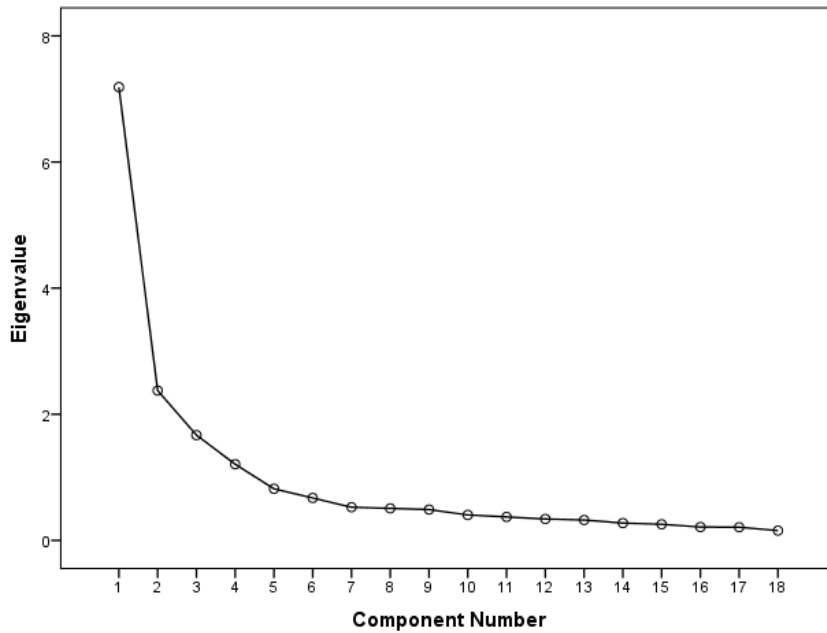


FIGURE 1. Scree plot of the principal component analysis of the 18 dimensions of the DAPP-SF-A.

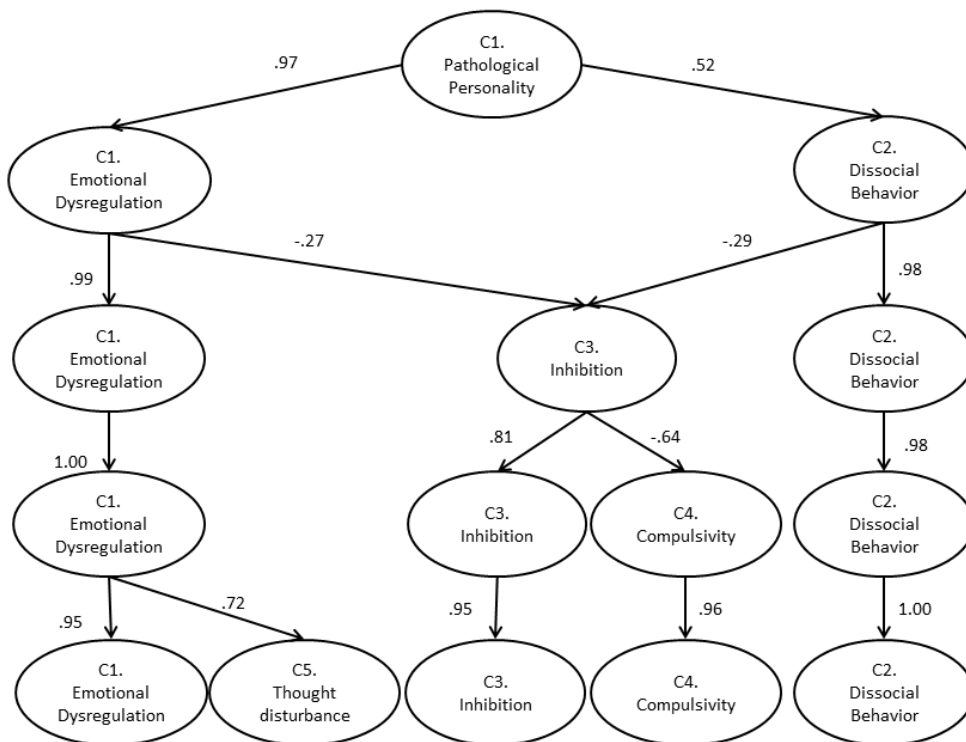


FIGURE 2. Hierarchical structure of the DAPP-SF-A.

