

The Five-Factor Model of Personality at the Facet Level: Association with Antisocial Personality Disorder Symptoms and Prediction of Antisocial Behavior

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Abstract The association between the Five-Factor Model of personality (FFM) and antisocial personality disorder (APD) symptoms was investigated in a sample of young males with a history of severe antisocial behavior. Results were compared against those of an expert-consensus study (Lynam and Widiger *Journal of Abnormal Psychology* 110:401–412, 2001) and those of a recent meta-analysis (Samuel and Widiger *Clinical Psychology Review* 28:1326–1342, 2008) based primarily on non-antisocial samples. A high degree of similarity was observed across the three. Multivariate analysis indicated two FFM facets, Compliance and Activity, to be associated with APD symptoms. The contribution of these facets to the prospective prediction of antisocial behavior over and above that of APD symptoms and past antisocial behavior was evaluated. Compliance alone explained 8.7% of the unique variance in future antisocial behavior.

Keywords Five-factor model · Antisocial personality disorder · Antisocial behavior · Traits · Personality

Most theoreticians consider traits to be the fundamental unit of personality (Morizot and Miranda 2007). Presently, the Five-Factor Model (FFM) is the most empirically validated trait-based model of personality (Mervielde et al. 2005). It is rooted in the “lexical hypothesis”, according to which the most salient and socially relevant individual differences are embedded as words in the natural language. Indeed, the

FFM’s traits have been found to subsume over 4,500 adjectives in the English language (Goldberg 1990). This five-factor structure has been replicated in several other languages (McCrae and Allik 2002), on the basis of natural-language descriptions of personality (Kohnstamm et al. 1998), and through factor analyses of different personality questionnaires developed independently of the FFM (Costa and McCrae 1997).

Compared with other models focused solely on second-order traits, it has been demonstrated that the FFM, with its 30 facets (each trait subdivides into six facets), allows a more specific and sensible measure of personality and better clinical differentiation (De Clercq and De Fruyt 2003; Miller et al. 2003). In this regard, facets have been shown to account for portions of the variance in various behaviors not otherwise explained by the five broad traits (Paunonen and Ashton 2001).

Several authors have been striving to reconcile two fields of research that have remained relatively independent until recently: personality theory and personality disorders (Widiger and Costa 2002; Livesley 2001). By definition, personality is an essential component of personality disorders (Krueger and Tackett 2005). As the FFM, according to the lexical hypothesis, covers all dimensions of personality, it should be possible to interpret other personality scales and constructs from this perspective (Trull and McCrae 2002). In other words, it should be possible to describe and even conceptualize personality disorders from the perspective of this general model of personality. Following this line of reasoning, researchers have been seeking to close the theoretical and empirical gaps between the FFM and the personality disorders on the assumption that the latter constitute extreme configurations (maladaptive variants) of general personality traits (Widiger and Costa 2002).

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FFM and Antisocial Personality Disorder

Most of the studies that have investigated the association between the FFM and antisocial personality disorder (APD) as defined by the DSM-IV (American Psychiatric Association [APA] 1994) have done so at the trait level only (Widiger and Costa 2002). In a meta-analysis of these studies, Saulsman and Page (2004) reported APD to be moderately to weakly associated with two of these traits, namely, Agreeableness ($r=-.40$) and Conscientiousness ($r=-.25$). Samuel and Widiger (2008) obtained similar meta-analytic results with different samples ($r=-.36$ and $r=-.33$, respectively). The five traits thus did not adequately account for the disorder. In fact, effect sizes have been found to be lower in clinical samples than in the general population (Saulsman and Page 2004), thus reinforcing the view that the FFM's five broad traits were not sufficiently specific to describe personality pathology.

However, though a broad trait might not be associated with APD, facets under the trait could prove otherwise. The fact that a trait is not significantly associated with APD could be due to the fact that some of its facets are associated positively with APD and others, negatively (Trull et al. 2001). This could have reduced the strength of the association between APD and FFM traits. Consequently, facets might afford the explanatory power and the clinical specificity that broad traits cannot provide (Krueger and Tackett 2005; Widiger et al. 2002).

