The relation between the bifactor model of the Youth Psychopathic traits Inventory

and conduct problems in adolescence:

Variations across gender, ethnic background, and age

Abstract

The current study examines how the bifactor model of the Youth Psychopathic traits Inventory (YPI) is related to conduct problems in a sample of Dutch adolescents ($N = 2,874$, 43% female). It addresses to what extent the YPI dimensions explain variance over and above a general psychopathy factor (i.e., one factor related to all items) and how the general factor and dimensional factors are related to conduct problems. Group differences in these relations for gender, ethnic background, and age were examined. Results show that the general factor is most important, but dimensions explain variance over and above the general factor. The general factor, and affective and lifestyle dimensions of the YPI were positively related to conduct problems, whereas the interpersonal dimension was not, after taking the general factor into account. However, across gender, ethnic background, and age different dimensions were related to conduct problems, over and above the general factor. This suggests that all three dimensions should be assessed when examining the psychopathy construct.

Keywords: Youth Psychopathic traits Inventory, psychopathic traits, bifactor model, dimensionality, adolescents

Public Significance Statement: This study found support for the "bifactor model of psychopathy", wherein psychopathy is represented by a general psychopathy factor and three dimensions (i.e., interpersonal, affective and lifestyle dimension). The general factor and dimensions were differently related to conduct problems, and relations varied across ethnicity, age, and gender. This suggests that it is important to consider group membership and all three dimensions of psychopathy for research purposes and in clinical practices.

Psychopathy is a personality disorder, consisting of a constellation of interpersonal (e.g., superficial charm, manipulation, and grandiosity), affective (e.g., lack of remorse, shallow emotions, and callousness), and behavioral or lifestyle traits (e.g., impulsivity, need for excitement, and irresponsibility; Cooke & Michie, 2001). Most studies on psychopathic traits in youth focus on one dimension of psychopathy; the affective or callous-unemotional (CU) dimension (Andershed, 2010; Colins et al., 2014; Salekin, 2016). Among youth with conduct disorders, CU traits are used to distinguish a subgroup of youth at high risk for severe and persistent antisocial outcomes from youth at low risk (Frick, Ray, Thornton, & Kahn, 2014). Concerns have been expressed that CU traits have become synonymous to psychopathic personality (Colins et al., 2014), and it has been argued that that all three dimensions and the interaction between the dimensions should be studied, as opposed to only CU traits (Colins et al., 2014; Salekin, 2016). According to Lilienfeld and Fowler (2006), psychopathy should be seen as an 'emergent composite of separable, often unrelated lower-order traits' (p.127), but traits of all dimensions have to be combined to form the psychopathic personality. Several studies show that all three dimensions of psychopathy together, as measured with the Psychopathy Checklist: Screening version (PCL:SV; Andershed, Köhler, Eno Louden, & Hinrichs, 2008) or the Youth Psychopathic traits Inventory (YPI; Colins, Andershed, & Pardini, 2015), are more predictive of conduct problems or relational aggression than one dimension. Moreover, the dimensions seem to depend on each other to predict behavioral outcomes (Colins et al., 2014). Using a bifactor model to examine the relation between psychopathy measurements and their correlates may clarify the role of the dimensions in understanding psychopathy.

Recent studies show that psychopathy is well represented by a bifactor model (Patrick, Hicks, Nichol, & Krueger, 2007; Zwaanswijk, Veen, & Vedder, 2016); with a general psychopathy factor underlying all the items of the measure of psychopathy, and in addition,

the items also load onto a specific dimensional factor that represents one of the psychopathy dimensions (i.e., interpersonal, affective, and lifestyle dimension; Reise, 2012). In a bifactor model overlapping variance between factors is taken into account by the general psychopathy factor (Reise, 2012), which allows for a clearer appreciation of what the factors and the psychopathy construct represent, and of the relationships between these factors and outcome measures (Chen, West, & Sousa, 2006; Patrick et al., 2007).

