

# Developmental Pathways of Childhood Dark Traits

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The dark triad of personality has traditionally been defined by 3 interrelated constructs, defined as Narcissism, Machiavellianism, and Psychopathy. Although the content of each of these constructs is clearly represented in childhood maladaptive trait measures, no studies have jointly addressed the prospective developmental course of this core set of maladaptive characteristics throughout childhood and adolescence. The current study uses latent growth modeling to explore how early dark traits develop over time, relying on a selected set of 6 childhood maladaptive traits that conceptually cover the adult dark triad. Across a 5-wave multi-informant design spanning 10 years of childhood, adolescence, and emerging adulthood ( $N_{wave 1} = 717$ , 54.4% girls, age range  $T_1 = 8-14.7$  years, mean age = 10.73), results indicate that childhood dark traits show to some extent shared growth across time, although notable unique growth variance was also observed. Early dark traits further demonstrate significant association patterns with an adult dark triad measure across informants and are increasingly able to discriminate among more and less prototypical profiles of adult dark triad scores. Findings are discussed from a developmental psychopathology framework, underscoring that the proposed set of childhood dark traits represents a meaningful developmental precursor of the adult dark triad.

## General Scientific Summary

This article describes how socially aversive personality traits develop from childhood onward and demonstrates that these traits overall decline over time, although some unique developmental issues are observed too for each of the childhood traits. From an outcome perspective, the study shows that childhood dark traits, as perceived by the children themselves as well as by their mothers, are meaningfully related to adult socially aversive traits.

*Keywords:* Dark Triad, development, personality, child

Developmental antecedents of adult personality pathology are increasingly recognized as a prominent research field, and have gradually strengthened their position on an empirical ground (Kongerslev, Chanen, & Simonsen, 2015). One area that remains understudied involves the development of the Dark Triad (DT; Paulhus & Williams, 2002), referring to three interrelated personality constructs of Narcissism, Machiavellianism and Psychopathy that characterize socially aversive personalities. The absence of a developmental focus on the DT relates to its distant link with clinical literature, as the DT was originally believed to represent a cluster of malicious yet nonpathological personality traits (Paulhus

& Williams, 2002), and therefore not in need of early detection. Increasing evidence on the significance of the DT for various adaptive and maladaptive life outcomes (for a review see Furnham, Richards, & Paulhus, 2013) has gradually stimulated research on the etiology and development of dark side traits from childhood onward, yet no studies have prospectively examined the developmental course of childhood DT subcomponents in terms of stability and change over time. The present study addresses these core developmental issues from a prospective multi-informant design with five assessment points across childhood, adolescence, and early adulthood, and aims to explore common and unique growth of child-specific dark side traits over time. In addition, it will be examined how childhood dark traits empirically connect with the adult dark triad outcome from both a multi-informant and age-perspective.

## Conceptualizing Childhood Dark Side Traits

One potential way to conceptualize childhood dark traits is by framing the core features of the dark triad within established childhood personality frameworks (Tackett & Mackrell, 2011).

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This suggestion is embedded within one of the most well-known research areas at the intercourse of traits and psychopathology, providing substantial evidence for the idea that maladaptive tendencies can be conceptualized, assessed and predicted by (basic) personality traits (Lynam & Miller, 2015; Markon, Krueger, & Watson, 2005; Widiger & Costa, 2002; Widiger & Simonsen, 2005). This dimensional trait approach was recently recognized by major psychiatric nosologies (*DSM-5*; American Psychiatric Association [2013] and ICD-11; Tyrer [2013]), and is supported by an extensive group of international researchers and clinicians who continue to stimulate the field to move toward a dimensional and evidence-based framework for personality and psychopathology (Hopwood, 2017; Kotov et al., 2017). This dimensional trait approach on personality-related pathology has also been complemented by a developmental perspective, showing that childhood maladaptive traits can be represented within a similar structural model (De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006; Verbeke, De Caluwé, & De Clercq, 2017) and have significant value for understanding adaptive and maladaptive outcomes (De Fruyt, De Clercq, De Caluwé, & Verbeke, 2017). Building upon this evidence, translating the Dark Triad (DT) construct toward younger age groups from such developmental trait perspective may thus be a viable way to construct a valid phenotypic profile of the DT in youth. To that end, a conceptual analysis of the developmental literature on the DT is required, in order to delineate shared versus unique trait characteristics of the developmental DT construct. This literature is small, however, because only few developmentally oriented studies addressed the DT components in tandem (Klimstra, Sijtsema, Henrichs, & Cima, 2014). On the basis of the larger developmental Psychopathy and Narcissism field, and to a lesser extent the literature specifically focusing on childhood Machiavellianism, the following conclusions can be drawn.

First of all, established evidence suggests that each of the three DT components relates to a typical dominant-egocentric style that overshadows the interpersonal functioning of Psychopathic, Machiavellian and Narcissistic children. Indeed, highly Narcissistic children already show at a young age a certain desire for power and attention, and have a dominating self-centered approach toward others in the pursuit for prestige (Barry & Wallace, 2010). Likewise, children with Psychopathic and Machiavellian tendencies are known for a tendency to control and dominate others (Salekin, 2006; Kerig & Sink, 2011). In terms of behavioral acts, bullying is a strategy directly related to this social dominance (Sijtsema, Veenstra, Lindenberg, & Salmivalli, 2009), and has been observed in both Machiavellian (Berger & Caravita, 2016; Sutton & Keogh, 2000), Narcissistic (Reijntjes et al., 2016) and Psychopathic (Viding, Simmonds, Petrides, & Frederickson, 2009) children. This shared engagement in relational aggression strategies such as bullying leads us to a second common feature of the DT components, defined as aggression. Beyond bullying, aggressive acts may vary for Narcissistic, Machiavellian or Psychopathic children (Kerig & Stellwagen, 2010; Klimstra et al., 2014), and the strength in associations between the DT component and aggression may also depend upon the informant (Klimstra et al., 2014; Muris, Meesters, & Timmermans, 2013). The basic tendency of acting out toward others however, can be understood as a fundamental aggressive trait, irrespective of its phenotypic manifestation in terms of more indirect or direct forms of aggression. The aggressive

component in Machiavellian children may be less pronounced, though, because children with Machiavellian strategies are not only known for their coercive but also for their use of prosocial strategies (Hawley, 2003), that may potentially mask the coercive or aggressive tendencies. In addition, their aggressive behavior does not result from behavioral impulsivity (Láng & Birkas, 2014; Lau & Marsee, 2013), with the latter being responsible for outbursts or reactive impulsive aggression as typically seen in children with more psychopathic tendencies (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Frick & Hare, 2001) who are known for their poor impulse control (Frick, O'Brien, Wootton, & McBurnett, 1994; Jones & Paulhus, 2011). A similar impulsivity feature has also been observed in Narcissistic children (Thomaes, Bushman, Orobio de Castro, & Stegge, 2009), although this impulsiveness mainly stems from bold social engagement and not from a lack of impulse-control (Jones & Paulhus, 2011; Vazire & Funder, 2006). Still, at the phenotypic level, Impulsivity may be considered a shared trait feature of Narcissistic and Psychopathic children.

The coercive strategies of the prototypical Machiavellian child can further be understood as lying and manipulating, with an overall resistant attitude toward authority and "living life by my own rules", indicating a lack of an internal moral conscience which is closely related to the concept of moral disengagement as proposed by Bandura (2002). An explicit lack of moral emotions is also characteristic of psychopathic children, making both Machiavellian and Psychopathic children difficult to socialize (Saltaris, 2002). From a trait perspective, these features may be assessed by a specific low agreeableness facet that captures the aspects of deception and defiance, and is presumed to characterize both Psychopathic and Machiavellian youth.

Closely related to a lack of moral conscience is a lack of empathy, which is the next shared feature of childhood Machiavellianism (McIlwain, 2003) and Psychopathy (Blair, 1999; Salekin, 2006). It is important to emphasize at this point that the normative developmental process of empathy includes both a cognitive and an emotional component. The cognitive component is strongly affiliated with the neuropsychological "theory of mind" construct, referring to the capacity of perspective taking. The emotional component relates to the ability to experience another's emotional state which is associated with the normative development of feelings of guilt and conscience (McDonald & Messinger, 2011). It is especially this social empathy component as reflected in an inadequate responsiveness to others' emotions, that seems to be underdeveloped in children with Psychopathic and Machiavellian tendencies. The combination of lack of moral emotions as well as a resistant and manipulative attitude as outlined above is typically seen in Psychopathic and Machiavellian children and has been systematically defined in the trait literature as callous-unemotional traits, a dispositional construct that has been well-validated in younger age groups (Frick & White, 2008).

