The Links between Dark Personality Traits, Aggression, Mating Behaviour, and Status-Seeking in Adolescence and Adulthood

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Abstract

From an evolutionary perspective, “dark” personality traits are argued to comprise a coordinated system of co-adapted traits that facilitate exploitive, manipulative, and aggressive strategies to vie for valued social and reproductive resources. Three quantitative studies were conducted to examine the cross-sectional and longitudinal associations between dark personality characteristics with bullying (Study 1), delinquency and dating (Study 2), and status-striving (Study 3) in adolescents aged 15–18 (Studies 1–2) and adults aged 18–61 (Study 3). In Study 1, using random-intercept cross-lagged panel modeling in a sample of N = 514 adolescents from ages 15–18 (Grades 10–12), Machiavellianism and psychopathy (but not narcissism) shared significant between-person associations with bullying. Within-person cross-lagged relations supported both disposition- (e.g., Machiavellianism at Grade 10 → bullying at Grade 11) and perpetration-driven pathways (e.g., bullying at Grade 11 → narcissism at Grade 12). In Study 2, cross-lagged panel modeling with the same sample as Study 1 revealed that secondary (i.e., impulsivity), but not primary (i.e., callous-unemotionality), psychopathy as well as delinquency were positively correlated with being in a current dating relationship at Grade 10. An indirect effect was found, whereby secondary psychopathy at Grade 10 positively predicted delinquency at Grade 11, which then predicted being a dating relationship one year later. In Study 3, path analysis with a sample of N = 516 adults aged 18–61 demonstrated that narcissism, Machiavellianism, and psychopathy positively predicted dominance status-striving, whereas only narcissism positively predicted prestige. Indirect aggression mediated the positive associations between psychopathy and sadism with dominance status-striving. Findings from the current dissertation indicate that dark personality traits are dynamically related to bullying and delinquency in youth, as well as aggression in adults, which is of relevance to educators, clinicians, and researchers looking to curb problematic behaviour that can carry significant personal and interpersonal harm.

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List of Acronyms and Abbreviations

1. APSD-SR = Antisocial Process Screening Device–Self-Report
2. CFI = comparative fit index
3. CLPM = cross-lagged panel modeling
4. ICC = Intraclass correlation
5. KMS = Kiddie Mach Scale
6. MLR = maximum likelihood robust estimation
7. NPQC-R = Narcissistic Personality Questionnaire for Children–Revised
8. RI-CLPM = random-intercept cross-lagged panel modeling
9. RMSEA = root mean square error of approximation
10. SD4 = Short Dark Tetrad 4
11. SPSS = Statistical Package for the Social Sciences
12. SRMR = standardized root mean square residual
13. TLI = Tucker-Lewis index

Chapter 1 – General Introduction

Conceptualizations of "evil" have been a recurrent feature across diverse human societies throughout history (Baumeister, 1996; Clasen, 2014; Santilli, 2007). Despite its conceptual familiarity to people, evil has been a challenging topic for psychological scientists to study because of its culturally specific manifestations and symbolisms, as well as its varied definitions (discussed in Baron-Cohen, 2011). To organize research on inter-individual variability in subclinical socially malevolent dispositions, Paulhus and Williams (2002) proposed a tripartite model of distinct but moderately overlapping personality traits called the "Dark Triad" encompassing narcissism, Machiavellianism, and psychopathy. Importantly, it is not a matter of whether people express the above three higher-order dimensions of personality, but rather to what extent they express these traits. Stated differently, youth and adults all possess some level of narcissism, Machiavellianism, and psychopathy; however, there is significant variability in their expression. Since its original conception some 20 years ago, there has been an explosion of research in psychology and other interrelated disciplines on the Dark Triad (see Muris et al., 2017 and Vize et al., 2018 for meta-analyses). Despite a significant amount of scholarly effort devoted toward studying these dark personality characteristics alongside their damaging personal, interpersonal, and societal-level outcomes, several empirical gaps exist in the broader literature.

