

Internalizing and Externalizing Problem Behavior in Children with Nocturnal and Diurnal Enuresis: A Five-Factor Model Perspective

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Objectives To describe personality traits, internalizing, and externalizing problems of 6- to 12-year-old children with nocturnal and diurnal enuresis, examining differences from healthy referents, and investigating the association between personality traits and problem behavior. **Methods** Eighty-five children with combined nocturnal and diurnal enuresis were compared with 56 children with nocturnal enuresis and 155 healthy children on personality characteristics and problem behavior. **Results** Post hoc analyses of multivariate analyses indicated that parents of children with combined nocturnal and diurnal enuresis reported on average lower conscientiousness and higher neuroticism scores in their children than parents of healthy children, although the magnitude of these differences was moderate. Considerable differences in mean scores were found for the Child Behavior Checklist (CBCL) total problem scale and moderate differences for internalizing, externalizing, and attention deficit hyperactivity disorder (ADHD) problems in children with nocturnal and diurnal enuresis compared with healthy referents. Regression analyses across enuretic and healthy groups demonstrated that personality trait and problem behavior scales share substantial variance. **Conclusion** Moderate to substantially higher levels of problem behavior is demonstrated in children with nocturnal and diurnal enuresis, who also display slightly higher neuroticism and lower conscientiousness scores.

Key words behavior problems; children; enuresis; personality.

Enuresis is defined in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV; American Psychiatric Association, 1994) as “repeated voiding of urine into bed or clothes at age 5 or older, with a frequency of twice a week during three consecutive months” (p. 109). Three subtypes are distinguished: nocturnal enuresis, diurnal enuresis, and a combined type. Enuresis is a common problem in childhood, with a prevalence of 3% for females and 7% for males at the age of 5 (DSM-IV; American Psychiatric Association, 1994). Combined nocturnal and diurnal enuresis affects 8% of 10- to 12-year-old Belgian children (Bakker, van Sprundel, van der Auwera, van Gool, & Wyndaele, 2002).

Given the rising prevalence of nocturnal and diurnal enuresis in childhood, this study attempts to explore whether these children differ in psychological outcomes from their healthy peers. Although some researchers argue that childhood enuresis is unrelated to psychopathology (Hirasing, van Leerdam, Bolk-Bennink, & Bosch, 1997; Wille & Anveden, 1995), there is growing evidence suggesting that children with nocturnal and diurnal enuresis do experience more behavioral maladjustment compared with population norms, including both internalizing and externalizing problem behavior (Byrd, Weitzman, Lanphear, & Auinger, 1996; Hjalmas et al., 2004; Kodman-Jones, Hawkins, & Schulman,

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2001; Lettgen et al., 2002) and attention deficit hyperactivity disorder (ADHD) (Baeyens et al., 2004; Robson, Jackson, Blackhurst, & Leung, 1997). Moreover, children with combined nocturnal and diurnal enuresis are particularly at risk for developing problem behavior compared with children who suffer from nocturnal enuresis. In addition, low socioeconomic status (SES) was found to be a risk factor for the development of enuretic problems (Mark & Frank, 1995; Steinhausen & Göbel, 1989) and psychopathology in general (Campbell, 1995), but has recently been described as a common factor underlying the association of the two conditions (Van Hoecke, Baeyens, Vande Walle, Hoebeke, & Roeyers, 2003).

Although several studies have examined the psychopathological aspects of childhood enuresis, it remains unclear whether these children differ in personality characteristics from their healthy peers. A few researchers have described children with enuresis as having high motor activity, being more aggressive, experiencing multiple neurotic symptoms, and having low achievement motivation and self-confidence (Kaffman & Elizur, 1977; Moilanen, Järvelin, Vikevaainen-Tervonen, & Hunttunen, 1987; Srivastava, Nigam, & Sing, 1982). However, none of these studies has studied personality traits in enuretic children systematically by using a comprehensive and widely accepted model of personality differences.