Lynam and Widiger (2001) proposed an original method to study the representation of personality disorders using FFM facets. They examined the degree to which 120 experts agreed in their FFM descriptions of prototypic cases of the disorders using the 30 FFM facets rated on a five-point scale. Mean scores then served to form the expert-consensus prototype for each personality disorder. Where APD is concerned, 17 facets obtained a mean less than 2.00 or greater than 4.00 and were thus considered "characteristic" (see Table 1). These results were replicated in two subsequent studies. Samuel and Widiger (2004) used a similar method with a sample of private-practice psychologists; they obtained a convergence coefficient of .97 with the Lynam and Widiger (2001) expert-consensus prototype. Sprock (2002), for her part, asked licensed psychologists to rate a prototypic APD case from a vignette on the 30 FFM facets; she obtained a convergence coefficient of .87 with the prototype. These studies confirmed that the expert-consensus prototype established by Lynam and Widiger (2001) constituted an adequate representation of how clinicians conceptualized APD through the FFM.

In a recent meta-analysis, Samuel and Widiger (2008) estimated the strength of the association between the 30 FFM facets and the personality disorders. Regarding APD,

absolute values ranged from $r=.00$ (Anxiousness, Aesthetics) to $r=.38$ (Deliberation), with 11 correlations above .20 (see Table 1). Of the 16 studies considered, seven were unpublished at time of writing and thus could not be scrutinized. The other nine studies did not focus solely on APD but instead examined all or several of the personality disorders. Their samples, whether recruited from college, adolescent or psychiatric populations, presented a low mean number of APD symptoms and, in turn, low variance. Indeed, the prevalence of APD was very low (under 5%) throughout, suggesting a non-normal (skewed) distribution. The low variance in and the non-normal distribution of the number of APD symptoms might have affected the magnitude of the relations studied. Moreover, given that the psychiatric samples, too, comprised very few APD cases, the generalizability of the results to people likely to need treatment for APD was questionable. A second limitation presented by the 9 published studies lay in the fact that, in most cases, APD symptoms were self-reported, which might have introduced an overestimation bias (Guthrie and Mobley 1994). Other studies that investigated the association between FFM facets and APD but that were not considered by Samuel and Widiger (2008) have presented the same limitations (Axelrod et al. 1997; De Clercq and De Fruyt 2003; Hicklin and Widiger, 2005; Miller et al. 2005; Yang et al. 2002).

Our Study

The first objective of our study was to measure the association between each of the 30 FFM facets and the APD symptoms count for a clinical sample of adolescents and young adults with a history of severe antisocial behavior, a sample in which a high number of APD symptoms was expected. The results would then be compared against those of the Samuel and Widiger (2008) meta-analysis and the Lynam and Widiger (2001) expert-consensus prototype to determine whether the same pattern of associations emerged.

Multivariate Perspective

Multivariate analysis is essential in order to identify facets that share significant unique variance with APD. Indeed, a high bivariate correlation between a given facet and APD could be due to a strong correlation between this facet and another that is correlated to APD. In this regard, correlations between same-trait facets have been found to vary from .13 to .64 (Costa and McCrae 1992). In all five studies that have run multiple regression analyses to examine the relation between the FFM and APD instead of only computing correlations (Bagby et al. 2005; De Clercq and

Table 1 Association between FFM facets and APD according to the Lynam and Widiger (2001) expert prototype, the Samuel and Widiger (2008) meta-analysis, and our study. Reliability coefficients of FFM's facets