Although investigators have studied the Dark Triad and aggressive behaviour during different periods of development, most of this work is cross-sectional and focused on young adult university students, which does not provide insight into the temporal ordering of variables (i.e., their sequential ordering over time) among adolescents (Sijtsema et al., 2019). Many researchers have also examined the mating preferences, reproductive strategies, and desirability of adults higher in psychopathy using cross-sectional data (e.g., Atari & Chegeni, 2017; Jauk et al., 2016; Jonason et al., 2017; Jonason et al., 2011; Webster et al., 2016). However, few scholars have assessed the longitudinal relations between psychopathy, particularly its lower order factors (e.g., callous-unemotional traits and impulsivity), in adolescents using more direct markers of mating behaviour, such as current dating status. Furthermore, researchers tend not to test the specific behavioural mechanisms that may mediate mating outcomes over time among those higher in psychopathy, such as delinquency (Rebellon & Manasse, 2004; Seffrin et al., 2009). Limited empirical work has also been devoted toward disentangling the relative contributions of

different dark personality dimensions in predicting the varied ways in which adults may strive for status (Semenyna & Honey, 2015). It remains unclear if particular kinds of aggressive behaviour facilitate certain status-striving strategies among those higher in sinister dispositions. My goal with the current dissertation research was to conduct three quantitative studies revolving around an examination of the cross-sectional and longitudinal relations between "dark" (i.e., malevolent) personality characteristics, aggression, and status-striving across adolescence and adulthood from the perspective of evolutionary psychology.

Chapter 2 includes a detailed discussion of evolutionary psychology to help situate the current dissertation and provide the theoretical grounding that informed each of the three studies. The importance of an evolutionary framework for understanding how personality traits manifest and are maintained across diverse cultural circumstances and time is described. The principal theoretical perspective, life history theory, is then introduced, with a description of current controversies and ongoing discussions regarding its application to the study of human trait covariation. Chapters 3, 4, and 5 represent the three articles that comprise the current dissertation.

In Chapter 3, the longitudinal associations between self-reports on the Dark Triad characteristics and bullying perpetration were examined in a randomly selected sample of 514 Canadian adolescents from age 15–18 (Grades 10–12) using random-intercept cross-lagged panel modeling (RI-CLPM; Hamaker et al., 2015). This research is important because most of the empirical work on the Dark Triad and aggression has involved convenience samples of young adult university students with cross-sectional data. Therefore, there is limited work wherein the Dark Triad dimensions have been collectively examined alongside bullying perpetration (e.g., Baughman et al., 2012), and even less research involving adolescents (e.g., Safaria et al., 2020). Moreover, only a couple of studies have included longitudinal data on each Dark Triad trait and bullying among youth (De Clercq et al., 2017; Sijtsema et al., 2019). Another key limitation of previous studies is that investigators have yet to conduct longitudinal analyses that separate between-person (i.e., inter-individual) from within-person variability (i.e., intra-individual) in the Dark Triad and bullying. Therefore, there is little knowledge available to researchers and practitioners regarding how the Dark Triad characteristics and bullying perpetration collectively develop and influence each other over time between and within adolescents. This information is important to clinicians looking to intervene and curb problematic behaviour, which necessitates

an understanding of when antisocial dispositions (e.g., psychopathy) arise throughout development, and how they are maintained over time.

Notably, each Dark Triad characteristic is a higher-order dimension of personality that embodies lower-order factors (Miller et al., 2019). In Chapter 4, the longitudinal relations between self-reports of two prominent lower-order factors of psychopathy (callous-unemotional traits and impulsivity) with delinquent behaviour and current dating status were assessed using the same randomly selected sample as Study 1 via cross-lagged panel modeling (CLPM; Masten & Cicchetti, 2010). Most of the cross-sectional and longitudinal research on delinquency and mating behaviour in adolescence has focused on sexual behaviour (e.g., number of sex partners) at the neglect of behaviour that is more normative during adolescence, such as dating (Collins et al., 2009). Furthermore, few scholars have collectively studied more antisocial personality traits (e.g., psychopathy) alongside delinquency and indices of mating behaviour in youth longitudinally (Anderson et al., 2017; Thornton et al., 2019; Wymbs et al., 2013). This research is needed to gather greater insight into what promotes and maintains delinquent behaviour among youth, and whether particular factors of psychopathy and dating behaviour need to be considered in this picture.