In recent decades, trait psychologists have reached a consensus on the validity of the so-called Five-Factor Model (FFM) or Big Five as the most common denominator underlying trait differences in adults (McCrae & John, 1992), but also in adolescence and childhood (De Clercq, De Fruyt, Koot, & Benoit, 2004; Shiner & Caspi, 2003). The five basic dimensions of this model are usually labeled as neuroticism (emotional stability), extraversion, openness to experience (imagination), agreeableness (benevolence), and conscientiousness. Brieger, Sommer, Bloeink, and Marneros (2001) were the first to adopt the FFM to study traits in adults who experienced psychiatric problems in childhood and suffered from enuresis. No differences in adulthood were observed compared with a group of former psychiatric patients without enuresis. However, it is unclear whether trait scores of patients with enuresis at younger ages are different from those of children without enuresis problems. This study is the first to examine personality characteristics in young children with nocturnal and diurnal enuresis by using a comprehensive FFM measure that is specifically designed to assess childhood personality. The purposes of this study are to examine

personality characteristics and problem behavior in two different groups of children with enuretic problems, that is, nocturnal versus combined nocturnal/diurnal enuresis, relative to a healthy control group, and to explore associations between personality and problem behavior after controlling for sociodemographic variables (age, gender, and SES). We hypothesized significantly different trait scores in a less favorable direction, that is, lower scores for conscientiousness and benevolence and higher scores for neuroticism and for both groups of enuretic children compared with healthy referents (Kaffman & Elizur, 1977; Moilanen et al., 1987; Srivastava et al., 1982). Secondly, we expected elevated levels of ADHD symptoms and internalizing and externalizing problem behavior in children with combined enuresis (Baeyens et al., 2004; Kodman-Jones et al., 2001) compared with children suffering from nocturnal enuresis. Finally, we hypothesized conscientiousness and benevolence to be negatively associated with externalizing problems and ADHD symptoms, extraversion to be positively associated with externalizing problems, and neuroticism to be positively correlated with internalizing problems (De Fruyt, Mervielde, & Van Leeuwen, 2002).

Method

Participants and Procedure

Participants were children with diurnal and/or nocturnal enuresis who were consulting an outpatient enuresis clinic of a large university hospital. Between January and December, 2000, 643 children were screened by using a noninvasive standardized medical screening procedure. The sample is a random selection of children with enuretic problems, because the pediatric uro-nephrologic unit is visited by children from all over Flanders. At the first consultation, the pediatric nephrologist informed the parents about the research project [approved by the University Hospital's Ethical Committee (1999/43)] and invited them to participate. After written informed consent was obtained, a research associate requested parents to complete a set of psychological inventories during the hospital visit. Parents were given detailed instructions about how to complete questionnaires and were assured that all information would be treated as confidential, serving only research purposes. All participants could contact the researchers for additional information or to express concerns. Families were not reimbursed, but received a report of the assessment.

In sum, 180 children were eligible, but 13 parents refused participation. Children with anatomical or neurological abnormalities ($N = 3$), mental retardation

($N = 6$), or chronic diseases ($N = 5$) were excluded. Moreover, data were incomplete for 12 children. The final study group consisted of 141 participants: 56 children with nocturnal enuresis and 85 children with combined nocturnal and diurnal enuresis. The children had an average age of 8.36 ($SD = 1.94$; range = 6–12).

The referent group consisted of 155 healthy children between 6 and 12 years (M age = 8.61 years, $SD = 1.72$) recruited from a regular primary school. Exclusion criteria were the presence of diurnal and/or nocturnal enuresis (relying on a short screening check list). Detailed written information about the study and an invitation letter to participate were provided to the parents. They were assured that all information would be treated confidentially and would serve only for research purposes. Completed questionnaires were returned via the class teacher in enclosed envelopes. The refusal rate was 17%. After informed consent was obtained from the parents, questionnaires and instructions were distributed in the classroom.