TABLE 2. Oblimin-Rotated Principal Component Factor Loadings for the Scales of the DAPP-SF-A

	Level 1		Level 2			Level 3			Level 4			Level 5		
	C1	C2	C1	C2	C3	C1	C2	C3	C1	C2	C3	C4	C5	
Submissiveness	.76	.12	.82	.13	-.17	.83	.15	-.13	.04	.83	.12	-.37	.09	.47
Cognitive distortion	.77	.33	.76	.34	-.20	.76	.35	-.18	-.02	.64	.31	-.42	.03	.67
Identity problems	.82	.22	.86	.25	-.13	.86	.26	-.10	-.03	.82	.22	-.37	.03	.62
Affective lability	.77	.28	.74	.24	-.46	.76	.27	-.41	.16	.63	.24	-.63	.20	.56
Oppositionality	.66	.45	.62	.51	.05	.63	.44	-.17	-.45	.66	.42	-.34	-.43	.31
Anxiousness	.81	.21	.81	.17	-.46	.82	.22	-.36	.24	.72	.19	-.59	.28	.52
Social avoidance	.78	.10	.86	.14	-.05	.86	.17	.07	.08	.90	.14	-.19	.14	.48
Suspiciousness	.81	.37	.80	.39	-.14	.80	.44	.05	.16	.76	.41	-.21	.21	.59
Insecure attachment	.58	.21	.52	.13	-.58	.54	.15	-.64	.13	.43	.13	-.76	.15	.32
Narcissism	.60	.46	.38	.64	-.55	.40	.71	.36	.31	.37	.72	-.45	.30	.16
Self-harm	.52	.13	.58	.20	.16	.57	.20	.23	-.08	.37	.15	-.02	.00	.90
Stimulus seeking	.40	.23	.20	.78	-.06	.21	.74	-.19	-.33	.19	.73	-.25	-.35	.13
Callousness	.57	.41	.38	.81	-.09	.39	.84	.06	.01	.38	.83	-.07	.01	.30
Rejection	.33	.13	.06	.75	-.39	.07	.81	-.18	.24	.04	.82	-.20	.22	.04
Behavior problems	.44	.29	.30	.75	.19	.30	.69	.06	-.44	.25	.67	-.06	-.43	.39
Restricted emotions	.69	.19	.74	.23	-.01	.73	.26	.14	.08	.82	.24	-.08	.12	.34
Intimacy problems	-.10	-.02	.08	-.18	.66	.05	-.18	.83	-.06	.12	-.20	.75	-.01	.22
Compulsivity	.39	.40	.15	.33	.04	.34	.19	-.15	.82	.30	.20	-.24	.83	.16
R <sup>2</sup>		40%	13%	40%	13%	9%	13%	9%	7%	40%	13%	9%	7%	5%

Note. Factor loadings greater than or equal to .155 | appear in bold. Cross-loadings of  $\geq .155$  | are underlined.

resembling depersonalization, derealization, and suicidal ideation), we called this factor *thought disturbance*. The dissocial behavior, compulsivity, and inhibition components were replicated, with a difference that affective lability now had equally strong loadings on the emotional dysregulation and inhibition components, albeit in the opposite direction (i.e., a negative loading for the inhibition component and a positive loading for the emotional dysregulation component).

#### ASSOCIATIONS BETWEEN DAPP-SF-A COMPONENTS AND CHILDHOOD PERSONALITY DIMENSIONS

To assess associations of the DAPP-SF-A components with childhood HiPIC dimensions, we performed multiple linear regression analyses predicting each component at each level of the hierarchy (Table 3). At the highest level of the hierarchy, where all lower order dimensions load on a single component, the amount of variance explained by the HiPIC dimensions was not significant in middle childhood. In late childhood, high imagination was significantly associated, whereas in early and middle adolescence, low extraversion was associated. In middle adolescence, low benevolence also became predictive of this general factor. Overall, associations were not very consistent, and the percentages of explained variance were small.

At the second level, the HiPIC dimensions predicted a significant amount of variance in the DAPP-SF-A dissocial behavior component across all ages. Children who were less benevolent and more extraverted were higher on the dissocial behavior dimension in late adolescence. From late childhood on, high emotional stability also became predictive of this component. The emotional dysregulation component was not predicted by any of the HiPIC dimensions in middle childhood. From late childhood on, low extraversion became associated with this component, and from early adolescence on, the expected association with low emotional stability also emerged.