The current study examines the dimensionality of the YPI and the relations between the bifactor model of the YPI and conduct problems in a Dutch community sample. The first aim of the current study is to examine whether the dimensions explain variance over and above the general factor and how the dimensions and general factor are related to conduct problems. Hence, the concurrent validity of the bifactor model for the YPI is examined, which should contribute to a better understanding of what the dimension factors represent (Chen et al., 2006). The positive relation between psychopathic traits and conduct problems has been found for preschoolers (Colins et al., 2014), school children, and adolescents (e.g., Andershed, Kerr, Stattin, & Levander, 2002). Therefore, it is hypothesized that higher scores on the general psychopathy factor correspond to higher levels of conduct problems. Furthermore, the dimensions of the YPI are expected to explain variance over and above the variance explained by the general factor. Previous research found positive relations between conduct problems and each of the dimensions when controlling for the other two dimensions (Colins, Noom, & Vanderplasschen, 2012). Based on this finding it is hypothesized that higher levels of conduct problems are related to higher scores on the interpersonal, affective, and lifestyle dimensions. Because the strength of the relation between one dimension and conduct problems decreased when controlling for the other dimensions (Colins et al., 2014) and all three dimensions of psychopathy together were more predictive than one dimension (Andershed et al., 2008), it is also expected that the relation with conduct problems is weaker

for each individual psychopathy dimension than for the general factor that accounts for the common variance among all three dimensions.

The second aim is to examine whether the relations between conduct problems and the psychopathy factors differ across gender, ethnic background, and age. Previous studies on the relation between psychopathic traits and adaptation measures yielded mixed results depending on respondents' gender, ethnic background, and age (see Rubio, Krieger, Finney, & Coker, 2014). If the predictive value of psychopathy and the dimensions varies by group this may have implications for diagnostic practices in different groups (Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003; Skeem, Polaschek, Patrick, & Lilienfeld, 2011).

Across gender, the relation between psychopathic traits and externalizing problem behavior seems similar (e.g., Hillege, Das, & De Ruiter, 2010). However, the relation with overt aggression and externalizing problem behavior appeared stronger for boys than for girls (Marsee, Silverthorn, & Frick, 2005). Therefore it is expected that the relation between the general psychopathy factor and dimensions of psychopathy and conduct problems will be stronger for boys than for girls. Studies on differences in psychopathic traits for adolescents with various ethnic backgrounds are scant (Verona, Sadeh, & Javdani, 2010). Available studies have reported mixed results (e.g., Edens & Cahill, 2007; Jackson, Neumann, & Vitacco, 2007). Consequently, no differences are expected between different ethnic groups. Manifestations of psychopathic traits in adolescents might be transient or represent temporary normative behavior (Skeem & Cauffman, 2003), but studies are inconclusive. One study found that the association between psychopathic traits and conduct problems was similar in older and younger adolescents (Colins et al., 2012). Therefore we expect that for adolescents aged 12 to 15 and adolescents older than 15 years the correlations between psychopathic traits and conduct problems will be similar.

Methods

Participants and Procedure

Participants were 2,850 adolescents (43% female) from 21 junior vocational high schools and five senior vocational high schools in the Netherlands (M_{age} = 14.47, SD = 1.69; 51 participants did not report their age). We distinguished younger (12 – 15 years old; n = 2,152) and older (16 – 24 years old; n = 647) youth. Adolescents' ethnic background was determined using (grand)parental birth place. About 55% was from native-Dutch origin, the other 45% had a different ethnic background (e.g., Moroccan-Dutch, Turkish-Dutch, Surinamese-Dutch). Following Statistics Netherlands (2000), we distinguished three groups: 1,548 native-Dutch, 206 Western immigrants (e.g., Polish or French), and 1,094 non-Western immigrants (e.g., Surinamese or Moroccan). Two youth did not report their place of birth.

For participants younger than 16 years, parents signed a consent form. Participants over 16 years signed a consent form themselves. After a short explanation of the study, participants completed the questionnaire behind a computer in the classroom in the presence of the teacher and two members of the research team. The Institutional Review Board of Ethics approved of the study.