A comparison between the study group (nocturnal and combined nocturnal/diurnal enuresis) and referent group showed significant differences for gender and SES. The study group included 73.8% boys and 26.2% girls, versus 50.3% boys and 49.7% girls in the referent group, $\chi^2(1) = 17.13$, $p < .001$. The Hollingshead Index (Hollingshead, 1975) for professions was used as a measure of SES. To avoid small cell frequencies, the Index was regrouped into three levels: low (<4), middle (5–6), and high (>7) social classes. In the study group, 40.4% of the children were assigned to the low SES group, 55.9% were classified in the middle SES, and 3.7% in the high SES group, compared with 24.2% (low), 58.2% (middle), and 17.6% (high) of the referent group, $\chi^2(2) = 18.74$, $p < .001$. Both groups had the same age distribution, $\chi^2(1) = 0.004$, $p = .95$. Given the potential effects of gender, SES, and age, these variables were considered as covariates in all analyses.

Measures

Parents completed three questionnaires: the Hierarchical Personality Inventory for Children (HiPIC; Mervielde & De Fruyt, 1999), the Dutch version of the Child Behavior Checklist (CBCL; Verhulst, van der Ende, & Koot, 1996), and the Dutch Disruptive Behavior Disorder Rating Scale (DBDRS; Oosterlaan, Scheres, Antrop, Roeyers, & Sergeant, 2000).

HiPIC

The HiPIC (Mervielde & De Fruyt, 1999) measures the FFM trait domains in 6- to 12-year-old children, together with 18 lower-order facets that are hierarchically

organized under the five domains. The conscientiousness domain includes subscales of orderliness, perseverance, concentration, and achievement motivation; the benevolence domain comprises the subscales of egocentrism, dominance, compliance, irritability, and altruism; the imagination domain includes the subscales curiosity, intellect, and creativity; the neuroticism domain is represented by the subscales of anxiety and self-confidence; and, finally, the extraversion domain encompasses the subscales shyness, expressiveness, energy, and optimism. The inventory includes 144 items (eight per facet) to be rated on a five-point Likert scale. Facet internal consistency coefficients in this study ranged between 0.72 (egocentrism) and 0.90 (curiosity), except for shyness (0.56), and can be considered as satisfactory.

CBCL

The CBCL (Achenbach, 1991; Dutch version by Verhulst et al., 1996) is used as an instrument for screening emotional and behavioral problems in 4- to 18-year-old children. The CBCL contains three broadband scales: internalizing, externalizing, and total problems. The 120 CBCL items are rated on a three-point Likert scale, and the scales have good reliability and validity.

DBDRS

The DBDRS (Pelham, Gnagy, Greenslade, & Milich, 1992; Dutch version by Oosterlaan et al., 2000) measures disruptive behavior disorder symptoms according to DSM-IV criteria in 6- to 12-year-old children. This parent questionnaire consists of 42 items and contains four scales: inattention, hyperactivity and impulsivity, oppositional defiant disorder, and conduct disorder. For this study, parents completed only the items of the first two scales to assess ADHD symptoms. Items are rated on a four-point Likert scale. The Dutch translation of the DBDRS has adequate validity and reliability in both Dutch and Flemish samples. The ADHD scales demonstrated good internal consistency, with α coefficients ranging from .87 to .90.

Overview of the Statistical Analyses

Mean differences on the personality (HiPIC) and problem behavior measures (CBCL and DBDRS) across the three groups (nocturnal, combined nocturnal/diurnal, and referent) are examined by using analysis of variance (MANOVA), with post hoc analyses to compare the different groups. HiPIC domains, CBCL scales, and DBDRS scales are considered as dependent variables, group (nocturnal, combined nocturnal/diurnal, and referent) as the independent variable, and age, gender, and SES as covariates. A series of hierarchical regressions

are subsequently conducted to explore the predictive validity of personality traits in understanding problem behavior in children with enuresis, regressing the three CBCL broadband factors and the two DBDRS scales (dependent variables) on age and gender (step 1), SES (step 2), group (defined as both enuretic samples versus healthy referents; step 3), and the HiPIC domain scores (step 4).