After Paulhus and Williams (2002) had originally proposed the Dark Triad, some researchers subsequently argued that the triad should be expanded to include the malevolent trait of sadism under the label of the Dark Tetrad (Buckels et al., 2013; Chabrol et al., 2009). Scholarly work on the Dark Tetrad has quickly grown over the past decade; however, there is little empirical work describing how adults higher in these personality traits strive for status. In Chapter 5, self-reports of the Dark Tetrad alongside two general status-striving orientations (dominance and prestige) were assessed in adults aged 18–61 years. The potential mediating role of indirect aggression (e.g., malicious gossip) in helping to explain how those higher in the Dark Tetrad dimensions may effectively strive for status in particular ways was also considered. This research is needed to disentangle the relative contributions of each Dark Tetrad dimension to dominance and prestige status-striving, and what kind of behavioural mechanisms may help to account for these putative relations. This is of theoretical import to researchers studying personality and status, as well as those looking to find ways to encourage more harmonious forms of status-striving in adults.

A general discussion of the main findings of interest are provided in the penultimate chapter of the thesis (Chapter 6), which recaps the novelty and importance of the studies contained in the current dissertation. Chapter 6 further includes a discussion of general limitations that transcend each individual study. A summary of the dissertation research and final remarks are then provided in Chapter 7, which reemphasizes the principal findings of interest for the reader.

Chapter 2 – Theoretical and Conceptual Framework

The Paradigm of Evolutionary Psychology

Proximate and Ultimate Causality

Human psychology manifests through an interaction of physiological, developmental, dispositional, situational, social-cultural, and evolved factors (Alessi, 1992; Confer et al., 2010; Laland et al., 2013; Laland et al., 2011). This necessitates a consideration of proximate factors, such as physiology, attitudes, values, and culture, which address *how* immediate causal mechanisms produce or trigger a behavioural outcome. It also requires examining ultimate factors that concern *why* a certain behaviour manifests and its functional significance in light of evolution. The proximate–ultimate distinction helps to overcome the problematic nature–nurture dichotomy and highlights the complementarity between sociological and evolutionary approaches to studying human psychology (Confer et al., 2010; Davis, 2020).

Adaptations, Intersexual Selection, and Intrasexual Selection

The salience of ultimate causality is core to evolutionary psychology, which is a branch of psychology where researchers inquire about how evolution has shaped human perceptual systems, affect, cognition, and behaviour (Buss, 2009, 2019; Confer et al., 2010; Tooby & Cosmides, 1990). Evolutionary psychologists argue that humans are endowed with evolved psychological mechanisms that develop, become activated, and produce behaviour in response to specific input from the social-ecological environment. The guiding paradigm in evolutionary psychology is based on Darwin's (1859, 1871) theory of natural and sexual selection, whereby heritable traits that facilitate the survival and reproductive success of an organism are transmitted to future generations more often than those traits that detract from an organism's capacity to survive and reproduce. *Adaptations* are an important consequence of this evolutionary process, defined as reliably occurring characteristics among members of a species that were selected in the ancestral past to help overcome adaptive problems that impinged, in some way, on an organism's survival and reproductive success. From the perspective of sexual selection (Darwin, 1871), across species adaptations may be selected because of two interrelated processes: intersexual selection and intrasexual competition. In the context of heterosexual mating, intersexual selection involves competing to display, emphasize, and signal those characteristics that are regarded as attractive by opposite-sex mates. In contrast, intrasexual competition involves conspecifics of the same-sex engaging in rivalry to acquire or retain desired mates and

resources that facilitate mating success, including breeding territory, material goods, and status (Arnocky & Vaillancourt, 2017; Clutton-Brock, 2007; Darwin, 1871).

Mate Competition Strategies

Within a heterosexual framework, the two processes of mate choice and intrasexual combat reciprocally influence one another because the criteria deemed to be attractive by one sex become what opposite-sex individuals compete to emphasize or embody (Buss, 2019; Buss & Schmitt, 1993; 2019). Furthermore, female animals, including women, often select mates who are effective in competing with same-sex rivals because a male's competitive ability may signal good genes, better health, or access to resources (e.g., status; Buss, 1988; Tobias et al., 2012; Walters & Crawford, 1994). Self-promotion (i.e., accentuating or displaying desirable characteristics) and competitor derogation (i.e., acting to lower a rival's mate value or their capacity to compete) are key mate competition strategies that have been studied among humans (Buss & Dedden, 1990). Humans also possess strategies that relate to specific relationship contexts, of which short-term (e.g., casual sexual relationships) and long-term strategies (e.g., marriage; Buss & Schmitt, 1993, 2019) are central. Scholars argue that sexual selection has created unique psychological design features that help in overcoming adaptive problems linked to particular mating strategies, and that these strategies differ in sex-specific ways owing to the unique evolutionary histories of women and men (Buss, 1995, 2019).