A last important DT feature is a grandiose feeling of the self (i.e., feelings of entitlement) and an overly high self-esteem, which has been typically described as overt Narcissism (Dickinson & Pincus, 2003). This variant of Narcissism is represented in the DT (Jones & Paulhus, 2014), and should be differentiated from covert Narcissism, which is also already observable in childhood and includes a vulnerability component reflected in heightened self-consciousness and concern with interpersonal approval (Wink,

1991). Although it is a challenge to differentiate maladaptive overt Narcissism in childhood and adolescence from normative adolescent Narcissism (Hill & Lapsley, 2011), a closer look at youth Narcissism measures that were specifically constructed from a developmental perspective (e.g., Thomaes, Stegge, Bushman, Olthof, & Denissen, 2008), confirms the inclusion of a maladaptive overt Narcissism component across measures, suggesting that this feature is already observable in the behavioral repertoire of children from 8 years onward (Thomaes et al., 2009). In trait terms, this Narcissism feature in youth is defined as a core antagonistic feature that strongly aligns with the broad trait domain of Agreeableness (Lynam et al., 2005), specifically conceptualized by the traits of Grandiosity and Attention seeking. Although overt narcissism may logically be understood as a childhood maladaptive trait especially relevant for the DT Narcissism component, research has convincingly shown that it is also a fundamental characteristic of the Psychopathy construct (Fontaine, Barker, Salekin, & Viding, 2008), and is well-integrated in all youth psychopathy measures (for an overview see Salekin, 2006).

From this conceptual developmental analysis, a childhood constellation of six dark side traits<sup>1</sup> was selected from a comprehensive childhood dimensional maladaptive trait measure (i.e., the Dimensional Personality Symptom Itempool (DIPSI); De Clercq et al., 2006), that has been well-validated and internationally endorsed (Clark, 2007; Decuyper, De Clercq, & Tackett, 2015; Tackett, 2010). Facets were chosen after consensus among two independent experts in the field of developmental personality assessment and were retained after approval by researchers in the adult DT field. All facets were further reviewed at the item-level, comparing their content with the content of each of the adult dark triad components as represented in the measurement issues-section of the seminal review by Furnham et al. (2013). In line with evidence showing that the DT components in youth share a substantial antagonistic feature (Klimstra et al., 2014), the current selection procedure of childhood maladaptive traits did not produce 1-to-1 equivalents for each of the three adult DT subcomponents, but overall resulted in facets indicative of more than one DT subcomponent. The selection strategy thus aimed at covering the entire spectrum of DT manifestations from a developmental angle, resulting in the selection of Dominance (8 items), Aggressive traits (9 items), Narcissism (8 items), Lack of Empathy (10 items), Impulsivity (4 items), and Resistance (5 items).

Table 1 provides sample items for each of the selected facets, and also demonstrates how the proposed facets conceptually map onto the adult dark triad. More specifically, it is proposed that the childhood trait facets “Dominance-egocentrism” and “Aggressive traits” are indicative for each of the three dark triad components, whereas “Narcissistic traits and Impulsivity” are representative of Psychopathy and Narcissism, and “Lack of Empathy and Resistance” of Psychopathy and Machiavellianism. It should be noted that this proposal does not account for phenotypic variations in the manifestation of the trait as seen in typical Psychopathic, Narcissistic or Machiavellian children, but rather tends to describe the underlying building blocks that compose the developmental construct of the DT. From Table 1, it can be concluded that the shared dispositional features among the developmental DT constructs are substantial, with all proposed trait facets at least characterizing two of the DT components. This conceptual conclusion is in line with recent metaanalytical evidence on the substantial overlap among

the adult DT components (Vize, Lynam, Collison, & Miller, *in press*), suggesting that the minor distinctiveness is presumably already observable from childhood onward.

### Current Evidence on the Development of Dark Triad Traits

Established evidence on the development of the DT from childhood onward is fragmented, and is reflected in literature addressing stability and change associated with the DT subcomponents in isolation. In addition, these studies generally focused on development from 8 years onward, presumably because many of the dark side strategies are not observable before that age (Slaughter, 2011; Thomaes et al., 2009). An inspection of this field learns that empirical evidence is scarce and mainly focused on rank-order stability of Psychopathy (Barry, Barry, Deming, & Lochman, 2008; Frick, Kimonis, Dandreaux, & Farrell, 2003; Lynam et al., 2009), whereas almost no longitudinal studies addressed mean-level development of dark traits in youth (but see López-Romero, Romero, & Villar, 2014; Lynam et al., 2009). These studies have suggested a relative strong mean-level stability of prototypical childhood psychopathic features, although for Narcissism in particular, a normative declining trend has been suggested in one study (Foster, Campbell, & Twenge, 2003). This suggestion, however, has been put forward on the basis of cross-sectional analyses, preventing a strong developmental conclusion. More general literature on mean level trait development throughout childhood and adolescence (Caspi, Roberts, & Shiner, 2005; Van den Akker, Deković, Asscher, & Prinzie, 2014) may lead us a step further, however, and generally suggests that dark side traits—at least when conceptualized along a Five-Factor Model perspective (FFM; McCrae & Costa, 1990)—may all show a declining normative developmental course, although different maturation processes or systems may account for this decrease. Trait components relating to impulse control or self-regulation heavily rely on brain maturation processes that linearly increase throughout childhood (Hammond, Potenza, & Mayes, 2012) resulting in decreasing mean-level trajectories of traits such as Aggression, Impulsivity and Dominance. In a related vein, moral reasoning processes increase when children grow older, resulting in normative declines of deception and defiance (Eisenberg, Fabes, & Spinrad, 2006), as currently represented by the trait Resistance. Traits reflecting a core dispositional characteristic that is conceptually related to the Psychopathy construct (Narcissism and Lack of Empathy) may show less pronounced maturational growth, given the abovementioned evidence in support of the relative stability of youth psychopathy features (Frick, Ray, Thornton, & Kahn, 2014; Lynam et al., 2009).

<sup>1</sup> Unequal number of items across traits can be understood from differences in coverage of the respective traits. Although all facets proved to be unidimensional (De Clercq et al., 2006), the bottom-up construction procedures of the DIPSI resulted in some cases in a merge of facets that were initially considered as distinct. For the current study, this is the case for Lack of Empathy (also including items describing Remorselessness and Unforgiveness), Narcissism (also including items covering Grandiosity and Attention seeking) and Dominance (also including items measuring Manipulative behavior).

Table 1  
*Sample Items for the Childhood Dark Traits Measured Across Time*

DIPSI trait facet	DIPSI sample items*	Adult DT equivalent
Aggressive traits	Gets frequently out of control when he/she is angry Is extremely touchy	Psychopathy Narcissism Machiavellianism
Dominance-egocentrism	Considers own needs more important than those of others Manipulates other children repeatedly to have his/her way	Psychopathy Narcissism Machiavellianism
Impulsivity	Acts constantly without considering the consequences Often reacts impulsively	Psychopathy Narcissism
Lack of empathy	Cannot forgive Shows no sympathy with other children	Psychopathy Machiavellianism
Narcissistic traits	Believes he/she has a right to preferential treatment Will do anything to be in the spotlight	Psychopathy Narcissism
Resistance	Breaks rules all the time, both at school and at home Cheats all the time	Psychopathy Machiavellianism

\* sample items should not be understood as direct indicators of the adult Dark Triad (DT) equivalent indicated at the same row. Rather, the adult DT equivalent should be interpreted at the level of the Dimensional Personality Symptom Itempool (DIPSI) trait construct.