Results

Association Between Nocturnal and Diurnal Enuresis and Personality Characteristics

Domain Level

The means and standard deviations for the three groups are reported in Table I. Group differences were found for conscientiousness and neuroticism, whereas no significant differences for benevolence, imagination, and extraversion were observed among the three groups. Post hoc analyses of significant MANOVA results for parental ratings of child personality revealed that children with nocturnal and diurnal enuresis show lower scores on conscientiousness, $F(2, 289) = 4.37, p < .01, \epsilon = .03$, and higher scores on neuroticism, $F(2, 289) = 4.39, p < .01, \epsilon = .04$, compared with the referent group. No differences were found between the children with nocturnal enuresis and the referent group or between the two study groups.

Facet Level

Table I reports significantly lower scores on concentration ($p < .01$), compliance ($p < .001$), creativity ($p < .001$), and self-confidence ($p < .001$), and higher scores on irritability ($p < .01$) for children with combined nocturnal and diurnal enuresis compared with healthy referents. Children with nocturnal enuresis have significantly lower scores on achievement motivation ($p < .01$) and expressiveness ($p < .001$) compared with the referent group, but facet scores of both enuretic groups do not differ from each other. There were no age, gender, or SES differences on HiPIC domains and facets.

Association Between Nocturnal and Diurnal Enuresis and Child Problem Behavior

CBCL

Parental ratings of child problem behavior for each group are reported in Table I. The MANOVA demonstrated significant differences among the three groups on internalizing ($p < .001$), externalizing ($p < .001$), and total problem scores ($p < .001$). Post hoc analyses demonstrated significant differences between the three groups on the total problem scale, with the scores of

the combined nocturnal and diurnal enuresis group being about one standard deviation higher than the average of the referent group. Children with combined nocturnal/diurnal enuresis scored about half a standard deviation higher on internalizing and externalizing problems compared with the referent group, but did not significantly differ from children with nocturnal enuresis. There were significant SES effects for the three CBCL scales, with higher mean levels for the low SES group, but there were no significant age or gender effects.

DBDRS

Post hoc analyses of significant MANOVA results revealed higher scores for attention problems in children with combined nocturnal and diurnal enuresis compared with healthy peers ($p < .01$). No differences for attention problems were found between the combined nocturnal/diurnal enuresis group and the children with nocturnal enuresis. For hyperactive problems, we observed a higher mean score for children with combined nocturnal and diurnal enuresis compared with children with nocturnal enuresis and with the referent group, whereas the nocturnal enuresis group did not differ from the healthy referent group. There were no differences between groups of age, gender, and SES on the DBDRS scales.

Regression Analyses

Hierarchical regression analyses were conducted to evaluate the common variance of personality and problem behavior. The standardized β coefficients reported in Table II report that the control measures, age and gender, entered in step 1, do not explain problem behavior variance. The control measure SES, entered in step 2, significantly explains about 6–11% of the variance of internalizing ($p < .01$), externalizing ($p < .001$), and total ($p < .001$) problems. Beyond age, gender, and SES, group explains an additional 7% ($p < .001$) of the CBCL total problems variance, indicating that the enuretic groups in general experience more problem behavior than healthy referents. For all CBCL and DBDRS scales, personality traits explain a substantial additional amount of variance, ranging from 31% for hyperactive problems to 43% for externalizing problems. More specifically, conscientiousness is negatively related to attention ($p < .001$) and hyperactive problems ($p < .01$), whereas benevolence is significantly related to externalizing ($p < .001$), total ($p < .001$), hyperactive ($p < .001$), and to a lesser extent, to internalizing problems ($p < .001$), indicating a negative relationship between this personality trait and problem behavior. Neuroticism

Table I. Means and Standard Deviations of Personality and Problem Behavior for the Three Groups