Sex Differences in Mate Competition Dynamics. Evolutionary psychologists posit that sex differences (i.e., normative differences in reproductive physiology, anatomy, hormones, and chromosomes; Buss, 1995; Schmitt, 2017) in the intensity, risky, and violent nature of intrasexual competition are attributable to the divergent adaptive problems faced by ancestral female and male animals. Mammalian females, including women, have higher levels of obligatory parental investment than males in the form of gestation (due to internal fertilization), childbearing, and breastfeeding (Trivers, 1972). Among humans, mothers also invest more resources toward their children (e.g., caregiving) than fathers across cultures (Geary, 2010). Furthermore, the survival of mothers is more important for the longevity of offspring than the survival of fathers (Campbell, 1999; Hill & Hurtado, 1996). Taken together, in comparison to men, women invest significantly more in their offspring before and after they are born, they are more important for the survival of their children, and they have lower potential rates of reproduction. Therefore, it likely benefitted the reproductive success of ancestral women, like

most other female mammals, to be selective in their mate choice, as well as to take fewer risks and avoid direct intrasexual rivalry to reduce the likelihood of being physically injured or dying (Arnocky, 2016; Arnocky & Vaillancourt, 2017; Buss, 1995; Campbell, 1999, 2004; Vaillancourt, 2013).

Like most other mammals, men have been shown to engage in more overt and violent forms of intrasexual rivalry with same-sex others, whereas women, like most female mammals, are more selective in their mate choice and less directly combative (Andersson, 1994; Archer, 2009a; Arnocky & Carré, 2016; Darwin, 1871). Nonetheless, humans are among the 5% of mammals that form socially monogamous relationships and engage in biparental care to raise dependent young (Kleiman, 1977; Lukas & Clutton-Brock, 2013). Relative to other species of primate, men invest significantly in their offspring. However, men vary considerably in their desirability as both sexual and romantic partners, which encourages intrasexual rivalry among women for higher quality mates that can provide short-term (e.g., genetic and material) or long-term benefits (e.g., provisioning and paternal investment) for her and her offspring (Arnocky, 2016; Arnocky & Vaillancourt, 2017; Vaillancourt, 2013). Indeed, several authors have shown that many women actively vie with same-sex others for access to mates and resources that facilitate mate competition (e.g., Arnocky et al., 2019; Arnocky & Vaillancourt, 2012; Vaillancourt et al., 2010; Vaillancourt & Sharma, 2011). Nonetheless, women's aggression, their agentic striving for status, and their sexual strategies have not always been appreciated by evolutionary psychologists (Burch, 2020). Although sex differences are important to consider, individual differences, such as in personality, often transcend these group-level disparities.

Individual Differences in Personality as Adaptations

Personality traits are defined as constellations of enduring individual differences in emotion, motivation, thoughts, and behaviour (McCrae, 2018). Evolutionary psychologists once viewed individual differences in personality as "noise" and primarily the consequence of stochastic changes in the environment rather than the product of selection (Tooby & Cosmides, 1990). Several scholars challenged this view, arguing that personality characteristics have simpler precursors in non-human animals, vary significantly from person to person, are highly stable across the lifespan, are partly heritable, and impact a wide range of survival and reproductive outcomes (Buss, 1991, 2009; Gosling, 2008; Nettle, 2006). Variability in personality may be maintained over evolutionary time because of balancing selection, whereby

multiple alleles are preserved in a population (i.e., polymorphisms). This genetic variability can facilitate long-term adaptation to particular ecologies and many human genes appear to have "signatures" of long-term balancing selection (e.g., genes for immunity; Andrés et al., 2009). It is also possible that personality traits are calibrated to varying levels of other phenotypic characteristics (e.g., physical attractiveness) that help to determine their reproductive payoffs (Lukaszewski & Roney, 2011). Inter-individual variability in personality may also manifest because of frequency-dependent selection, whereby traits emerge in response to the relative distribution of phenotypes among individuals within a population (Wolf & McNamara, 2012).