Measures

Youth Psychopathic traits Inventory. The YPI (Andershed et al., 2002) is a 50-item self-report measure to assess the 'core' traits of psychopathy in youths from the general population. The measure consists of ten subscales with five items each, loading onto three dimensions; an interpersonal dimension (Grandiose/Manipulative, with subscales Dishonest Charm, Grandiosity, Lying, and Manipulation), an affective dimension (Callous/Unemotional, with subscales Remorselessness, Unemotionality, and Callousness), and a lifestyle dimension (Impulsive/Irresponsible, with subscales Thrill Seeking, Impulsiveness, and Irresponsibility). In the bifactor model, the subscales were used as observed variables, yielding a general factor related to all subscales, while the general and dimension factors were all unrelated to each

other (see also Zwaanswijk et al., 2016). Participants rated statements on a four-point scale, ranging from 1 (*does not apply at all)* to 4 (*applies very well*) (for item content, see https://www.oru.se/jps/downloadYPI). Higher scores indicate higher levels of psychopathic traits. The Dutch translation of the YPI was used (Das & De Ruiter, 2003), which has good construct validity (Hillege et al., 2010). Internal consistency was estimated with the reliability index MacDonald's omega (ω), because omega is model-based and unlike Cronbach's alpha does not assume equal factor loadings (Zinbarg, Revelle, Yovel, & Li, 2005), and was moderate to good. For the total score ω was .87, for the interpersonal dimension .82, for the affective dimension .65, and for the lifestyle dimension ω was .66.

Strengths and Difficulties Questionnaire – Self-Report. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, Dutch translation: Van Widenfelt, Goedhart, Treffers, & Goodman, 2003) is a short behavioral screening instrument that measures psychosocial adjustment in adolescence. For the present study, the five item conduct problems scale was used with items referring to antisocial behaviors (e.g., *"I take things that are not mine from home, school or elsewhere"*). Participants rated an item on a three-point scale: (1) *not true*, (2) *somewhat true*, or (3) *certainly true*. Internal consistency of this scale as estimated with MacDonald's omega was .63.

Statistical Analyses

The bifactor model of the YPI and the one-factor model of the conduct problem scale of the SDQ were correlated using structural equation modeling with Maximum Likelihood estimations. The use of latent variables, as compared to the use of observed variables, gives the opportunity to examine relationships among constructs without measurement error (Oh, Glutting, Watkins, Youngstrom, & McDermott, 2004). Model fit was examined using Satorra-Bentler scaled chi-square (S-B χ^2) and associated degrees of freedom (*df*). However, chi-square is sensitive to sample size and tends to reject reasonably fitting models if the sample is

large (Van de Schoot, Lugtig, & Hox, 2012). Therefore the Comparative Fit Index (CFI),

Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean square

Residual (SRMR) were also used (Van de Schoot et al., 2012). An adequate fit was concluded

when CFI values were >.90, while values of >.95 indicate good fit (Hu & Bentler, 1999).

Values of the RMSEA and the SRMR between .05 and .08 indicate acceptable fit, while

values < .05 indicate good fit (Hu & Bentler, 1999). The factor loadings of the models were

fixed at the measurement level to prevent interpretational confounding (Burt, 1976), so that

only correlations between the latent factors were estimated. Because the SDQ is an ordinal

scale, the correlations were based on a polyserial correlation matrix. To calculate the

correlations between psychopathic traits and conduct problems for each gender, ethnic, and

age group, factor loadings based on the total sample were fixed at the measurement level[1].

Significance of the differences between correlations was examined with Fisher's Z. For all

analyses with structural equation modeling EQS 6.2 (Bentler, 2006) was used.

<center>**Results and Discussion**</center>

Psychopathy and Conduct Problems

Results regarding relations between psychopathy factors and conduct problems are

shown in Table 1. The test of the relationships between the conduct problem factor and the

factors of the YPI resulted in an adequately fitting model (S-B χ^2 (101) = 1627.80, CFI =

.931, SRMR = .194, RMSEA = .073 [.070-.076]). As hypothesized, the general psychopathy

factor was positively related to conduct problems (r(2848) = .65), and over and above the

general factor, higher scores on the affective and lifestyle dimension were positively related to

conduct problems (r(2848) = .17 and r(2848) = .15 respectively)[2]. These results indicate that

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[1] To examine differences in correlations between groups, the models that were compared were kept as similar as possible. For that reason, factor loadings based on the total sample were used, which was possible because the YPI is measurement invariant (Zwaanswijk et al., 2016).
[2] For the total sample, relating a one-factor model of the YPI (Zwaanswijk et al., 2016) to conduct problems resulted in a correlation of .65, which is similar to the correlation with the general psychopathy factor from the bifactor model. The three-factor model, however, yielded correlations with conduct problems that were clearly

the psychopathy construct overall is more important in relation to conduct problems than the separate dimensions, but that it remains important to consider the dimensions (Ward, Nobles, & Fox, 2014). The bifactor model suggests that an individual characterized by high levels of psychopathic traits, as indicated by the general factor, in combination with either high levels of impulsivity, as indicated by the lifestyle factor, or high levels of CU traits, as indicated by the affective factor, likely has more conduct problems than an individual characterized by only high levels of psychopathic traits (cf. Ward et al., 2014).