At the third level of the hierarchy, the HiPIC dimensions explained a significant amount of variance in two of the three DAPP-SF-A components in middle childhood: dissocial behavior and inhibition. Children who were less benevolent and more emotionally stable in childhood had higher levels of dissocial behavior, and children who were less extraverted and conscientious, and more emotionally stable, scored higher on the inhibition/compulsivity component. These associations replicated across assessments, and from late childhood on, high extraversion also became predictive of the dissocial behavior component. Again, none of the HiPIC dimensions were predictive of the emotional dysregulation component in early childhood, but from late childhood on, low extraversion and high imagination became predictive of this component. Again, from early adolescence, the association with low emotional stability emerged. The inhibition/intimacy problems component was consistently related to low extraversion and conscientiousness, and high emotional stability, from middle childhood up to middle adolescence.

At level four, associations between the HiPIC dimensions and the emotional dysregulation and dissocial behavior components were highly similar to those at levels 2 and 3. Some exceptions include associations between high

**TABLE 3. Results of Regression Analyses Predicting Each of the Extracted Late Adolescent Pathological Personality Components at Each Level of the Hierarchy, by Maternal Reports of Personality Dimensions in Childhood**

	Level 1			Level 2			Level 3			Level 4			Level 5				
	C1	C2	C3	C1	C2	C3	C1	C2	C3	C1	C2	C3	C1	C2	C3	C4	C5
EXT T1	-.04	.14*	-.12*	-.11	.11	-.12*	-.10	.11	-.15*	.00	.12*	-.12*	-.16**	.12*	-.12*	-.01	.01
BEN T1	-.12*	-.22**	.06	-.06	-.24**	-.02	-.06	-.24**	-.02	-.07	-.24**	-.00	-.08	-.24**	-.00	-.07	.01
CONST1	-.01	.03	-.25**	-.06	-.02	-.25**	-.05	.01	-.17**	.22**	.02	-.15*	-.09	.02	-.15*	.21**	-.03
EST1	-.04	.09	.11*	-.06	.10	.11*	-.06	.10	.11*	-.07	.10	.12*	-.02	.10	.12*	-.08	-.06
IMAG T1	.07	.01	.07	.08	.03	.07	.08	.03	.10*	-.01	.03	.07	.14*	.03	.07	-.01	-.04
R <sup>2</sup>	.02	.07**	.05**	.03	.07**	.05**	.02	.07**	.03*	.04**	.07**	.03	.04**	.07**	.03	.04**	.01
EXT T2	-.09	.18**	-.16**	-.19**	.14*	-.16**	-.18**	.14*	-.08**	.03	.15**	-.12*	-.26**	.15**	-.12*	.02	-.03
BEN T2	-.10	-.24**	.09	-.03	-.25**	.09	-.03	-.25**	.01	-.08	-.25**	.02	-.03	-.25**	.02	-.07	-.02
CONST2	-.04	-.02	-.32**	-.08	-.09	-.32**	-.07	-.04	-.22**	.29**	-.04	-.19**	-.13*	-.04	-.19**	.28**	-.04
EST2	-.06	.15**	.13*	-.10	.15**	.13*	-.10	.15**	.10	-.14*	.16**	.12*	-.06	.16**	.12*	-.16**	-.11
IMAG T2	.12*	-.02	.06	.16*	.00	.06	.15*	.01	.11	.01	.01	.06	.21**	.01	.06	.02	.02
R <sup>2</sup>	.03*	.05**	.08**	.06**	.10**	.08**	.06**	.09**	.05**	.08**	.10**	.04**	.08**	.10**	.04**	.08**	.02
EXT T3	-.15**	.17**	-.16**	-.25**	.13*	-.16**	-.24**	.13*	-.19**	.01	.13*	-.12*	-.33**	.13*	-.12*	-.01	-.04
BEN T3	-.09	-.25**	.11*	-.01	-.27**	.11*	-.01	-.27**	.02	-.10*	-.27**	.02	-.01	-.27**	.02	-.09	.01
CONST3	-.02	-.07	-.38**	-.04	-.16**	-.38**	-.03	-.08	-.17**	.46**	-.07	-.15*	-.10	-.07	-.15*	.46**	.01
EST3	-.10	.16**	.11*	-.15**	.18**	.11*	-.15**	.16**	.08	-.12*	.17**	.12*	-.12*	.17**	.12*	-.14**	-.12*
IMAG T3	.11	-.00	.10	.14**	.03	.10	.13*	.02	.09	-.06	.02	.06	.21**	.02	.06	-.06	-.03
R <sup>2</sup>	.05**	.08**	.13**	.09**	.12**	.13**	.09**	.10**	.05**	.17**	.10**	.04**	.13**	.10**	.04**	.18**	.02
EXT T4	-.18**	.19**	-.18**	-.29**	.14*	-.18**	-.28**	.13*	-.23**	.01	.15**	-.14*	-.36**	.15**	-.14*	-.02	-.11
BEN T4	-.17**	-.32**	.10	-.07	-.34**	.10	-.07	-.34**	.01	-.08	-.34**	.04	-.05	-.34**	.04	-.08	-.09
CONST4	.04	-.04	-.35**	.01	-.11	-.35**	.02	-.02	-.10	.49**	-.02	-.11	-.06	-.02	-.11	.50**	.08
EST4	-.08	.17**	.12*	-.14**	.20**	.12*	-.14**	.18**	.11*	-.10	.19**	.15**	-.11*	.19**	.15**	-.11*	-.10
IMAG T4	.11	-.04	.12	.15*	-.02	.12	.15*	-.02	.08	-.11	-.03	.04	.22**	-.03	.04	-.10	-.01
R <sup>2</sup>	.07**	.11**	.11**	.12**	.17**	.11**	.12**	.15**	.05**	.18**	.15**	.03*	.14**	.15**	.03*	.19**	.04**