	Lynam & Widiger (2001)	Samuel & Widiger (2008)	Our study	α
Neuroticism				
Anxiousness	1.82	.00	-.06	.71
Angry hostility	4.14	.27	.14	.77
Depressiveness	2.45	.12	.05	.79
Self-consciousness	1.36	.02	-.13	.63
Impulsiveness	4.73	.27	.16	.52
Vulnerability	2.27	.04	.08	.78
Extraversion				
Warmth	2.14	-.13	-.11	.75
Gregariousness	3.32	.02	-.01	.70
Assertiveness	4.23	.06	.04	.71
Activity	4.00	.02	.25*	.64
Excitement-Seeking	4.64	.25	.25*	.60
Positive emotions	2.86	-.09	.00	.70
Openness				
Fantasy	2.82	.10	-.06	.76
Aesthetics	2.36	.00	.01	.75
Feelings	2.27	-.02	.00	.64
Actions	4.23	.10	.03	.38
Ideas	2.91	.04	-.05	.82
Values	3.00	.08	.01	.50
Agreeableness				
Trust	1.45	-.22	-.07	.70
Straightforwardness	1.41	-.37	-.16	.71
Altruism	1.41	-.24	-.05	.63
Compliance	1.77	-.32	-.33**	.63
Modesty	1.68	-.17	-.08	.72
Tender-Mindedness	1.27	-.19	-.22	.65
Conscientiousness				
Competence	2.09	-.21	-.19	.64
Order	2.41	-.18	-.08	.60
Dutifulness	1.41	-.29	-.17	.67
Achievement-Striving	2.09	-.19	-.16	.75
Self-discipline	1.81	-.25	-.09	.80
Deliberation	1.64	-.38	-.15	.68

Lynam & Widiger (2001): average rating on a five-point scale by experts of a prototypic APD case on the 30 FFM facets.

Facets rated 4.00 and above or 2.00 and under are considered characteristic

Samuel & Widiger (2008): mean effect-size correlations as reported in their meta-analysis

Our study: correlations between FFM facets and the APD symptoms count in our sample.

* $p < .05$. ** $p < .01$

De Fruyt 2003; De Fruyt et al. 2006; Dyce and O'Connor 1998, Trull et al. 2001), a lower number of facets proved associated with APD symptoms, although in all cases but one (Dyce and O'Connor 1998) a smaller number of facets was entered in the regression analysis on the basis of theoretical hypotheses. Facets explained from 20% to 33.6% of the variance in APD. Nine facets proved significant in at least one of the five studies. Tender-Mindedness, Compliance, Dutifulness, Deliberation, Achievement-Striving, Straightforwardness, and Impulsiveness were negatively related to APD symptoms, while Angry-Hostility and Excitement-Seeking were positively associated. Consequently, the second objective of our study was to conduct a

multivariate analysis of the facets that proved significant at the bivariate level, in order to identify those that shared unique variance with APD.

Clinical Utility

Although a FFM-based conceptualization of APD offers several advantages (Trull and Durrett 2005), in the opinion of some authors (e.g., Ben-Porath and Waller 1992; Reynolds and Clark 2001) the FFM still needs to demonstrate that it can add to the existing symptom-based model before being considered useful for clinical purposes,

notably in terms of predictive capacity. We therefore set out, as a third objective of our study, to verify whether FFM facets associated with APD (and thus presumed to be underlying APD symptoms; see Warner et al. 2004) added to the prospective prediction of antisocial behavior, the main feature of APD. We hypothesized that these FFM facets would make a unique contribution to the prediction of antisocial behavior. To our knowledge, no prospective study had ever assessed the unique contribution of the FFM to the prediction of antisocial behavior, over and above APD symptoms.

Methods

Participants

As part of a larger study (Pauzé et al. 2004), 144 male adolescents 12 to 17 years of age were recruited at intake in Quebec Youth Centers (social services youth care) in three regions of the Province of Quebec (Canada). All met the DSM-IV criteria for conduct disorder based on parent or youth report or had obtained a clinical score in the 98th percentile or higher on the CBCL delinquent behavior scale based on parent or teacher report. They were reassessed three ($n=82$; 15–20 years old) and five ($n=46$; 17–22 years old) years later. Sample attrition over the three waves of data collection was considerable: 56.9% of the original sample was retained at time 2, and 56.1% of the sample at time 2 was retained at time 3.

Three reasons could explain sample attrition over the course of the study. First, in the five-year interval between the first and the third assessment, almost all participants reached the age of majority (set at 18 in Quebec), at which time they ceased to be in the charge of Quebec youth services. This made it more difficult to contact participants for follow-up assessments, especially given their ensuing residential mobility. Second, only token monetary compensation was offered for participation (\$20 to \$30 per participant at times 2 and 3). Third, participants from one of the three regions ($n=13$) did not complete the antisocial behavior questionnaire, and thus were dropped from the sample at time 3. At time 1, the 62 dropouts at time 2 did not differ from the 82 participants in terms of age ($t(142)=-0.57$, *ns*), or conduct disorder symptoms ($t(142)=0.23$, *ns*). At time 2, the 36 dropouts at time 3 did not differ from the 46 participants on age ($t(80)=0.02$, *ns*), or APD symptoms ($t(80)=0.17$, *ns*).