The interpersonal dimension was unrelated to conduct problems. Colins et al. (2014) reported similar results for parent-reported conduct problems, whereas for self-reported conduct problems they found a significant positive relation, which decreased significantly when controlling for the other psychopathy factors of the Child Problematic Traits Inventory (CPTI). Other studies also found a positive, but weaker relation of the interpersonal dimension with conduct problems after controlling for the other two dimensions (Colins et al., 2012), or with aggression after controlling for the general factor of the Hare Self-Report Psychopathy Scale (Debowska, Boduszek, Kola, & Hyland, 2014), whereas a negative relation between the interpersonal dimension and externalizing problems has also been found after controlling for the general factor of the Psychopathy Checklist-Revised (Patrick et al., 2007). Taking common variance between the dimensions into account when using a bifactor model (Reise, 2012) can result in a crossover suppression effect (Patrick et al., 2007). That is, when all factors are included in a prediction model, the direction of the relations may reverse compared to when the factors are examined separately (Hicks & Patrick, 2006). The relation between the interpersonal dimension and psychopathy correlates needs further examination,

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higher than those found for the dimensions of the bifactor model: .54 for the interpersonal, .63 for the affective, and .63 for the lifestyle dimension. This confirms the importance of the general psychopathy factor in the bifactor model.

because positive relations seem to become weaker, non-significant, or even negative, after controlling for the other dimensions or the general factor.

Group Differences in Psychopathy and Conduct Problems

The relations between psychopathy and conduct problems by gender, ethnic group and age group are presented in Table 1. In general, higher general psychopathic traits corresponded to higher levels of conduct problems. Furthermore, the dimensions explained variance over and above the general factor in relation to conduct problems, but different dimensions were important for different groups.

For boys, only the general factor was important in relation to conduct problems. For girls, however, in addition to the important role of the general factor, higher scores on the interpersonal dimension corresponded to less conduct problems ($r(1230) = -.31$). This suggests that the dimensions related to conduct problems may vary between boys and girls (Hillege et al., 2010; Marsee et al., 2005). Contrary to our expectations, the relation between the general psychopathy factor and conduct problems was significantly stronger for girls than for boys (Fisher's $Z = -3.33$, $p < .001$), which may be related to gender-linked social expectations (Charles, Acheson, Mathias, Furr, & Dougherty, 2012). Due to gender role socialization conduct problems are conceptualized as more deviant among girls than boys (Keenan & Shaw, 1997), and the youths may have rated themselves in relation to deviation from the gender-related expectations (Charles et al., 2012). Girls may be more sensitive to their own psychopathic traits and conduct problems, and rate themselves as more problematic.

For the native Dutch adolescents, but not for the immigrant groups, the interpersonal dimensions explained variance in conduct problems ($r(1546) = -.20$). Instead, in the immigrant groups the affective dimension was positively related to conduct problems, with a significantly stronger relation for Western immigrants than for non-Western immigrants (Fisher's $Z = 9.37$, $p < .001$). Moreover, only for Western immigrants, the affective factor was

more important than the general factor, and the lifestyle dimension was positively related to conduct problems over and above the general factor. This suggests that the expression of psychopathy differs between ethnic groups, and different social and cultural factors may be involved in the expression of psychopathy (Rubio et al., 2014). The stronger role of the affective dimension in the immigrant groups may reflect anger about negative experiences, such as discrimination particularly in the non-Western immigrant group (Berry & Vedder, 2016), or not being able to live up to parental expectations, more characteristic of Western immigrant youth (Vogels, Gijsberts, & Den Draak, 2014). Higher scores on the items regarding lack of remorse and callousness may reflect youths' attempts to cope with this anger and avoid that others see their anger, because this might attract negative attention (i.e., further discrimination or rejection: Boog, 2014; Vedder, Wenink, & Van Geel, 2016).