Note. C1 = Emotional Dysregulation, C2 = Dissocial Behavior, C3 = Inhibition, C4 = Compulsivity, C5 = Thought Disturbance. \* $p < .05$ . \*\* $p < .01$ .

emotional stability and dissocial behavior, which were not significantly associated in middle childhood. The inhibition component was again consistently associated with low extraversion. The associations with low conscientiousness in middle and late childhood and in early adolescence were replicated, but conscientiousness was no longer significantly associated in middle adolescence, and emotional stability was no longer associated in middle childhood and early adolescence. The additional component of compulsivity was already significantly associated with high conscientiousness in middle childhood, and this association replicated across all assessments. Associations of compulsivity with low emotional stability were inconsistent across assessments, with significant associations in late childhood and early adolescence, but not in middle childhood and middle adolescence. Finally, compulsivity was associated with low benevolence in early adolescence only.

In contrast to the previous levels, at level five the emotional dysregulation was already associated with the HiPIC dimensions in middle childhood: Children who were less extraverted and more imaginative were more emotionally dysregulated in adolescence. These associations replicated across assessments/ages. However, at this level we again found that low emotional stability did not become associated with emotional dysregulation before early adolescence. Similar to previous levels, the dissocial behavior component was already associated with lower benevolence in middle childhood, and these associations replicated across ages. In contrast to previous levels, the dissocial behavior component was now also already associated with high extraversion in middle childhood. The inhibition component was associated with low extraversion and conscientiousness consistently across assessments. Additionally, this component was now significantly associated with higher emotional stability at all assessments. The compulsivity component was again consistently associated with high conscientiousness at all ages. Low emotional stability became associated with this component from late childhood on, and the negative association between compulsivity and benevolence in early adolescence disappeared. The thought disturbance component was not significantly associated with any of the HiPIC dimensions at any of the assessments.

Overall, the associations between the HiPIC dimensions and the one-, two-, three-, and four-component solutions were more replicable from late childhood to later ages than they were in middle childhood. However, when we examined associations between the HiPIC dimensions and the five-component solution, we found much the same associations in middle childhood as across later ages.

## DISCUSSION

In this study, we investigated the hierarchical structure of personality pathology as assessed by the DAPP-SF-A in a community sample of adolescents. We extracted up to five components and mostly replicated the hierarchical structure of personality pathology up to level four (Kushner et al., 2011), whereas a thought disturbance component emerged at level five. Additionally, validity of

four out of five DAPP-SF-A personality pathology components was confirmed by associations with HiPIC personality dimensions as reported by mothers for middle childhood, late childhood, and early and mid-adolescence (11, 8, 5, and 3 years prior to the late adolescent assessment of personality pathology). The five factors appeared to line up best with level five of the hierarchy, where the HiPIC dimensions were consistently associated with four out of five DAPP-SF-A components from middle childhood on.

#### HIERARCHICAL FACTOR STRUCTURE OF DAPP-SF-A

Up to level four, the factor structure of the DAPP-SF-A was highly similar to that of the DAPP-BQ (Kushner et al. 2011). The general personality pathology factor first split into an emotional dysregulation component and a dissocial behavior component. At the next level, an inhibition component appeared, and a compulsivity component emerged at level four. At level four, the factor structure of the DAPP-SF-A in adolescents was highly similar to that found in previous investigations of the DAPP-SF in adults (De Beurs, Rinne, Van Kampen, Verheul, & Andrea, 2009), as well as the DAPP-BQ in adults (Bagby et al., 2005; Bagge & Trull, 2003) and adolescents (Tromp & Koot, 2008).