Instruments

At time 1, the severe antisocial behavior inclusion criterion was assessed using both the Diagnostic Interview Schedule

for Children—2 Revised (DISC-R, version 2.25; Shaffer et al. 1993) and the Child Behavior Checklist (CBCL; Achenbach 1991). The DISC-R, validated in French by Breton et al. (1998), was used to assess presence of DSM-IV (APA 1994) conduct disorder symptoms, based on parent and adolescent report. The CBCL (parent- and teacher-report forms) was used to identify youths with severe conduct problems, with the 98th percentile as cutoff.

At time 2, APD symptoms were assessed using the SCID-II (First et al. 1997), a structured-interview instrument administered by trained interviewers. Based on responses provided by participants, interviewers rated each symptom as 0 (absent), 1 (probable or under the clinical threshold), or 2 (present). For the purposes of the study and according to the DSM description, a symptom was considered absent if rated 0 or 1 and present if rated 2. This instrument has demonstrated good psychometric properties with clinical samples (First et al. 1997) and superior validity relative to self-report measures of APD (Guy et al. 2008). In our sample, the reliability coefficient reached .66. At time 2, 29.3% of participants were under 18 years of age, the minimum age for APD diagnosis according to the DSM-IV (APA 1994). However, APD has been shown to be a valid construct in adolescence (Taylor et al. 2007) and has been assessed in this population in other studies (e.g., De Clercq and De Fruyt 2003).

The FFM facets were measured at time 2 using the NEO-PI-R (Costa and McCrae 1992), a 240-item self-report questionnaire. The NEO-PI-R has proved valid with adolescents (De Fruyt et al. 2000; McCrae et al., 2002). In our study, a French version of the NEO-PI-R was used (Hodgins 1994; Rolland and Petot 1994). This version has shown reliability and validity equivalent to the original English-language version (Rolland et al. 1998). Reliability coefficients for the facets varied from .58 to .81 (*Mdn*=.70) for the English version (Costa and McCrae 1992) and from .38¹ to .82 (*Mdn*=.70) for the French version in a sample of adolescents and young adults recruited in high schools and in Quebec Youth Centers (Le Corff and Toupin 2009). Reliability coefficients for each facet are presented in the fourth column of Table 1.

Antisocial behavior was assessed at times 2 and 3 with an enhanced version of the *MASPAQ criminal delinquency scale* (Le Blanc et al. 1996), which measures the occurrence of 29 delinquent behaviors in the past year. The scale obtained a reliability coefficient of .91 in our sample and in a sample of high-school adolescents (Le Corff and Toupin 2009).

¹ The Actions facet under the Openness trait was the one to obtain this very low reliability coefficient. Reliability for this facet has proved problematic in other French-speaking samples as well. It reached .38 in a military sample and .50 in a student sample (Rolland et al. 1998).

Results

Sample Characteristics

At time 2, 35 of 82 participants (42.7%) met the diagnostic threshold for APD. The mean number of APD symptoms was 2.46 ($SD=1.72$). Tests for skewness and kurtosis indicated a normal distribution. At time 3, 23 of 46 participants (50.0%) met the diagnostic threshold for APD and the mean number of APD symptoms was 2.65 ($SD=1.64$). The increase in mean number of APD symptoms between times 2 and 3 did not prove significant ($t(45)=-0.69$, *ns*). At time 2, all symptoms were quite common, with prevalence rates varying from 20.7% to 43.1%, except for *failure to conform to social norms*, which registered a very high rate of 79.3%. However, this was not surprising as severe antisocial behavior was a selection criterion in the study.