### Predictive Validity of Childhood Dark Traits Toward the Adult Dark Triad

An empirical validation of the proposed childhood dark side trait set is an essential step in the further elaboration of a developmental perspective on the DT. In particular, childhood dark side traits should to some extent be related to the adult dark triad outcome before any conclusions can be drawn upon their significance as developmental precursor. This adult outcome can be operationalized along two different perspectives, that is, a variable-versus a person-centered perspective, each representing a unique approach to the construct of interest. A variable-centered approach conceives the DT as three different, though related, constructs and is the most widely used strategy in DT studies (Kam & Zhou, 2016). From a developmental perspective, this approach enables the study of specific associations for each of the adult DT components with potential developmental trait equivalents. A person-centered approach allows to explore whether recurrent combinations of DT scores exist in a population, and enables from a data-driven perspective to look for subgroups of individuals with distinct profiles. Although only few studies considered the DT from a person-centered approach (Egan, Chan, & Shorter, 2014), it may add interesting information from a developmental viewpoint, because it creates the opportunity to explore how childhood dark traits are antecedents of the DT as a constellation of traits, rather than as separate components. From a prevention perspective, this approach facilitates the identification of childhood dark traits that are specifically able to detect individuals at risk for a DT personality.

### The Current Study: Objectives

Relying on individual growth curve modeling, the current study aims in a first objective to explore the developmental pathways of childhood dark side traits. It will be examined whether these traits develop in a similar way or, instead, show developmental trends that differ in terms of growth parameters. This objective corroborates the findings of a recent meta-analysis by Vize et al. (in press) on differences among dark triad components by evaluating the distinctiveness between the DT constructs from a developmental perspective. We specifically hypothesize that the developmental course of childhood

dark side traits will show a substantial common growth, paralleling adult findings on shared variance among the DT traits. From the abovementioned developmental theory, we further expect to observe some unique growth, hypothesized as a stronger decline over time for trait facets that relate to impulse control, self-regulation or moral reasoning (Impulsivity, Aggressive traits, Dominance and Resistance), while traits reflecting core dispositional psychopathic characteristics (Narcissism and Lack of Empathy) are assumed to show less maturational growth. Prior to these analyses, longitudinal measurement invariance will be explored, in order to verify whether the childhood set of dark traits were measured across waves in the same way.

A second objective aims to empirically address the predictive validity of the current set of childhood dark traits for the adult DT from a multi-informant, age, and discriminatory power perspective. As there is an ongoing debate between the merits of a person-centered versus variable-centered perspective on the operationalization of the Dark Triad (see for instance Kam & Zhou, 2016), we explored the empirical association with the adult dark triad from both approaches. More specifically, we investigated how each of the childhood dark side traits across time is linked with the adult dark triad components across self- and maternal ratings (multi-informant perspective) and across the consecutive assessment points (age-perspective), in order to unravel how and to what extent the age-specific dark traits are relevant developmental correlates of one or more of the adult dark triad components. From a person-centered approach, we further explored whether the proposed childhood dark traits are across time increasingly able to discriminate among more and less prototypical DT profiles in early adulthood (discriminatory power perspective).

### Method

#### Participants and Procedure

The current study relies on data of the Personality and Affect Longitudinal Study (PALS). The PALS is an ongoing longitudinal study of children and adolescents from a community as well as a referred sample including children who were referred for psycho-



logical health care at the moment of inclusion in PALS. Data collection was approved by the Ghent University Ethical Review Board (protocol number 201201). Currently, the study includes a five-wave multi-informant design (i.e., with child, mother and father ratings) spanning 10 years of childhood, adolescence and emerging adulthood ( $N = 720$ , 54.4% girls, age range  $T_1 = 8\text{--}14.78$  years,  $M = 10.73$ ,  $SD = 1.39$ ). For detailed descriptions of the participants and procedure for Waves 1–3 see De Bolle, Beyers, De Clercq, and De Fruyt (2012) and for Wave 4 see De Caluwé, De Clercq, De Bolle, and De Wolf (2014). The present study additionally relies on data from Wave 5, including participants' self-reports who now entered late adolescence and emerging adulthood ( $N = 302$ , 60.3% females, age range  $T_5 = 17\text{--}24$  years,  $M = 20.93$ ,  $SD = 1.57$ ). Of these 302 participants, 257 come from the community sample (59.9% females, age range  $T_5 = 17\text{--}24$  years,  $M = 21.11$ ,  $SD = 1.46$ ) and 45 from the referred sample (62.2% females, age range  $T_5 = 17\text{--}24$  years,  $M = 19.89$ ,  $SD = 1.77$ ). Of the total group of 302, 143 participants are single, 145 are in a relationship but are not living together, whereas the remaining 14 do live together with their partner. Most participants ( $n = 195$ ) live together with one or both parents, 83 live in a student-housing facility (with or without friends) and a minority ( $n = 5$ ) lives alone. The majority of the participants are students ( $n = 215$ ), whereas others are employed ( $n = 63$ ; mainly in the education or health care sector), are looking for a job ( $n = 14$ ), are working students ( $n = 8$ ) or have another study/work related status ( $n = 2$ ). Ten participants are currently enrolled in a postgraduate study program, 111 follow a master program, 84 are taking bachelor courses, and 16 subjects are attending a high-school program. Fourteen participants obtained a master's degree, 25 a bachelor's degree, and 23 a secondary education degree. All participants received a survey by mail, including an information letter with a personal login code to access the online assessment platform, as well as a 10 euro voucher for compensation. Two weeks later, an e-mail was sent as reminder to complete the online questionnaires. Participants were guaranteed that data would only serve research purposes and would be treated confidential. Continued participation across all waves was 42%, with significant differences between the responders and nonresponders for gender (with 53.6% drop-out in girls vs. 63.4% in boys; Welch  $F [1, 656.48] = 7.21$ ,  $p < .01$ ). Nonresponders also showed a lower grade point average at T1 (Welch  $F [1, 649.84] = 20.90$ ,  $p < .001$ ) and were raised by parents with lower educational level (Welch  $F [1, 709.03] = 28.52$ ,  $p < .001$  and  $F [1, 693] = 3.97$ ,  $p < .05$ , respectively). Nonresponders were also more likely to be in the referred sample (69.2% vs. 55.2% in the community sample) at T1 (Welch  $F [1, 703.74] = 9.97$ ,  $p < .01$ ). Despite these minor differences between responders and nonresponders, Little's Missing Completely At Random (MCAR) test revealed that, in general, missingness in the data was completely at random,  $\chi^2(460) = 456.18$ ,  $p = .542$ .

## Measures

**Childhood dark side traits (DIPSI; De Clercq et al., 2006).** Across waves 1, 2, 3 and 4, all mothers rated their child on the 44 items covering childhood dark side traits, using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Alpha coefficients were adequate across waves, with coefficients ranging from .85 to .91 in wave 1 (mean age child = 10.73,  $SD =$

1.38), from .88 to .94 in wave 2 (mean age child = 11.75,  $SD = 1.40$ ), from .89 to .93 in wave 3 (mean age child = 12.75,  $SD = 1.37$ ), and from .89 to .94 in wave 4 (mean age child = 15.58,  $SD = 1.80$ ).

At Time 1, children provided independent self-ratings on the same set of dark side traits, also resulting in adequate alpha reliability coefficients, ranging from .65 to .78 (median value = .75). Cross-informant correlations on the childhood dark traits at Time 1 all showed to be significant at  $p < .001$ , with coefficients of  $r = .23$  (Lack of Empathy and Resistance),  $r = .25$  (Aggressive traits),  $r = .27$  (Impulsivity),  $r = .31$  (Narcissism), and  $r = .35$  (Dominance).

**Short Dark Triad (SD-3).** In wave 5, participants (mean age = 20.92,  $SD = 1.57$ ) completed the 27-item Short Dark Triad (SD3; Jones & Paulhus, 2014), initially developed for use in adults, and including a Narcissism, Machiavellianism, and Psychopathy Scale. All items were rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items are: "I know that I am special because everyone keeps telling me so" (Narcissism), "I like to use clever manipulation to get my way" (Machiavellianism), and "Payback needs to be quick and nasty" (Psychopathy). A high level of internal consistency was obtained for the Machiavellianism Scale ( $\alpha = .75$ ). The Cronbach alphas for the other scales were somewhat lower, with  $\alpha = .60$  for Narcissism, and  $\alpha = .68$  for Psychopathy, though still acceptable.