	Nocturnal enuresis		Nocturnal and diurnal enuresis		Referents		<i>F</i> (2, 289)	ϵ^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
HiPIC-domain level (raw score)								
Conscientiousness	96.75 ^{ab}	23.51	96.20 ^a	17.01	105.39 ^b	20.17	4.37*	.03
Benevolence	135.75	21.07	130.06	17.52	138.90	19.24	3.29	.03
Imagination	85.57	13.70	84.26	15.63	89.60	14.00	3.03	.03
Neuroticism	43.17 ^{ab}	8.39	47.06 ^a	10.52	41.92 ^b	10.64	4.39*	.04
Extraversion	107.89	14.32	108.60	15.39	112.39	16.60	3.88	.02
HiPIC-facet level (raw score)								
CON orderliness	23.11	7.27	22.51	6.71	24.73	6.57	2.38	.02
CON perseverance	23.79	6.03	24.11	4.75	25.88	5.62	2.99	.03
CON concentration	25.30 ^{ab}	6.62	24.44 ^a	5.74	27.47 ^b	6.10	4.61*	.05
CON achievement striving	24.38 ^a	7.17	25.13 ^{ab}	5.45	27.31 ^b	5.88	4.25*	.04
BEN egocentrism	19.70	5.63	21.07	4.72	19.05	4.71	2.60	.03
BEN dominance	21.66	5.33	22.23	4.76	22.53	5.64	0.31	.01
BEN compliance	26.40 ^{ab}	5.44	24.80 ^a	4.61	27.69 ^b	5.03	5.68**	.06
BEN irritability	21.34 ^{ab}	6.27	24.34 ^a	6.96	21.07 ^b	6.27	4.53*	.04
BEN altruism	28.04	4.83	28.90	4.84	29.87	5.30	2.94	.02
IMA curiosity	29.60	6.23	30.29	5.72	30.25	5.59	1.30	.00
IMA intellect	28.47	5.33	27.60	6.70	29.99	5.80	2.84	.03
IMA creativity	27.51 ^{ab}	5.61	26.37 ^a	5.51	29.36 ^b	5.60	4.77*	.06
NEU anxiety	20.98	6.07	23.30	6.18	21.25	6.03	1.98	.02
NEU self-confidence	25.81 ^{ab}	4.14	24.24 ^a	5.41	27.34 ^b	5.57	5.84**	.06
EXT shyness	20.26	5.19	20.69	5.47	18.80	4.98	2.31	.03
EXT expressiveness	24.13 ^a	5.22	25.34 ^{ab}	4.95	27.00 ^b	5.45	8.16*	.05
EXT energy	28.60	4.87	28.40	5.93	26.93	5.87	1.45	.02
EXT optimism	27.43	4.55	27.54	4.94	29.26	5.67	12.16	.03
CBCL broadband factors (<i>T</i> score)								
Internalizing problems	55.53 ^{ab}	11.19	58.67 ^a	10.26	52.48 ^b	10.70	9.27**	.06
Externalizing problems	51.95 ^{ab}	12.40	55.04 ^a	10.42	49.16 ^b	10.00	8.35**	.05
Total problems	54.13 ^a	11.20	59.44 ^b	10.11	49.75 ^c	11.34	21.30**	.13
DBDRS (raw score)								
Attention problems	6.15 ^{ab}	5.57	8.33 ^a	5.81	5.69 ^b	5.39	6.31*	.04
Hyperactive problems	5.13 ^a	5.14	8.50 ^b	6.78	4.71 ^a	5.36	12.30**	.07

BEN, benevolence; CBCL, Child Behavior Checklist; CON, conscientiousness; DBDRS, Disruptive Behavior Disorder Rating Scale; EXT, extraversion; HiPIC, Hierarchical Personality Inventory for Children; IMA, imagination; NEU, neuroticism.

^{ab}^cNumbers sharing a letter do not differ from each other (post hoc test, Scheffé, $p < .05$).

* $p \leq .01$. ** $p \leq .001$.

is positively related to internalizing ($p < .001$), total ($p < .001$), and to a lesser extent, to hyperactive problems ($p < .001$). Extraversion shows a significant positive relation with hyperactive ($p < .001$), and to a lesser extent, with externalizing ($p < .001$) and attention problems ($p < .01$).