FFM Facets and APD Symptoms Count

Correlations between FFM facets and the APD symptoms count are reported in the third column of Table 1. Compliance under the Agreeableness trait showed the strongest correlation to APD symptoms ($r=-.33$; $p<.01$); Activity and Excitement-Seeking, both under the Extraversion trait, also reached significance ($r=.25$; $p<.05$ in both cases). Owing to our small sample size, only correlations above .22 reached statistical significance. Nonetheless, the correlation patterns suggested good agreement between our results and those from the Samuel and Widiger (2008) meta-analysis and the Lynam and Widiger (2001) expert prototype. To estimate the degree of agreement empirically, we correlated the values in each column of Table 1 across the three studies.² The correlation obtained in all three possible pairings was .80 ($p<.001$), indicating a high and equivalent level of similarity across results.

Several associations were similar in all three studies, although they varied in size. Excitement-Seeking, for example, correlated at .25 in both our study and in the meta-analysis, and was rated high (4.64/5) by the experts. In a few cases, results from both correlational studies did not confirm the expert ratings. Anxiousness, for instance, was rated low (i.e., less than 2.00) by experts and therefore considered characteristic, whereas near-zero correlations were observed in the two other studies. In other cases, the expert prototype was corroborated by our results, but not by the meta-analysis. Activity, for one, was rated high (i.e., 4.00 or greater) by

experts and correlated at .25 in our sample, whereas it correlated at near zero in the meta-analysis. Finally, in a few cases, our study was the one to yield the divergent result. In particular, three facets under the Agreeableness trait (Trust, Altruism, and Modesty) were characteristic of APD in the two other studies, but correlated weakly to APD ($r<-0.08$) in our antisocial sample.

Multivariate Analysis of FFM-APD Associations

A backward multiple regression analysis of the facets significantly associated with APD at the bivariate level (from Table 1: Compliance, Activity, and Excitement-Seeking) was run to identify which of these shared unique variance with APD. With the backward selection method, only the facets with the highest partial correlations to APD symptoms were retained (Tabachnick and Fidell 2001).

As shown in Table 2, of the three facets entered in the regression, two (Compliance and Activity) proved significantly associated with the APD symptoms count ($F(2, 79)=7.38$; $p<.01$), explaining 15.7% of the variance. According to Cohen (1992), this corresponds to a medium effect size ($f^2=0.19$).

Prediction of Antisocial Behavior

A sequential multiple regression analysis was carried out to predict antisocial behavior measured at time 3. Predictors were entered in three steps. First, past antisocial behavior (measured at time 2) was entered as a control variable. Second, the APD symptoms count was entered. Third, the two significant facets associated with APD symptoms above (i.e., Compliance and Activity) were entered. Results are presented in Table 3.

In the first step, past antisocial behavior explained 34.8% of the variance in future antisocial behavior over the two-year follow-up period. In the second step, the APD symptoms count barely reached significance ($p=.05$), with $\Delta R^2=5.5\%$ ($f^2=.09$). In the third and final step of the regression model, the two facets accounted for 10.5% of the variance in future antisocial behavior over and above past antisocial behavior and APD symptoms. Compliance was the only statistically significant facet, and it alone explained 8.7% of the unique variance ($sr^2=.087$). The observed effect size ($f^2=0.11$) attributable to the addition of the two facets was medium to small according to the standards established by Cohen (1992).

Discussion

Our first objective was to compare the correlations we observed between FFM facets and APD symptoms in our

² Agreement was estimated as in Samuel and Widiger (2008). Correlations were calculated using facets as “subjects” and studies as “variables”. We thus correlated “Lynam and Widiger (2001)” with “Our study” and obtained $r=.80$. The two other correlations yielded the same strength of association.

Table 2 Backward regression model of the association between FFM facets and APD symptoms

	<i>B</i>	β	<i>t</i>	<i>p</i>	<i>sr</i> ²
E4-Activity	.10	.23	2.17	.03	.05
A4-Compliance	-.14	-.31	-2.98	.00	.09

n=82; *R*²=15.7%; adjusted-*R*²=13.6%; *F*(2, 79)=7.38; *p*<.01

sample of males with a history of severe antisocial behavior against the Lynam and Widiger (2001) expert prototype and the results of the Samuel and Widiger (2008) meta-analysis based on non-antisocial samples. Despite major methodological differences, a high degree of agreement was noted across the three studies, suggesting that it could be possible in the near future to develop a general profile for APD using FFM facets applicable to various levels of APD severity.