## Analyses

Prior to the individual growth curve analysis, we examined whether the DIPSI trait facets were measured in the same way across time (i.e., across the four waves). Toward this end, longitudinal measurement invariance was explored using MPlus version 7.3. For each of the six DIPSI traits, a CFA model was tested for the four waves simultaneously. In these models, we allowed covariances among measurement residuals for the indicators that were repeated over time (Newsom, 2015). In other words, items were allowed to correlate with themselves at different time points. Three levels of measurement invariance were tested for the DIPSI traits: *configural invariance* (i.e., factor structure is equivalent across time), *metric invariance* (i.e., factor structure and factor loadings are equivalent across time), and *scalar invariance* (i.e., factor structure, factor loadings, and intercepts of items are equivalent across time). To decide upon invariance, both absolute and relative fit indices were used. To evaluate the configural invariance, only the absolute fit indices Root Mean Square of Error of Approximation (RMSEA) and Comparative Fit Index (CFI) were used because this is the first, and less constrained model. To have an adequate model fit, RMSEA and CFI should be  $\leq .10$  and  $\geq .90$ , respectively (Chen, Curran, Bollen, Kirby, & Paxton, 2008; Hu & Bentler, 1999). To evaluate metric and scalar invariance, the change in model fit was evaluated using delta ( $\Delta$ ) RMSEA, and delta ( $\Delta$ ) CFI, which should be  $< .015$  and  $< .010$ , respectively (Chen, 2007) to conclude that the fit of the model with more constraints does not differ from that of the less-constrained one (i.e., invariance). As a matter of convention, we also reported the chi-square difference test ( $\Delta\chi^2$ ), which should be nonsignificant to reflect invariance between the fit of the compared nested models. However, because this test is highly sensitive to sample sizes and to minor deviations from the conceptual model (Kline, 2005), we did not use it to evaluate metric and scalar invariance.

The first main objective of this study was to test how Dominance/egocentrism, Aggressive traits, Narcissism, Lack of Empathy, Impulsivity and Resistance develop over time. Growth in each of the six dark side traits was modeled using latent growth curve modeling (LGM). To determine which functional form best described growth in each of the six dark side traits, we first tested a linear LGM, after which we tested a quadratic LGM. For both the linear and quadratic LGM, model fit was assessed using two goodness-of-fit indices (i.e., the Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI)), and two badness-of-fit indices (i.e., the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR)). For the CFI and TLI, values larger than .95 are indicative of a good fitting model (Kline, 2005). For the RMSEA and SRMR, values lower than .08 suggest a reasonable fit between the model and the observed data (Kline, 2005; Vandenberg & Lance, 2000). All analyses were performed in Mplus version 7.31, using the Robust Maximum Likelihood (MLR) estimator (Muthén & Muthén, 2014). Missing data were handled using full information maximum likelihood (FIML), which has been shown to yield unbiased parameter estimates with missingness that is (completely) at random (Enders & Bandalos, 2001).

After having established the best growth curve model for each of the six dark side traits, we combined the individual growth curve models in one parallel process growth curve model (PPM). In this PPM, the growth curves for each of the six dark side traits are simultaneously modeled, allowing the growth factors to correlate (Wickrama, Lee, Walker O'Neal, & Lorenz, 2016). By inspecting the correlations among the growth factors, we can test whether the intercepts and slopes of the six dark side traits covary. To reduce the likelihood of model misspecification, error correlations were specified among the dark side traits per measurement occasion (Wickrama et al., 2016). As a final step of objective 1, we tested a Factor-of-Curves Model (FCM). This model extends the PPM by capturing shared variance in the intercept and slope factors using second-order growth factors (Wickrama et al., 2016). That is, in the FCM the intercepts (respectively slopes) of each of the dark side traits serve as indicators of a general—second order—intercept (respectively slope) factor. Moreover, for each trait the loading on the second-order intercept and on the second-order slope factor are the same, and the second-order intercept and second-order slope factor are allowed to covary (Wickrama et al., 2016).

The second main objective explored whether the proposed childhood dark side trait set actually behaves as a developmental antecedent of the adult dark triad, as conceptualized from both a variable- and a person-centered perspective. From a variable-centered approach, Pearson correlations were calculated between initial self- and maternal reports on each of the proposed childhood dark traits (mean age child = 10.73 years,  $SD = 1.38$ ) and adult dark triad self-reports. Pearson correlations were calculated for the multi-informant child ratings with each of the three DT components as well as for a composite Dark Triad score. Furthermore, Pearson correlations were calculated for each of the childhood dark traits and the DT outcome across the four assessment points in childhood and adolescence. From a person-centered approach, we first performed a latent profile analysis on the adult dark trait scores, as measured by the *SD-20* in order to look for classes of people with a similar profile on the three dark triad dimensions. To

determine the number of classes in the data, we used the Bayesian Information Criterion (*BIC*; Schwarz, 1978) and the Bootstrap Likelihood Ratio Test (*BLRT*; McLachlan & Peel, 2000), as simulation studies have shown that they perform well when it comes to recovering the true number of classes. For the *BIC*—an index that balances model fit and model parsimony—, lower values suggest a better fitting model. The *BLRT*, in turn, compares a *k*-class model with a *k*-1-class model using a bootstrapping procedure and indicates whether the *k*-1-class model should be rejected in favor of the *k*-class model. After having determined the number of classes, we tested whether class membership (i.e., the class to which the individual belongs) could be predicted from the scores on the six childhood dark traits using multinomial logistic regression analysis. In particular, a multinomial logistic regression model was tested for each wave separately, each time testing the extent to which the six childhood dark traits in a specific wave predicted class membership in early adulthood. To measure the predictive power of the six childhood dark traits, we used three pseudo- $R^2$  measures: Cox and Snell's Pseudo  $R^2$ , Nagelkerke's Pseudo  $R^2$ , and McFadden's Pseudo  $R^2$ .

## Results

### Measurement Invariance of Childhood Dark Traits Over Time

Table 2 represents the fit indices for the different levels of invariance. From the acceptable absolute fit indices for Model 1, it can be concluded that configural invariance is supported, with an RMSEA value  $\leq .10$  and a CFI  $\geq .90$  for each of the childhood dark traits. Moreover, metric invariance was also established, as all absolute (RMSEA and CFI) and relative fit indices ( $\Delta$ RMSEA is  $< .015$  and  $\Delta$ CFI is  $< .010$ ) were acceptable (see Table 2, Model 2). Finally, Model 3 in Table 2 shows that scalar invariance was also present because of acceptable absolute (RMSEA and CFI) and relative ( $\Delta$ RMSEA and  $\Delta$ CFI) fit indices. In sum, measurement invariance was found across time, reflecting equivalence of factor structure (cf. configural invariance), factor loadings (cf. metric invariance), and intercepts (cf. scalar invariance) of all proposed childhood dark side trait facets.

### Growth Trajectories of Childhood Dark Traits

As a first step, we modeled growth in each of the six dark side traits using latent growth curve modeling (LGM). This analysis revealed that, for each dark trait, a linear LGM fitted the data well (see Table 3), while a quadratic LGM yielded extremely small—and nonsignificant—quadratic components. Because of this reason, we decided to proceed with the linear growth models. As shown in Table 3, Aggression, Dominance, and Impulsivity on average tended to decrease over time, with the strongest decrease for Aggressive traits. In contrast, Narcissism, Resistance, and to a lesser extent Lack of Empathy, showed little systematic evolution over time. Moreover, all dark side traits, except Resistance and again to a lesser extent Lack of Empathy, showed significant interindividual differences in the slope factor, indicating that for most dark traits, children differ in the way their dark side personality traits develop over time. Even for Narcissism, demonstrating no overall growth effect, there appeared to be significant differ-

Table 2  
Longitudinal Measurement Invariance for the Childhood Dark Traits Across Time