The finding that the relationship between the affective dimension is stronger in the Western immigrant group than in the non-Western immigrant group may find an explanation in better coping in non-Western immigrants, who have lived for two or more generations in the new country of settlement (Vedder et al., 2016). Moreover, Western immigrants' length of residence in the Netherlands is on average ten years and they are indecisive about wanting to stay or not (Statistics Netherlands, 2015). This may lead to a strong sense of estrangement and confusion in Western immigrant youths. They are likely to struggle with negative experiences about being a minority, although in appearance they resemble Dutch native youths. In addition, they may struggle with disappointment about not living up to parental expectations (Vogels et al., 2014). Apart from these substantive, but speculative explanations there could be other explanations for these relations, and we should not forget that the Western immigrant sample is relatively small, and consequently the findings for this group may not be very stable. Our findings underline the importance of further research on differences between

ethnic groups in order to increase the feasibility of group specific, valid and timely identification of the development of psychopathic traits in youth (Skeem et al., 2011).

In both age groups, the interpersonal dimension was unrelated to conduct problems, whereas the affective dimension was positively related to conduct problems. This relation was significantly stronger for the older adolescents (Fisher's $Z = -3.03$, $p < .01$). Moreover, for the younger adolescents, the lifestyle dimension was also positively related to conduct problems over and above the general psychopathy factor. Though this study is not longitudinal, this result suggests that traits related to the lifestyle dimension become less important in relation to conduct problems as youth grow older, which concurs with a normative view of youth development (Skeem & Cauffman, 2003).

The current study focused on adolescents from a community sample. It is possible that the bifactor model is differently related to conduct problems in other samples, e.g., a forensic sample (Paap et al., 2012). Perhaps interpersonal deficits are more important in relation to conduct problems in a forensic sample than in a community sample, though further research should clarify this. Moreover, conduct problems and psychopathic traits were both assessed through self-report measures. It is possible that youth high on psychopathic traits do not answer honestly or lack insight in their problems and do not perceive themselves as problematic (Lilienfeld & Fowler, 2006). Future research could focus on the relations of the bifactor model based on multi-informant data. Nevertheless, the results from this study are in line with the idea that psychopathy is one syndrome, that consists of traits on three dimensions (see also Salekin, 2016). The current study stressed the importance of assessing all three dimensions in relation to conduct problems and viewing psychopathy in adolescents as one syndrome, instead of only focusing on CU traits. Restricting assessments and diagnosis to one dimension may impair (violence) risk assessment, the identification of protective factors, and treatment.

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Table 1

Correlations between conduct problems and the psychopathy general and dimension factors.

| Factor | Total ($n = 2850$) | Gender | | Ethnic background | | | Age | |
		Boys ($n = 1618$)	Girls ($n = 1232$)	Native Dutch ($n = 1548$)	Western immigrants ($n = 206$)	Non-Western immigrants ($n = 1094$)	Younger ($n = 2152$)	Older ($n = 647$)
General psychopathy	.63*	.63*	.70*	.69*	.38*	.60*	.64*	.62*
	[.61, .65]	[.60, .66]	[.67, .73]	[.66, .72]	[.26, .49]	[.56, .64]	[.61, .66]	[.57, .67]
Interpersonal	-.07	-.07	-.31*	-.20*	.24	-.04	-.07	-.13
	[-.11, -.03]	[-.12, -.02]	[-.36, -.26]	[-.25, -.15]	[.11, .37]	[-.10, .02]	[-.11, -.03]	[-.21, -.05]
Affective	.17*	.09	.18	.05	.74*	.23*	.14*	.27*
	[.13, .21]	[.04, .14]	[.13, .23]	[.00, .10]	[.67, .80]	[.17, .29]	[.10, .18]	[.20, .34]
Lifestyle	.15*	.12	.09	.15	.64*	.17	.13*	.17
	[.11, .19]	[.07, .17]	[.03, .15]	[.10, .20]	[.55, .71]	[.11, .23]	[.09, .17]	[.09, .24]

Note. Approximation of 95% Confidence Interval between brackets, based on Fisher *r*-to-*z* transformation

* $p < .05$.