Life History Theory. Using life history theory, evolutionary scholars view personality traits as embodying resource investment trade-offs (e.g., time, energy, and material resources) between the different components of fitness (e.g., survival, health, reproduction, and parenting; da Silva & Salekin, 2015; Davis et al., 2019a, 2019b; Gladden et al., 2009; Jonason et al., 2010; Lalumière et al. 2001; Mishra & Lalumière, 2008; Mishra et al., 2017). These trade-offs influence various life history outcomes, including pubertal timing, the age at which individuals reproduce, and longevity (Sear, 2020). Local social-ecological factors (e.g., environmental unpredictability, mortality risk, and parental care) are important life history parameters that help to determine the relative costs and benefits to fitness associated with the expression of personality characteristics (Ellis et al., 2017; Jonason et al., 2014; Pedneault et al., 2019). Life history theory has proven useful in studying personality traits normatively deemed to be socially desirable, such as agreeableness (being non-judgmental and forgiving), but also those dimensions of personality regarded as socially noxious, such as the interrelated traits that constitute the Dark Triad (Davis et al., 2019a; Gladden et al., 2009; Harris et al., 2007; Jonason et al., 2010; Mishra & Lalumière, 2008).

Evolutionary Perspective of Dark Personality Traits

The Dark Triad is a tripartite model of subclinical personality traits embodying ego-centrism and grandiosity (i.e., narcissism), manipulative and cynical tendencies (i.e., Machiavellianism), and callousness and antisociality (i.e., psychopathy; Paulhus & Williams, 2002). Across varying cultural circumstances, researchers have shown how boys and men often score higher in the Dark Triad traits in comparison to girls and women (Davis et al., 2019a; Jonason & Davis, 2018; Semenyna & Honey, 2015; Stellwagen & Kerig, 2013). These three personality characteristics were originally included in the same model because they share a

significant amount of theoretical and empirical overlap. Nonetheless, researchers suggest that it is beneficial to examine the Dark Triad simultaneously using multivariate approaches to control for the common overlap among each trait to avoid misattributing unique effects to one dimension over others (Davis et al., 2019a; Paulhus et al., 2018).

From a clinical perspective, researchers tend to conceptualize the Dark Triad dimensions as indicative of dysfunction and psychopathology (Edwards et al., 2019; McHoskey, 2001; Miller et al., 2010; Pechorro et al., 2018; Soderstrom, 2003; Walsh et al., 2007). This is sensible, given that the traits of the triad are often associated with, to varying degrees, damaging personal, interpersonal, and societal-level behaviour, such as aggression, violence, and criminality in adolescence (Chabrol et al., 2009; Hawley, 2003; Pechorro et al., 2018) and adulthood (Edwards et al., 2017; Kiehl & Hoffman, 2011; Walsh et al., 2007). Evolutionary scholars have, however, challenged this view, arguing that the subclinical traits comprising the Dark Triad are heritable, manifest in context-specific ways, are cross-culturally and historically apparent, and promote the execution of adaptive strategies that can facilitate reproductive success (da Silva & Salekin, 2015; Davis et al., 2019a; Harris et al., 2007; Hawley, 2003, 2011; Jonason et al., 2017; Krupp, 2013).

Using life history theory, evolutionary scientists propose that the Dark Triad characteristics may constitute an organized system of co-adapted traits that facilitate investment in early sexual development, short-term mating strategies, risk-taking, exploitive and coercive proclivities, and aggressive behaviour; a so-called “fast life history strategy” (da Silva & Salekin, 2015; Davis et al., 2019a; Gladden et al., 2009; Jonason et al., 2010; Jonason & Webster, 2010; Lalumière et al. 2001; Mishra & Lalumière, 2008). This is contrasted with personality traits, such as honesty-humility (avoidance of exploiting others), that appear to be linked to a “slower life history strategy” whereby resources are invested in producing fewer offspring later in development, heightened parental care, risk-aversion, as well as greater physical and psychosocial health (David et al., 2019b). However, the fast–slow continuum of life history has been criticized by some who argue that these strategies do not operate on a single continuum (Holtzman & Senne, 2014). Scholars have also contended that the evolutionary processes that lead to differences between species in life history (Darwinian evolution) are not the same as those that lead to differences in psychological traits among members within a species (e.g., developmental plasticity; Zietsch & Sidari, 2020). Nonetheless, researchers agree that a life

history framework is useful for understanding adaptive trade-offs in personality traits in human and non-human animals, particularly regarding behaviour such as aggression that impacts salient life history outcomes (Del Giudice, 2020; Dhellemmes et al., 2021; Franklin-Luther & Volk, 2021; Figueredo & Jacobs, 2010; Wolf et al., 2007; Visser, 2020).