DIPSI trait facet	Measurement invariance	$\chi^2$	<i>df</i>	$\Delta\chi^2$	$\Delta df$	<i>p</i>	<i>RMSEA</i>	<i>CFI</i>	$\Delta RMSEA$	$\Delta CFI$
Aggressive traits	Model 1: Configural	1557.28	534				.052	.934		
	Model 2: Metric	1598.86	558	41.58	24	.014	.051	.932	.001	.002
	Model 3: Scalar	1652.25	582	53.39	24	<.001	.051	.931	.000	.001
Dominance	Model 1: Configural	896.30	410				.041	.959		
	Model 2: Metric	909.39	431	13.09	21	.905	.039	.959	.002	.000
	Model 3: Scalar	967.95	452	58.56	22	<.001	.040	.956	.001	.003
Lack of empathy	Model 1: Configural	1524.06	674				.042	.930		
	Model 2: Metric	1556.90	701	32.84	27	.202	.041	.929	.001	.001
	Model 3: Scalar	1621.40	728	64.5	27	<.001	.041	.926	.000	.003
Impulsivity	Model 1: Configural	132.56	74				.033	.990		
	Model 2: Metric	136.07	83	3.51	9	.941	.030	.991	.003	.001
	Model 3: Scalar	156.62	92	20.55	9	.015	.031	.989	.001	.002
Narcissism	Model 1: Configural	1165.38	410				.051	.925		
	Model 2: Metric	1212.24	431	46.86	21	<.001	.050	.923	.001	.002
	Model 3: Scalar	1263.48	452	51.24	21	<.001	.050	.920	.000	.003
Resistance	Model 1: Configural	319.60	134				.044	.971		
	Model 2: Metric	362.08	146	42.48	12	<.001	.045	.967	.001	.004
	Model 3: Scalar	385.05	158	22.97	12	.028	.045	.965	.000	.002

Note.  $\Delta = \delta$  (difference); *RMSEA* = Root Mean Square of Error of Approximation; *CFI* = Comparative Fit Index; DIPSI = Dimensional Personality Symptom Itempool.

ences in growth trajectories among children, suggesting that the overall observed stability over time may result from contrasting trajectories that cancel each other out. Compared to the interindividual differences in baseline scores, however, differences between children in terms of growth were substantially smaller for all dark side traits, indicating that children more substantially vary in level of dark side features at baseline compared to the variability they show in terms of development.

Second, we tested a Parallel Process Model (PPM), which combines all individual growth curves in one overall model, thereby allowing a test of the correlations between the growth factors. When testing this model, we found a correlation greater than one between the slope of Resistance and the slope of Empathy, yielding estimation problems (i.e., a latent variable covariance matrix ( $\Psi$ ) that is not positive definite). Because the slope variance for Resistance was extremely small and nonsignificant (*est.* = .004; *p* = .329), we fixed it to 0, after which the estimation problem disappeared. This model fitted the data well ( $\chi^2$  (162) =

203.629; *CFI* = .995; *TLI* = .992; *RMSEA* = .019; *SRMR* = .037). Moreover, as can be seen in Table 4, the correlations between the intercept factors and the correlations between the slope factors were substantial, showing shared variation in both the intercepts and slopes of the dark side traits. Of note, intercorrelations among intercepts are overall larger compared to the slope intercorrelations, underscoring that the selected set of childhood dark side traits indeed strongly co-occur at baseline.

Third, we tested a Factor-of-Curves Model (FCM), aiming to capture the shared variance among the intercept factors and among the slope factors. Also in this model, a small negative residual variance of the slope of Resistance needed to be fixed to 0 to prevent estimation problems (i.e., a latent variable covariance matrix ( $\Psi$ ) that is not positive definite). After doing so, the FCM with one common intercept factor and one common slope factor fitted the data well ( $\chi^2$  [204] = 469.210; *CFI* = .970; *TLI* = .960; *RMSEA* = .043; *SRMR* = .056), implying that the six childhood dark side traits are characterized by common growth. Turning to

Table 3  
LGM for Each of the Childhood Dark Traits (Unstandardized Estimates)

Childhood dark traits	Growth factors				Model fit indices					
	Intercept		Slope		$\chi^2$ <sup>a</sup>	<i>df</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>SRMR</i>
	Mean	Var	Mean	Var						
Aggressive traits	1.99***	.52***	-.06***	.02*	14.283*	5	.985	.982	.051	.059
Dominance	2.00***	.49***	-.04***	.02**	11.779*	5	.992	.990	.043	.049
Empathy	1.47***	.19***	.01†	.01†	12.471*	5	.990	.988	.046	.054
Impulsivity	2.00***	.65***	-.03**	.03**	20.090**	5	.981	.977	.065	.041
Narcissism	1.66***	.29***	-.00	.01*	12.762*	5	.987	.984	.046	.033
Resistance	1.47***	.25***	.00	.00	11.667*	5	.990	.988	.043	.056

Note. *CFI* = Comparative Fit Index; *TLI* = Tucker Lewis Index; *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standardized Root Mean Square Residual.

<sup>a</sup> The  $\chi^2$  test is also reported, but was not used for assessing model fit, as the  $\chi^2$  test is very sensitive to deviations from the conceptual model and is strongly affected by sample size (Kline, 2005).

† *p* < .10. \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

Table 4  
Correlations Among Growth Factors (Standardized Estimates)

Growth parameters	INT <sub>agg</sub>	INT <sub>dom</sub>	INT <sub>emp</sub>	INT <sub>imp</sub>	INT <sub>nar</sub>	INT <sub>res</sub>	SLP <sub>agg</sub>	SLP <sub>dom</sub>	SLP <sub>emp</sub>	SLP <sub>imp</sub>	SLP <sub>nar</sub>	SLP <sub>res</sub>
INT <sub>agg</sub>	—											
INT <sub>dom</sub>	.63***	—										
INT <sub>emp</sub>	.66***	.59***	—									
INT <sub>imp</sub>	.70***	.60***	.58***	—								
INT <sub>nar</sub>	.48***	.79***	.47***	.50***	—							
INT <sub>res</sub>	.70***	.65***	.78***	.64***	.53***	—						
SLP <sub>agg</sub>	-.31***	-.11	.03	-.35**	-.02	.13	—					
SLP <sub>dom</sub>	-.12 <sup>†</sup>	-.44***	-.07	-.13	-.32***	.08	.43**	—				
SLP <sub>emp</sub>	.20	-.14	.12	-.11	-.10	.28	.19	.51	—			
SLP <sub>imp</sub>	-.21*	-.15 <sup>†</sup>	.04	-.46***	-.13	.11	.78***	.35*	.25	—		
SLP <sub>nar</sub>	.02	-.12	.18	-.03	-.30**	.23 <sup>†</sup>	.36 <sup>†</sup>	.76***	.36	.36*	—	
SLP <sub>res</sub>	—	—	—	—	—	—	—	—	—	—	—	—

Note. Correlations among subdomains at the same period are not shown.  $X^2(162) = 203.629$ ;  $CFI = .995$ ;  $TLI = .992$ ;  $RMSEA = .019$ ;  $SRMR = .037$ .  
<sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

the interpretation of this one-factor FCM, we found that the common intercept factor was on average 1.99 ( $p < .001$ ), while the common growth factor was on average  $-.06$  ( $p < .001$ ). Moreover, there were significant between-person differences in the common intercept factor ( $s^2 = .33$ ;  $p < .001$ ) and in the common growth factor ( $s^2 = .01$ ;  $p = .042$ ). Again, interindividual differences in growth appear to be smaller than interindividual differences in baseline scores. With regard to the building blocks of the common factor, we found that all primary intercept factors loaded significantly ( $p < .001$ ) on the common intercept factor and that all primary slope factors loaded significantly ( $p < .001$ ) on the common slope factor (i.e.,  $\lambda_{aggression} = 1.00^2$ ,  $\lambda_{dominance} = .929$ ,  $\lambda_{empathy} = .640$ ;  $\lambda_{impulsivity} = 1.027$ ,  $\lambda_{narcissism} = .684$ ;  $\lambda_{resistance} = .786$ ), implying that the intercept factors and the slope factors shared common variance (note that the intercept and slope loadings are the same per dark side trait). This is also reflected in the percentage of variance in the primary growth factors that is explained by the common growth factors, with the common intercept factor explaining between 55 and 84% of the variance in the individual intercept factors. Also, the general slope factor accounted for a substantial amount of variance in each of the dark trait slope factors (i.e., 63% for Aggression, 65% for Dominance, 77% for Lack of Empathy, 49% for Impulsivity, 50% for Narcissism, and 100% for Resistance<sup>3</sup>).

### Predictive Validity of Childhood Dark Traits for the Adult DT Outcome

**Multi-informant perspective.** Table 5 reports the longitudinal associations across the 10-year time span for each of the initial ratings of the childhood dark traits with the adult DT components from a multi-informant perspective. Overall, the results show that childhood dark traits are meaningfully associated with the adult DT outcome 10 years later, both from a single as well as from a multi-informant perspective. Of note, almost all childhood self- and maternal rated dark traits are significantly associated with the Psychopathy construct of the adult DT, with the exception of self-rated Lack of Empathy and maternal rated Narcissism. Early impulsivity as perceived by mothers and early child-rated Narcissism are associated with adult Machiavellianism, whereas none of the childhood dark traits except self-rated Narcissism shows sig-

nificant associations with the adult Narcissism construct. Furthermore, only self-rated childhood Narcissism is meaningfully associated with each of the DT subcomponents, whereas maternal ratings do not show any significant association. Finally, most childhood traits are related to the adult DT compound score, with the majority of childhood traits producing correlations with the adult DT across informants. Notably, childhood Lack of Empathy is not associated with the adult DT compound score for any of the informant perspectives.