Certain dissimilarities across the studies are noteworthy. First, contrary to the two other studies, we did not find Trust, Altruism or Modesty (under the Agreeableness factor) to be associated with APD symptoms. Where Trust is concerned, it may be more characteristic of antisocial behavior (a feature of our sample) than of APD specifically, especially as Trust has been shown to characterize delinquents (with varying levels of APD symptoms) compared with normative peers (Le Corff and Toupin 2009). Moreover, none of these three facets was associated with APD symptoms in any of the multivariate studies reviewed (De Clercq and De Fruyt 2003; De Fruyt et al. 2006; Dyce and O’Connor 1998; Trull et al. 2001), while each of the three other Agreeableness facets (i.e., Straightforwardness, Compliance, Tender-Mindedness), for which there was consensus among the three studies compared here, proved significant in previous multivariate studies.

Second, the fact that some facets, such as Anxiousness, were associated with APD only by experts (Lynam and Widiger 2001) might suggest that experts provided a richer

description of personality. Indeed, though excluded from the DSM-IV APD symptoms, low anxiousness was nevertheless judged by experts to be characteristic of the disorder (Samuel and Widiger 2004). Most empirical studies, including ours, have assessed the FFM through the NEO-PI-R, whose items are not believed to cover the maladaptive variants of FFM facets adequately (Haigler and Widiger 2001). We can reasonably assume that clinicians, instead, do consider the maladaptive variants when assessing the FFM and that this might reveal associations between some facets and APD that cannot be observed with the NEO-PI-R. However, our results might also indicate that expert judgments are influenced by theoretical assumptions not always confirmed by empirical studies. For example, the experts might have rated prototypical APD cases low on the Anxiousness facet according to psychopathy theory, even though not all psychopaths present low levels of anxiousness (Schmitt and Newman 1999).

Third, it is not clear why some facets, such as Activity, are characteristic of APD according to experts (Lynam and Widiger 2001) and in our sample, but not in the meta-analysis (Samuel and Widiger 2008). One possible reason is that both the expert prototype and our study involved APD subjects, whereas they were rare in the samples of the studies considered in the meta-analysis. More studies involving samples with a significant prevalence of APD symptoms need to be conducted so that future meta-analyses can investigate the potential moderator effect of this sample characteristic.

Table 3 Sequential regression model of antisocial behavior prediction

	<i>B</i>	β	<i>t</i>	<i>p</i>	<i>sr</i> ²	<i>R</i> ²	ΔR^2
<i>Step 1</i> [<i>F</i> (1, 44)=23.49; <i>p</i> <.001]						34.8%	–
Past antisocial behavior	.53	.59	4.85	.00	.35		
<i>Step 2</i> [<i>F</i> _{change} (1, 43)=3.96; <i>p</i> =.05]						40.3%	5.5%
Past antisocial behavior	.30	.33	1.87	.07	.05		
APD symptoms	.85	.35	1.99	.05	.05		
<i>Step 3</i> [<i>F</i> _{change} (2, 41)=4.35; <i>p</i> <.05]						50.8%	10.5%
Past antisocial behavior	.30	.33	2.02	.05	.05		
APD symptoms	.56	.22	1.29	.20	.02		
E4-Activity	.18	.15	1.32	.19	.02		
A4-Compliance	-.43	-.32	-2.77	.01	.09		

n=46; *sr*² = semi-partial correlation squared; ΔR^2 = change in *R*-square

Regarding our second objective, of the three FFM facets significantly correlated to APD (i.e., Compliance, Activity, and Excitement-Seeking), two were significant also when analyzed jointly. In our sample, Compliance (under the Agreeableness factor) emerged as the FFM facet most strongly associated with the APD symptoms count. Of the other two facets (both under the Extraversion factor), only Activity proved associated with APD. This suggests that the correlation between Excitement-Seeking and APD might be explained in part by Excitement-Seeking's shared variance with Activity, and that Activity shares more unique variance with APD. Further multivariate research is needed to investigate the effect that shared variance between facets has on their association with APD. Contrary to Compliance and Excitement-Seeking, Activity did not prove significant in the multivariate studies reviewed (De Clercq and De Fruyt 2003; De Fruyt et al. 2006; Dyce and O'Connor 1998; Trull et al. 2001). In fact, it was not even entered in the analyses because these studies based their inclusion criteria on the theoretical hypotheses put forward by Widiger et al. (2002), which made no prediction about the Activity facet. As discussed earlier, Activity was rated high in the expert-consensus prototype (Lynam and Widiger 2001). These results suggest that future research on the FFM facets should not use theoretical inclusion criteria alone, seeing how important unexpected associations can emerge from empirical data.