Chapter 3 – Time-Invariant and Temporal Associations among the Dark Triad and Bullying in Adolescence

Abstract

Few have studied the longitudinal associations between the Dark Triad and bullying in youth and none have examined these relations using analytic techniques that permit separating between- from within-person variability. Random intercept cross-lagged panel modeling was used with three waves of data from a randomly selected sample of 514 Canadian adolescents from ages 15–18 to assess the Dark Triad and bullying over time. Controlling for sex and parental education, at the between-person level, random intercepts for Machiavellianism and psychopathy correlated positively with bullying. At the within-person level, moment-to-moment stability was found in narcissism and Machiavellianism. Residual within-time correlations mirrored bivariate associations, indicating that Machiavellianism and psychopathy shared consistent links with bullying. Cross-lagged effects were found for both disposition- and perpetration-driven pathways.

Keywords: Dark Triad; bullying perpetration; longitudinal; adolescence; random intercept cross-lagged panel model

Introduction

Many researchers have shown how individual differences in the Dark Triad of narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002) are associated with aggressive and antisocial behaviour in adults (see Paulhus et al., 2018 for review). Fewer have assessed these relations in adolescents, particularly regarding bullying perpetration (e.g., Wright et al., 2020). Like most of the scholarship on the Dark Triad (see Muris et al., 2017 and Vize et al., 2018 for meta-analyses), those studying the Dark Triad and different kinds of aggression in adults and youth have tended to use cross-sectional data collected via convenience sampling procedures. Among the important, but limited, longitudinal work (e.g., Sijtsema et al., 2019), researchers have favoured the use of analytic techniques that do not separate between- from within-person variability, such as the traditional cross-lagged panel model (CLPM; Hamaker et al., 2015). Thus, the developmental unfolding of the Dark Triad in youth, as well as how these traits influence one another and predict bullying perpetration over time, particularly at the within-person level, remain equivocal. To attend to these gaps, we examined the between- and within-person longitudinal relations among the Dark Triad and bullying in a random sample of Canadian youth from ages 15 to 18 using a three-wave random intercept cross-lagged panel model (RI-CLPM; Hamaker et al., 2015).

The Dark Triad of Personality

The Dark Triad is a tripartite model of distinct, but overlapping, socially aversive subclinical personality dimensions including narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002). Narcissism describes a proclivity toward egocentrism, grandiosity, entitlement, and exhibitionism (Miller et al., 2011; Raskin & Terry, 1988). Machiavellianism denotes a tendency toward cynicism, manipulation, and the "bi-strategic" use of coercive and prosocial strategies in a context-specific manner (Christie & Geis, 1970; Hawley, 2003). Psychopathy embodies impulsivity, an erratic lifestyle, heartlessness, and antisociality (Hare & Neumann, 2008; Lilienfeld, 2018). Meta-analytic work shows that across different measures, cultures, and demographic characteristics, a medium effect (r = ~.20–.30) characterizes the positive correlation between narcissism and the other two Dark Triad dimensions, whereas a large effect (r = ~.40–.60) describes the correlation between Machiavellianism and psychopathy (Muris et al., 2017; Vize et al., 2018). Due to the theoretical and empirical overlap among the Dark Triad, some researchers encourage using multivariate techniques to isolate the unique

variability accounted for by each dimension to avoid misattributing effects (Furnham et al., 2014; Paulhus et al., 2018). Others argue that there are difficulties in interpreting the residualized variance of the Dark Triad traits, which may lead to problematic inferences (Miller et al., 2019; Vize et al., 2018). Therefore, it is recommended that investigators conduct and report both bivariate and multivariate analyses to facilitate interpretability and to advance theory.