**Ag perspective.** A more detailed overview of longitudinal associations between childhood dark traits and the adult DT outcome for each of the assessment points is represented in Table 6, including associations of early DT traits described by mothers during childhood (Time 1 and 2), onset of adolescence (Time 3) and mid-adolescence (Time 4) with the self-rated DT outcome during early adulthood (Time 5). Due to a large amount of tests, significance level was set at  $p < .01$ . The results show that some of the childhood dark traits are relatively straightforward and unique antecedents for one core component of the adult Dark Triad, such as Aggressive traits, Dominance, and Resistance for Psychopathy, whereas other childhood traits tend to show increasing specificity over time. In particular, Impulsivity and to a lesser extent Lack of Empathy appear to be a childhood indicator of both adult Psychopathy and Machiavellianism during childhood, but turn into a specific precursor of Psychopathy in adolescence. An exception is childhood Narcissism, showing no associations with the adult DT outcome during the first assessment wave, but gradually evolving into a shared antecedent of both Psychopathy and

<sup>2</sup> Using the marker variable technique, we fixed the factor loading of the intercept of Aggressive traits on the common intercept factor and the factor loading of the slope of Aggression on the common slope factor to 1.

<sup>3</sup> The fact that 100% of the slope of Resistance is accounted for is a direct consequence of fixing the residual variance for this slope to 0. However, to come up with a realistic estimate, we tested the factor of curves model using Bayesian estimation, which allows testing complicated and hard-to-fit models. Using Bayesian estimation, we found that the general slope factor accounted for 66% of the variance in the slope factor of Aggressive traits, 66% for Dominance, 65% for Lack of Empathy, 46% for Impulsivity, 46% for Narcissism. Moreover, we found that the general slope factor accounted for 72% of the variance in the slope factor of Resistance.



Table 5  
Pearson Correlations for Multi-Informant Early Childhood Dark Traits and the Adult Dark Triad Across a 10-Year Time Span

Childhood dark traits	Adult dark triad			
	Time 5			
Time 1	Psy	Narc	Mach	DT compound
Aggressive traits				
Self	.28**	-.07	.13	.15*
Mother	.21**	.01	.06	.12
Dominance-egocentrism				
Self	.22**	.04	.13	.17*
Mother	.26**	.08	.15	.21**
Impulsivity				
Self	.15*	-.07	.02	.03
Mother	.18*	.04	.24**	.20**
Lack of empathy				
Self	.13	-.07	.04	.05
Mother	.15*	-.11	.12	.07
Narcissistic traits				
Self	.18**	.14*	.17*	.22**
Mother	.14	.08	.13	.15*
Resistance				
Self	.24**	.05	.10	.17*
Mother	.21**	-.01	.13	.14

Note. DT = Dark Triad; Psy = Psychopathy; Narc = Narcissism; March = Machiavellianism.

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

Machiavellianism. Surprisingly, maternal rated Narcissism continued to be uncorrelated with self-rated Narcissism in early adulthood, whereas self-rated Narcissism already in early childhood serves as an indicator of this same adult Narcissism trait. Of note, correlations of childhood dark traits with the adult DT outcome tended to drop during wave 3, which coincided with the onset of adolescence.

**Discriminatory power perspective.** Finally, we tested whether the six childhood dark traits were over time increasingly able to discriminate among different constellations of the adult DT components. To this end, we first performed a latent profile analysis on the adult DT scores. Both the *BIC* and the *BLRT* showed that the three-class solution ( $BIC = 1267.916$ ;  $BLRT_{2 \text{ classes vs. } 3 \text{ classes}} = 42.727$ ,  $df = 7$ ;  $p < .001$ ) outperformed the one-class ( $BIC = 1356.825$ ), two-class ( $BIC = 1270.858$ ;  $BLRT_{1 \text{ class vs. } 2 \text{ classes}} = 125.753$ ,  $df = 7$ ;  $p < .001$ ), and four-class ( $BIC = 1285.560$ ;  $BLRT_{3 \text{ classes vs. } 4 \text{ classes}} = 22.142$ ,  $df = 7$ ;  $p = .375$ ) solutions. Moreover, in the three-class solution the class-specific measures of classification accuracy (as measured by average posterior class probabilities) were .83, .87, and .87 for Classes 1, 2 and 3, respectively. According to Nagin (2005), average posterior class probabilities above .70 imply that the classes are well separated and that latent class assignment accuracy is adequate. This three-class solution is shown in Figure 1, revealing that the three classes predominantly differ in the extent to which they represent Machiavellianism, Narcissism and Psychopathy. In particular, there is one class (i.e., Class 3;  $n = 93$ ) showing somewhat elevated levels of these traits, one class (i.e., Class 1;  $n = 147$ ) that is in between, and one class (i.e., Class 2;  $n = 54$ ) is characterized by very low levels of Machiavellianism

and Psychopathy. This finding suggests that DT profiles are quantitatively different, rather than showing meaningful qualitative differences. From a validation perspective of the currently proposed childhood dark trait set, it is interesting to know whether childhood traits are able to differentiate among more (i.e., class 3) and less prototypical DT profiles.

After having identified these latent profiles, we used multinomial logistic regression analysis to test whether class membership in adulthood (i.e., the latent profile to which the individual belongs) could be predicted from the scores on the six childhood dark traits. Across waves, the results show that childhood dark traits were at least marginally significantly related to class membership ( $\chi^2 [12] = 27.134$ ;  $p = .007$  for Wave 1;  $\chi^2 (12) = 19.973$ ;  $p = .068$  for Wave 2;  $\chi^2 [12] = 18.688$ ;  $p = .096$  for Wave 3, and  $\chi^2 [12] = 23.611$ ;  $p = .023$  for Wave 4). Moreover, Figure 2 shows that the predictive power of the six childhood dark traits (as measured by Cox and Snell's Pseudo  $R^2$ , Nagelkerke's Pseudo  $R^2$ , and McFadden's Pseudo  $R^2$ ) was relatively stable across the first three waves, and increased in the fourth wave. This result suggests that the discriminatory power of the childhood dark traits increases over time, although this increase does probably not follow a

Table 6  
Pearson Correlations for Childhood Dark Traits Across Four Consecutive Assessment Points and the Adult Dark Triad

Childhood dark traits	Adult dark triad			
	Self-ratings			
Maternal ratings	Psy	Narc	Mach	DT compound
Aggressive traits				
T1	.21**	.01	.06	.12
T2	.20**	-.01	.06	.11
T3	.20*	.00	.08	.12
T4	.21*	.05	.06	.13
Dominance-egocentrism				
T1	.26**	.08	.15	.21**
T2	.21*	.11	.13	.18*
T3	.13	.00	.09	.09
T4	.24*	.14	.07	.18*
Impulsivity				
T1	.18*	.04	.24**	.20**
T2	.22**	.11	.20**	.23**
T3	.20*	.09	.15	.19*
T4	.25**	.07	.16	.21*
Lack of empathy				
T1	.15*	-.11	.12	.07
T2	.22**	-.02	.20*	.17*
T3	.13	-.10	.11	.06
T4	.19*	-.02	.16	.15
Narcissistic traits				
T1	.14	.08	.13	.15
T2	.15	.10	.17*	.18**
T3	.10	.02	.12	.10
T4	.15*	.14	.15*	.19*
Resistance				
T1	.21**	-.01	.13	.14
T2	.20*	.06	.11	.15
T3	.16*	.05	.14	.15
T4	.26**	.06	.08	.17*

Note. DT = Dark Triad; Psy = Psychopathy; Narc = Narcissism; March = Machiavellianism; T= Time.