Discussion

To our knowledge, this is the first study examining internalizing and externalizing problem behavior in association with personality traits in a large sample of children with enuresis problems, adopting a compre-

hensive and age-specific FFM questionnaire. In line with our hypotheses, moderate significant differences for conscientiousness and neuroticism were observed, but no differences for benevolence, except at the facet level. Parents of children with combined nocturnal and diurnal enuresis described their child as less conscientious and more neurotic at the domain level than parents of the referent group. At the facet level, these children are described as less self-confident, less concentrated, more irritable, and less compliant. Moilanen et al. (1987) and Srivastava et al. (1982) found a very similar pattern, that is, with enuretic children exhibiting low patience and tolerance, being less compliant, and

Table II. Regression Results

	Intern standardized β	Extern standardized β	Total standardized β	Attent standardized β	Hyperact standardized β
Step 1					
Age	.07	.04	.05	.08	-.07
Gender	.02	.05	.06	-.04	-.09
R ²	.01	.00	.01	.02	.03
Step 2					
Socioeconomic status	-.16*	-.19**	-.20**	-.01	-.05
R ²	.08**	.06*	.11**	.03	.04
R ² _{change}	.07**	.06**	.10**	.01	.01
Step 3					
Group	.07	.03	.14	-.01	.06
R ²	.11**	.08**	.17**	.05	.06
R ² _{change}	.03	.02	.07**	.01	.02
Step 4					
Conscientiousness	.03	-.12	-.13	-.56**	-.18*
Benevolence	-.22**	-.58**	-.38**	-.07	-.34**
Imagination	.08	.02	.04	-.10	.02
Neuroticism	.51**	.11	.38**	.14	.23**
Extraversion	-.08	.20**	.10	.15*	.36**
R ²	.45**	.51**	.52**	.46**	.37**
R ² _{change}	.34**	.43**	.35**	.41**	.31**

Attent, Disruptive Behavior Disorder Rating attention scale; extern, Child Behavior Checklist externalizing problem scale; hyperact, Disruptive Behavior Disorder Rating hyperactive scale; intern, Child Behavior Checklist internalizing problem scale; total, Child Behavior Checklist total problem scale.

* $p < .01$. ** $p < .001$.

demonstrating difficulties keeping themselves quiet and concentrated, and further showing an inability to behave in an appropriate way. The pattern of low self-confidence corresponds to differences in neuroticism between enuresis patients and healthy referents, observed by Moilanen et al. (1987). Children with enuresis may fear being teased by peers, affecting their self-confidence and their general emotional state (Butler, 1998). This study further showed that children with nocturnal enuresis were less expressive and less achievement-oriented than the referent group. This last finding was previously noticed in the longitudinal study of Kaffman and Elizur (1977). Children with low achievement motivation do not strive for high standards (Caspi, Henry, McGee, Moffit, & Silva, 1995; Shiner & Caspi, 2003), and may hence have difficulty with treatment adherence (Shiner & Caspi, 2003).

In line with our hypotheses, the combined diurnal and nocturnal enuresis group had higher total, internalizing, externalizing, attention, and hyperactive problems compared with healthy referents, whereas only the nocturnal enuretic group manifested higher scores for the total problem scale. These findings underscore the higher vulnerability of the combined diurnal/nocturnal group to develop psychopathology.

Given the cross-sectional nature of this study, questions of causality cannot be addressed. Shaffer (1973) described four different viewpoints to interpret associations between enuresis and psychological symptoms. First, the association between the two concepts is based on chance, and there is hence no causal relationship. Secondly, psychological factors such as negative life events or temperament cause the problem of enuresis. Stressful events in the child's surrounding might contribute or cause enuresis. Durkin et al. (1993), for example, demonstrated that 34% of children who were previously dry developed enuresis after a flood disaster in Bangladesh. Kaffman and Elizur (1977) suggest that infant temperament is an important factor in the development of nocturnal enuresis. Two types of children are most likely to be enuretic at age 4: those with high levels of motor activity and aggression and those who are dependent and demonstrate low levels of achievement motivation. Thirdly, psychological problems can be a consequence of enuresis. Studies have observed that the child is often ashamed or distressed with the enuresis problem (Butler, 1998), that parents often exhibit an intolerant attitude toward their enuretic child (Butler, Redfern, & Forsythe, 1993), and that parents and child are usually relieved after a successful bladder training