In the light of these results, the main personality features of adolescents with a high number of APD symptoms include a propensity for interpersonal conflicts and aggressive reactions (lower Compliance) and the need to expend a high level of energy (higher Activity facet). These facets seem to account only partially for the APD symptoms count, as they explain about one-sixth of its variance. This proportion of explained variance is slightly less than that reported in the other multivariate studies presented above (Bagby et al. 2005; De Clercq and De Fruyt 2003; De Fruyt et al. 2006; Dyce and O'Connor 1998; Trull et al. 2001); the difference might be attributable to the lower number of facets included in the regression owing to our small sample size. The observed effect size is nonetheless considered to be medium (see Cohen 1992).

As for our third objective, Compliance was associated with future antisocial behavior over and above APD symptoms and past antisocial behavior, explaining 8.7% of the unique variance. Personality features appear to contribute, then, to the assessment of antisocial propensity independently of past antisocial behavior. Moreover, when considered jointly with Compliance and past antisocial behavior, the APD symptoms count did not seem relevant to predicting future antisocial behavior.

Given that personality traits are theorized as causal phenotypes (Caspi and Shiner 2006), the same traits should

be associated both concurrently and prospectively with antisocial behavior. It is impressive, then, that one facet should account for so much variance over and above past antisocial behavior. This suggests that, as adolescents grow into young adults, their proneness to aggressive interpersonal reactions (low Compliance) tends to increase the severity of their antisocial behavior. Hence, clinicians working with delinquent and APD adolescents and young adults should pay special attention to the Compliance facet.

The fact that Compliance is also the only facet associated with future antisocial behavior over and above APD symptoms suggests that this particular facet captures an element of the antisocial personality construct that symptoms do not. In this regard, no DSM-IV APD symptom covers interpersonal aggressiveness, as *irritability and aggressiveness* refers essentially to physical aggression. Replication of our results in other samples with a significant prevalence of APD symptoms would militate in favor of adding *proneness to aggressive interpersonal reactions* (low Compliance facet) to the list of APD symptoms if the current symptom-based conceptualization of personality disorders is to be maintained in future nosology.

In closing, some of the strengths of our study merit highlighting. First, APD symptoms were assessed through a structured interview, a method recognized as superior to self-report instruments, which tend to produce an over-endorsement of personality psychopathology (Guthrie and Mobley 1994). Second, measuring FFM facets through a self-report instrument avoided introducing a shared-method bias; a stronger association is observed between FFM facets and APD symptoms when both are self-reported than when one is measured through an interview (Bagby et al. 2005). Third, our sample had a high prevalence of APD and a higher mean number of symptoms compared with the samples in the studies reviewed; studying a sample whose main feature is antisociality increases the clinical validity of results. Finally, to our knowledge, this study is the first to compare APD symptoms and general personality traits in terms of their capacity to predict antisocial behavior prospectively. In addition, it is the first to investigate the prospective association between the FFM and antisocial behavior.

However, our study is not without certain limitations. First, the conclusions apply only to males. In the studies reviewed regarding the association between FFM facets and APD, mixed-gender samples were common despite earlier results suggesting that associations between personality traits and antisocial behavior differed between males and females (Moffitt et al. 2001). Future studies should take into account potential gender differences. Second, participants were recruited in youth care centers and, therefore, they may represent a specific subgroup of delinquents.

Third, the small sample size resulting from the high attrition rate limited the statistical power available to detect statistically significant associations. Fourth, the cross-method assessment of FFM facets (self-reported) and APD symptoms (interviews) limited the size of the correlations that could be observed. Fifth, as already mentioned, the NEO-PI-R does not appear to cover the most extreme (maladaptive) variants of FFM facets; this might have resulted in under-estimating the association between FFM facets and APD symptoms.

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