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

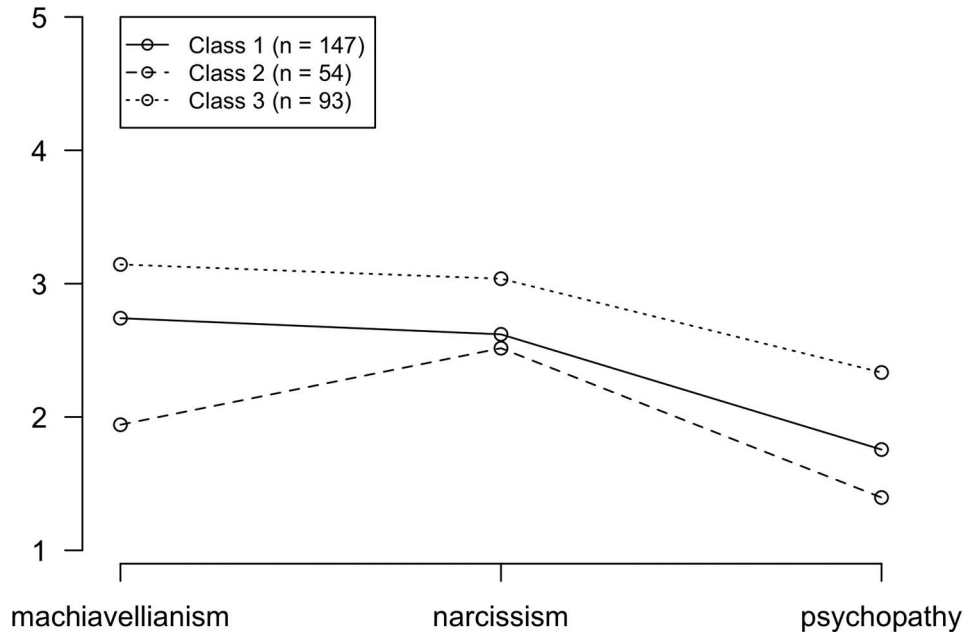


Figure 1. Latent profiles of dark triad traits in emerging adulthood.

smooth, continuous evolution, but may rather represent a threshold effect paralleling the accomplishments of adolescence.

### Discussion

In contrast to a wealth of research on the conceptualization of the dark triad and its effects in adulthood, its precursors and developmental patterns remained largely unexplored. Although socially aversive behavior is commonly observed in childhood, no studies have examined the specific constellation of childhood Narcissism, Psychopathy and Machiavellianism in terms of codevelopment. The current study is an attempt to fill this gap and sheds light on the prospective developmental course of dark side traits throughout childhood and adolescence from a multi-informant design. This perspective may provide valuable input for further research on the developmental processes that contribute to the unfolding of early dark traits over time toward an adult socially aversive outcome. From a theoretical perspective, the current study aligns with a developmental psychopathology framework (Cicchetti & Toth, 2009), by (a) conceptualizing a well-established adult aversive trait construct from an age-specific trait perspective, thereby building upon the developmental literature as a guideline for delineating all relevant developmental manifestations that may act as precursors of the dark triad; (b) exploring both the normative developmental prospective course of these childhood dark traits, as well as by examining interindividual differences between children that may potentially lead to more maladaptive pathways over time, thus focusing on both adaptive and maladaptive processes in the development of the dark triad; and (c) by prospectively examining how exactly different childhood dark traits connect with the adult dark triad outcome, and behave as either unique or shared precursors of adult Psychopathy, Narcissism and Machiavellianism. Taking this developmental psychopathology angle, this study may offer the field the following insights.

First, the results show that the proposed childhood dark traits strongly co-occur at a young age, as reflected in strong intercorrelations at baseline. This co-occurrence among childhood dark traits parallels adult findings on substantial overlap among the DT components (Vize et al., in press) and indicates that this shared antagonistic feature is already observable from childhood onward. This result is further in line with the conceptual developmental analysis as outlined in this study, suggesting that prototypical Psychopathic, Narcissistic and Machiavellian children do share a significant amount of phenotypic variance. The current findings also suggest that this overlap is not only represented at a structural level, but can be extended toward a dynamic level, given the significant shared growth factor among the childhood dark traits that captures more than half of the growth variance of each of the dark side traits.

Second, the shared growth factor among childhood dark traits shows an overall declining trend over time, underscoring established evidence on maturation effects of traits (Caspi et al., 2005; Van den Akker, et al., 2014) and more general externalizing psychopathology (Bongers, Koot, Van der Ende, & Verhulst, 2004), presumably resulting from an improvement in social and communication skills, self-regulation and impulse control (Hammond, et al., Eisenberg et al., 2006). Of note here is, that growth in Resistance is largely captured by the common growth factor, because this trait showed almost no evolution over time, nor did it demonstrate interindividual variability in growth patterns. The stability of this trait contrasts with our hypothesis on expected decreases across time due to increases in moral reasoning (Eisenberg et al., 2006). This finding may suggest that childhood defiance and deception, as measured by the Resistance trait, may closer connect with core childhood psychopathy characteristics, that have also shown to be relative stable (Frick et al., 2014; Lynam et al., 2009). Also in the present study, these core psycho-

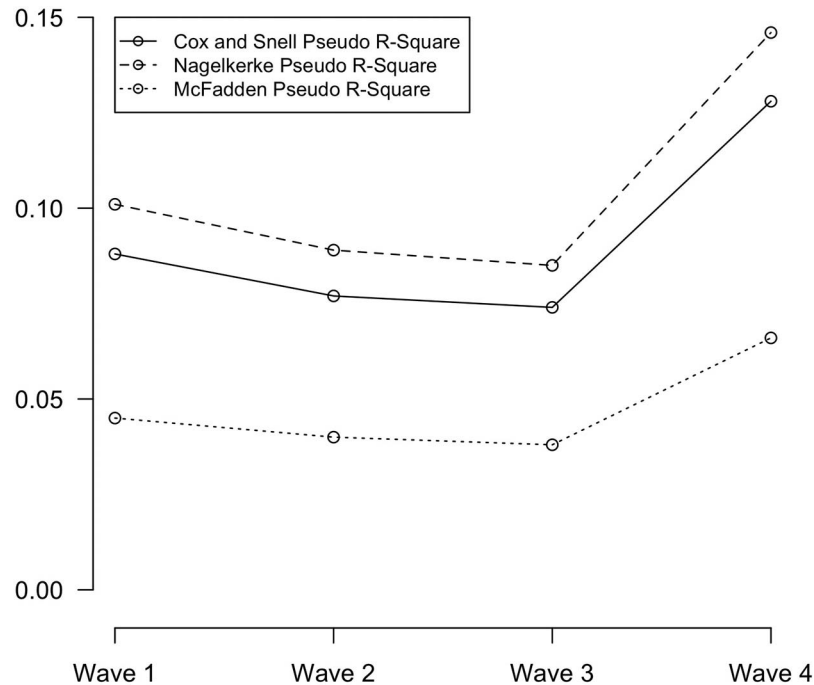


Figure 2. Quasi  $R^2$  coefficients across time reflecting increasing ability of childhood Dark Traits to predict the prototypical adult dark triad personality profile.

pathic features (Narcissism and Lack of Empathy) were the traits with least systematic growth across time, although this finding may with regard to Narcissism also result from contrasting individual trajectories that cancel each other out. It is worth speculating about the underlying developmental processes that may account for diverging maturation effects of traits as observed in the current study. The observed decline in the shared growth factor (externalizing) may be partly explained by increases in impulse control associated with protracted development of the prefrontal cortex across childhood and adolescence (Casey, Tottenham, & Fossella, 2002; Casey, Tottenham, Liston, & Durston, 2005; Galvan, Hare, Voss, Glover, & Casey, 2007). In contrast, psychopathic traits (Narcissism and Lack of Empathy) are associated with reduced amygdala reactivity (Carré, Hyde, Neumann, Viding, & Hariri, 2012; Hyde, Byrd, Votruba-Drzal, Hariri, & Manuck 2014; Lozier, Cardinale, VanMeter, & Marsh 2014; Jones, Laurens, Herba, Barker, & Viding, 2009; Marsh et al., 2008; Viding et al., 2012), indexing increased levels of severity in traits (Hyde et al., 2016) which may, in turn be associated with increased stability. Specifically with regard to Narcissism, the further exploration of contrasting individual growth trajectories should be subject for further research and may for instance be understood from an interactional perspective, as the role of the quality of parent childcare in childhood DT characteristics has been proposed as a valuable perspective on the development of DT traits at a young age (Jonason, Lyons, & Bethell, 2014). Increasing trajectories may at this point be understood as resulting from children with Narcissistic tendencies growing up in an overevaluating parental climate (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman., 2015) or in contrast with parents who tend to display high levels of aversive parenting, such as physical abuse or neglect

(Cohen et al., 2014; Hengartner, Ajdacic-Gross, Rodgers, Müller, & Rössler, 2013). Declining trajectories in turn, may be understood from the normative developmental pathway characterized by a decrease in the typical childhood self-centeredness and an increase in perspective-taking, supported by a parenting style characterized by age-appropriate responsiveness and demandingness (Cramer, 2011).