(Shaffer, 1973). Additional studies have shown short-term improvements in behavior scores, neuroticism scale scores, and self-concept after treatment (Moffat, 1989). Finally, a fourth conception assumes that psychological problems and enuresis are influenced by common risk factors such as age, gender, and social disadvantage. Male gender can be interpreted as a risk factor for both enuresis and psychological problems (American Psychiatric Association, 1994). However, this study did not find gender differences, which are in accordance with the study of Lettgen et al. (2002) who demonstrated certain patterns of behavioral problems for each gender in association with types of diurnal enuresis, that is, girls with urinary tract infections have more internalizing problems, whereas girls with voiding postponement display more externalizing problems. Such findings suggest that the type of wetting problem—and not gender as such—determines the comorbid behavioral problems. The relationship between enuresis and psychopathology can be also explained as a spurious relationship driven by influences of low SES on both, especially for externalizing problems (Couchells, Johnson, Carter, & Walker, 1981; Van Hoecke et al., 2003).

This work studied the associations between problem behavior and personality characteristics and demonstrated that four different personality domains are associated with internalizing, externalizing, attention, and hyperactive problems. In accordance with our expectations and previous research (Van Leeuwen, 2004; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004), benevolence and extraversion were associated with externalizing problem behavior and neuroticism with internalizing problem behavior. Contrary to our expectations, conscientiousness was not significantly related to externalizing behavior, but showed a negative relation with attention and hyperactive symptoms. The observation that broad personality domains explain psychopathology suggests including personality measures in the psychological assessment of children with enuresis.

Many limitations should be taken into account when interpreting this work. First, this sample may not be representative of all children with enuresis. Children referred to a university hospital may have a more complex etiology than those who respond to conventional treatments limiting the generalizability of our findings. Secondly, the enuresis and referent groups are drawn from different populations and may be difficult to compare. Although researchers controlled for SES, possible influences of third variables on the CBCL and DBDRS scale means cannot be ruled out. Future research should

therefore enhance comparability between study and referent groups improving the match for demographic variables such as gender and SES composition. Thirdly, all information was collected via the parent, enabling the possibility that a halo effect is (partly) responsible for the observed associations across the different inventories. Multiple informants, including the child, parents, teachers, and eventually psychologists as professional assessors, might be helpful in assessing the magnitude of any parental reporting bias. This study has also some strengths, including the comprehensive assessment of both problem behavior and personality combined with a large sample size, increasing the chances to find meaningful differences and associations.

Given the mean level personality differences between enuretic and healthy children, psychological assessment should specifically screen for children who are less achievement motivated, concentrated, compliant, self-confident, and more irritable. Low achievement motivated and concentrated children may experience difficulties in maintaining a strict drinking and voiding scheme and taking medication, and may be less sensitive to the fullness of their bladder (Kodman-Jones et al., 2001). Low compliant children may be unwilling to accomplish prescribed tasks, whereas children with low self-confidence get discouraged when success is postponed. In a similar vein, irritable children get easily frustrated in the absence of immediate results. To improve treatment adherence and effectiveness, psychoeducational bladder training should therefore not only provide information on the etiology and course of enuresis, but also support these children in maintaining a strict voiding and drinking schedule by reinforcing all efforts of the child, and taking into account their specific personality characteristics.

In sum, this study demonstrated considerable differences for the CBCL total problem scale, especially for children with combined diurnal and nocturnal enuresis compared with healthy children, whereas personality scores differed more modestly from those of healthy referents. Given the inconsistent research findings across studies, this observation needs further replication. To further advance the field, however, longitudinal research is required to explore the causal nature of the relationship between psychological problems and enuresis.

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