Next to these similarities, there were also some differences worth noting, especially with regard to the content of the inhibition component. This component usually includes restricted expression of emotions (Bagge & Trull, 2003; Kushner et al., 2011; Tromp & Koot, 2008), which loaded on the emotional dysregulation component in this study. However, as in our study of the Dutch DAPP-SF-A, restricted expression also loaded on the emotional dysregulation component in an investigation of the Dutch DAPP-BQ (Van Kampen, 2002). Also, similar to a previous study of the DAPP-BQ (Bagge & Trull, 2003), we found a negative loading of insecure attachment on the inhibition component. The negative loading of the insecure attachment scale indicates that the component we found is more related to a disinterest in forming and maintaining close relationships, a feature of schizoid personality disorder, than to inhibition in interaction with others despite a desire for contact. Thus, although the content is similar to previously found inhibition components, it may better be described as *asociality*, a label given to a factor that emerged from a joint factor analysis of normal and abnormal personality dimensions and personality disorder symptoms (Gutiérrez, Vall, Peri, Gárriz, & Garrido, 2014). This factor was defined (among others) by the inhibition component of the DAPP and schizoid personality disorder.

Another important deviation from previous studies is the content of the fifth component. In our study, the dissocial behavior did not split into two components at level five. Rather, a thought disturbance component emerged. Interestingly, this component at first glance appears to be in line with the dimensional model proposed for *DSM-5*, with a fifth component of psychoticism to assess cognitive-perceptual aberrations (Trull & Widiger, 2013). In fact, the hierarchical structure across all five levels is similar to the hierarchical structure of personality pathology as assessed by the Personality



Inventory for *DSM-5* (Wright et al., 2012). However, it should be noted that eccentricity is an important aspect of psychoticism, but is not covered by the DAPP-SF-A.

#### VALIDITY OF THE DAPP-SF-A COMPONENTS: ASSOCIATIONS WITH NORMAL PERSONALITY ACROSS DEVELOPMENT

Contemporary models of the etiology of adolescent and adult personality pathology posit that dimensions of personality pathology find their developmental origins in normal childhood personality dimensions (Shiner, 2009; Tackett et al., 2009). These earlier appearing individual differences may develop into more extreme, pathological traits through experiences that promote continuity of original personality vulnerabilities. For instance, children with a vulnerable personality disposition may develop insecure attachment representations and maladaptive coping strategies as a result of negative rearing experiences, ultimately resulting in personality pathology (McAdams & Pals, 2006). In this study, the DAPP-SF-A personality pathology factors were indeed predicted by childhood personality dimensions as reported by mothers across childhood and adolescence.

By first delineating the hierarchical structure of the DAPP-SF-A across several levels, we were able to investigate which level of the hierarchy lined up best with the five HiPIC personality dimensions. Results indicated that although the fifth component was not associated with any of the personality dimensions, the other four components were most consistently associated with the HiPIC dimensions at level five of the personality pathology hierarchy. Discussion of the findings on these associations will center mostly around this level.

Overall, we expected the strongest and most consistent associations with low emotional stability, as previous cross-sectional studies of adolescents (Tromp & Koot, 2010) and adults (Larstone et al., 2002; Wang et al., 2004) have found. However, results of the present study indicate that emotional stability was not associated with the general personality pathology factor and only became associated with the emotional dysregulation component in adolescence. Our findings may reflect the fact that emotional stability is not as differentiated from the other factors as extraversion before age 15 (Soto, John, Gosling, & Potter, 2008). Additionally, extraversion is more stable than emotional stability in children under the age of 12 (De Fruyt et al., 2006; Prinzie & Deković, 2008). More research is necessary to investigate how emotional stability comes to be associated with emotional dysregulation across development.

Low benevolence in children as young as age 7 predicted higher scores on the dissocial behavior component in late adolescence. These associations were replicated when children were 10, 13, and 15 years old. It has been noted that most evidence for emergence early in development exists for antisocial personality disorder, which is strongly linked to low benevolence, and has a childhood diagnostic counterpart in conduct disorder (Lynam & Gudonis, 2005). In addition to low benevolence, dissocial behavior was

associated with high extraversion from middle childhood on. High extraversion has previously been associated with the disagreeableness factor in adolescence, suggesting that this trait may be broader than the adult trait (De Clercq et al., 2006). Although emotional stability is usually not found to be associated (De Clercq et al., 2006; Tromp & Koot, 2010; Van Kampen, 2006), it became associated in late childhood, and associations remained across adolescence, indicating that this component is more broadly associated with the more general profile of antisocial personality disorder than with pure dissocial behavior.