Third, beyond shared growth, the majority of dark side traits appeared to also have unique developmental features, which is most explicitly the case for Narcissism and Impulsivity, because the growth variance of these childhood traits was less captured by the common growth factor. Although the findings of the current study cannot speak to exactly what these unique growth features are, the results for Narcissism can be related to the adult literature advocating that the Narcissistic DT component is empirically most distinct from the other two components (Vize et al., in press).

Fourth, the results underscore that children retain their relative trait-position across time (Roberts & DelVecchio, 2000; De Fruyt, et al., 2006), as large variances at baseline and relatively small interindividual differences in growth point to high differential stability. This finding indicates that children with high baseline scores on dark traits generally keep their high position compared to peers across time, pointing out their relative increased vulnerability for maladaptive outcomes.

Fifth, childhood dark traits show a significant empirical connection with the adult DT, indicating that these traits can be considered as relevant developmental antecedents of the adult DT. Childhood dark traits do differ, however, in terms of specificity, with some serving as a direct antecedent of a core DT component in adulthood, and some representing a shared

indicator of multiple aspects of the adult DT. It should be noted in this regard, that the strongest longitudinal associations of all childhood dark traits were observed with the adult Psychopathy component, suggesting that the core antagonistic feature of childhood dark traits is most closely connected to this DT Psychopathy concept. The significance of early dark traits further holds across informants (at least during childhood), hence establishing concurrent validity, complemented in some cases with unique associations of either self- or maternal ratings with the adult DT outcome. This finding underscores the importance of multi-informant designs (Tackett & Ostrov, 2010) when studying externalizing features in younger age groups, as different informants provide meaningful information and may differentially tap into the constructs of interest. In particular, the present results suggest that mothers are able to describe early aspects of lack of empathy in their children, in a way that is consistent with how these same children later on describe their personality in terms of adult psychopathy features. This is an important finding from a diagnostic viewpoint, indicating that mothers may be more reliable informants for this kind of psychological characteristics compared to the children themselves, as self-ratings at this age were not significantly associated with the adult outcome. In contrast, variance in adult Narcissism was exclusively captured by childhood self-rated Narcissism, suggesting that this childhood trait may already serve as a very specific developmental precursor of adult Narcissism. At mid-adolescence, however, maternal ratings of Narcissism do tend to become significant correlates of the adult DT outcome, still not with regard to Narcissism, possibly because a grandiose self-belief is often hidden from the outside world and is hence not captured by informant ratings. Overall, it should be noted that the drop in correlation coefficients at wave 3<sup>4</sup> is situated at the onset of adolescence. This puberty onset can be considered a significant transition moment in terms of situational changes, but also in terms of a sudden increased demandingness for maturity and autonomy, neuro-biological changes, and a shifting orientation from family to peers (Soenens, in press). From an assessment viewpoint, questionnaire research during this period may consequently undergo two important implications: First of all, informants (such as mothers) may have a less adequate view on their child's functioning because of an increased orientation of the child toward peers and the often observed (temporary) distance between parents and children during this life-stage (see for instance Keijsers & Poulin, 2013), and second, this period is marked by an increased (mostly temporary) emotionality and behavioral turmoil of the child as well as growing parent-child conflicts, which may actually lead parents to incorrectly judge the temporary behavior of the child as a trait-based manifestation, leading to lower associations with the scores on the respective trait constructs later in life. This transition period of adolescence has also previously been indicated with somewhat lower stability coefficients in studies on rank-order trait consistency that cover the onset of adolescence (De Fruyt, et al., 2006; McCrae et al., 2002). Although the current coefficients do not reflect stability coefficients, they represent in essence a similar statistic parameter (i.e., a Pearson correlation coefficient between similar—although not the same-constructs).

Finally, the current results also indicate that childhood dark side traits are increasingly able to discriminate among more and less prototypical DT profiles. Especially at the transition phase of late adolescence, a peak in discriminatory power was observed. Although a time factor is inherently intertwined with this effect, it can be argued that the current results reflect more than an artifact of time. If only a time effect would have been responsible for the current result, then one would expect to observe small but steady increases in discriminating power across waves, which was apparently not the case. Rather, a threshold model appeared to reflect reality, with an increase during late adolescence, paralleling the accomplishment of neurobiological maturation (Casey, Jones, & Hare, 2008).

Some limitations of the current study need to be addressed as well. First, the current study did not rely on a specific dark side trait measure for children, but has drawn its conceptualization of childhood dark side traits from an established dimensional maladaptive trait measure. It should be noted however, that this measure has a comprehensive coverage in terms of childhood maladaptive traits, including traits representative for each of the dark triad subcomponents as demonstrated by the current conceptual analysis. Second, one subscale of the dark triad had a relatively low internal consistency. Although some researchers argue that the threshold may decrease to .60 for exploratory research (e.g., Hair, Black, Babin, & Anderson, 2010; Robinson, Shaver, Wrightsman, & Andrews, 1991), it needs to be acknowledged that the alpha coefficient of Narcissism was somewhat below the commonly accepted threshold of .70. This might have constrained the correlations between the childhood dark traits and Narcissism and it might also have affected the classification accuracy of the latent class model in the sense that the scores Narcissism were less accurate, which might impact the person-specific profiles. Third, a nonrandom loss of data across time was observed, including a significant drop-out of boys and of children from families with a lower socioeconomic status. Also, families of referred children appeared to show a lower continued participation rate over time.

In sum, this study is a first attempt to model the development of dark traits from childhood onward. The significant shared growth among early dark traits extends the well-known overlap among DT components from a structural to a dynamic level, indicating that DT-traits substantially codevelop over time. Beyond this shared growth, however, future research may further unravel the more unique developmental aspects of each of the DT features and their significance for adult outcomes. The current findings also make an empirical case for the significance of early childhood dark traits to understand the adult aversive trait outcomes of the DT in general, and Psychopathy in particular, further emphasizing that gathering trait information at a young age from multiple informants should become a rule rather than a guideline.

<sup>4</sup> No differences across waves in terms of means, variances, or skewnesses were found for the DIPSI traits. Also, the assessment procedure across the first four waves was standardized, including the same order of questionnaires, administered to the same rater, and at the same time of the year.



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### Call for Nominations

The Publications and Communications (P&C) Board of the American Psychological Association has opened nominations for the editorships of the *Journal of Experimental Psychology: Animal Learning and Cognition*, *Neuropsychology*, and *Psychological Methods* for the years 2020 to 2025. Ralph R. Miller, PhD, Gregory G. Brown, PhD, and Lisa L. Harlow, PhD, respectively, are the incumbent editors.

Candidates should be members of APA and should be available to start receiving manuscripts in early 2019 to prepare for issues published in 2020. Please note that the P&C Board encourages participation by members of underrepresented groups in the publication process and would particularly welcome such nominees. Self-nominations are also encouraged.

Search chairs have been appointed as follows:

- *Journal of Experimental Psychology: Animal Learning and Cognition*, Chair: Stevan E. Hobfoll, PhD
- *Neuropsychology*, Chair: Stephen M. Rao, PhD
- *Psychological Methods*, Chair: Mark B. Sobell, PhD

Candidates should be nominated by accessing APA's EditorQuest site on the Web. Using your browser, go to <https://editorquest.apa.org>. On the Home menu on the left, find "Guests/Supporters." Next, click on the link "Submit a Nomination," enter your nominee's information, and click "Submit."

Prepared statements of one page or less in support of a nominee can also be submitted by e-mail to Sarah Wiederkehr, P&C Board Editor Search Liaison, at [swiederkehr@apa.org](mailto:swiederkehr@apa.org).

Deadline for accepting nominations is Monday, January 8, 2018, after which phase one vetting will begin.