The inhibition and compulsivity components were also consistently associated with the normal personality dimensions across development. Replicating previous cross-sectional findings in adolescents (De Clercq et al., 2006; Tromp & Koot, 2010), higher scores on the inhibition component were associated with low extraversion, and higher scores on the compulsivity component were associated with high conscientiousness. Results of this study add to the literature by showing that compulsivity and inhibition are already foreshadowed by high conscientiousness and extraversion in middle childhood, and consistently so across adolescence. Additionally, the inhibition component was consistently associated with emotional stability. However, in our study, higher emotional stability was associated with higher inhibition, whereas in previous studies, associations with lower emotional stability were found (Larstone et al., 2002; Tromp & Koot, 2010). Discrepancies are likely due to the aforementioned differences in the specific content of the inhibition factor. Our inhibition factor reflects a disinterest in forming close relationships, a feature of schizoid personality disorder, which may be linked more to high emotional stability than to inhibition in interaction with others, despite a desire for contact, which may be linked more to low emotional stability. Theoretical accounts have indicated that schizoid personality disorder should be associated to high emotional stability due to the low levels of anger-hostility and low self-consciousness that characterize this disorder (Trull & Widiger, 2013). However, empirical findings have been inconsistent both with evidence for associations with low emotional stability (Blais, 1997) and with high emotional stability (Coolidge et al., 1994).

The fifth factor, thought disturbance, was not associated with any of the personality dimensions across development. Although a fifth psychoticism factor of personality pathology has been proposed to be in line with the normal personality dimension of openness, as of yet, empirical evidence for congruence in this domain has been least consistent. A meta-analysis of associations between personality disorder and the five personality dimensions did not find evidence for an association with openness (O'Connor, 2005), but a meta-analysis investigating associations at the facet level did find associations between facets of openness and schizotypal personality disorder (Samuel & Widiger, 2008). It should also be noted that the fifth domain in childhood has been labeled imagination rather than openness to experience, due to dissimilarities in content. The childhood domain, assessing creativity, curiosity, and intellect, appears mostly related to emotional dysregulation in this study. However, although validity of the fifth factor as found in this study may be

questioned by the lack of associations with normal personality dimensions, it is important to note that the other four factors were mostly consistently associated with their expected normal personality counterparts at this level, indicating the utility of delineating multiple higher order levels in a hierarchical analysis.

Overall, the associations between the childhood Big Five personality dimensions and late adolescent pathological personality dimensions in this study mostly provide evidence for the continuity between normal and pathological personality across development (Shiner, 2009): Dissocial behavior may find its developmental origins in extremely low benevolence, and inhibition may develop out of low extraversion and compulsivity out of extremely high conscientiousness. However, some evidence for discontinuity from childhood to adolescence was also found: The emotional dysregulation factor was consistently associated with low extraversion and high imagination from middle childhood on, but only became associated with low emotional stability, its most likely developmental antecedent, in adolescence.

## STRENGTHS AND LIMITATIONS

This study has several strengths. First, ratings of the childhood Big Five personality dimensions were obtained from the mother, whereas DAPP-SF-A dimensions were provided by the adolescents themselves. We could thus rule out informant bias as an explanation for the associations. Second, we longitudinally investigated the developmental continuity of normal and pathological personality by modeling associations spanning more than a decade.

In addition to these strengths, some limitations are also worth mentioning. First, we studied dimensions of personality pathology in a non-clinical sample. The dimensional model implies that pathological personality can be studied in normal populations, as differences between normal and clinical samples are assumed to be differences of degree rather than differences in kind. In other words, normal populations score lower on the pathological personality dimensions, but are not expected to be characterized by a different underlying structure of pathological personality. However, because of limited variance in the pathological personality dimension in a non-clinical sample, associations between normal and pathological personality dimensions may have been underestimated in our study. Thus, replication of the present findings in clinical samples may add further support to the findings.

## CONCLUSION

The hierarchical structure of the DAPP-SF-A that we found in this study replicates previous findings up to the four-component solution, indicating that this personality structure is stable across populations. Further, the validity of the structure was supported by associations of the personality pathology components with childhood Big Five personality traits, providing evidence for a developmental model in which personality pathology dimensions develop out of earlier-appearing normal personality traits.

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