The Dark Triad, Bullying, and Antisocial Behaviour during Adolescence

In conjunction with a stronger expression of "malevolent" personality characteristics during adolescence (Klimstra et al., 2020), the perpetration of various forms of aggressive behaviour, including bullying, also increases during this period of development (Girard et al., 2019; Haltigan & Vaillancourt, 2014). Bullying describes the systematic and repetitive abuse of power to inflict harm on others (Olweus, 1994). Among adolescents, estimates of the prevalence of bullying perpetration range from about 15–35% (see Jadambaa et al., 2019 and Modecki et al., 2014 for meta-analyses). Several researchers have supported cross-sectional links between dark personality characteristics and bullying perpetration in youth (e.g., Wright et al., 2020). In studies where the Dark Triad are collectively assessed in youth, researchers often find that the dimensions are differentially related to bullying at the univariate level, with psychopathy sharing the strongest links (Safaria et al., 2020; Sehar & Fatima, 2016; van Geel, Goemans et al., 2017). At the multivariate level, psychopathy sometimes emerges as the only unique predictor of bullying and at times narcissism falls out of significance.

Many researchers have also studied the Dark Triad dimensions separately alongside aggressive and antisocial behaviour in adolescents with longitudinal data. Over a one-year period among adolescents aged 11 to 13 years, in a hierarchical regression Fanti and Henrich (2015) found that year one narcissism positively predicted year two bullying perpetration. Reijntjes et al. (2016) followed children for three years starting in Grade 4 and found that the within-time correlations between narcissism and total bullying were either small or non-significant. Using a two-wave CLPM with adolescents aged 11 to 14 years, Geng et al. (2017) found significant within-time associations between Machiavellianism with conduct problems. The autoregressive paths among these constructs were also significant, suggesting temporal stability. The cross-lagged path from Machiavellianism to conduct problems was significant, but not the alternative path from conduct problems to Machiavellianism. Frick et al. (2003) studied children from Grades 3–7 and noted differential stability based on trajectory group. Initial parent-reports of low

and high psychopathy scores were stable and consistent with later self-reported psychopathy, whereas those below the normative cut-off score decreased in psychopathy across time. Conduct problems (measured during wave two) significantly predicted being in the high psychopathy trajectory. Using CLPM with two-waves of data, Forsman et al. (2010) reported significant autoregressive paths for psychopathy and antisocial behaviour from ages 16–17 to 19–20, suggesting temporal stability.

In a three-wave longitudinal study of adolescents by Sijtsema et al. (2019), separate CLPMs were created for each individual Dark Triad dimension with antisocial behaviour (a latent construct embodying delinquency and aggression). Most autoregressive paths for narcissism and antisocial behaviour across time were significant, indicating temporal stability. The autoregressions for Machiavellianism and psychopathy were significant for girls, but either small or non-significant for boys. The within-time correlations for Machiavellianism and psychopathy with antisocial behaviour were significant at each time point for both girls and boys. In contrast, the within-time associations for narcissism and antisocial behaviour were either small to moderate, or non-significant. Only a significant positive cross-lagged path from antisocial behaviour (Time 2) to Machiavellianism (Time 3) for boys emerged. Based on these findings, it is challenging to say how the Dark Triad dimensions may have influenced each other and antisocial behaviour over time, because the traits were either examined in separate models (i.e., no shared variance considered) or combined into a single latent construct (i.e., the "dark factor"). This also precluded an assessment of how the Dark Triad dimensions may have been differentially linked with aggression and antisocial behaviour, which has been emphasized by many authors (see Paulhus et al., 2018 for review).

The Present Study

In previous longitudinal work, researchers have often used analytic approaches that are accompanied by the assumption that between- and within-person effects in the Dark Triad and bullying are the same, such as traditional CLPM (Mulder & Hamaker, 2021; Mund & Nestler, 2019). To avoid conflating these different sources of variability, we employed RI-CLPM (Hamaker et al., 2015) using three waves of data with a randomly selected sample of Canadian adolescents from ages 15–18 (Grades 10–12). RI-CLPM involves estimating latent random intercepts that control for the trait-like, time invariant stability of constructs (i.e., the between-person differences) to assess "pure" residual within-person autoregressions, within-time

covariances, and cross-lagged effects. Given that girls/women tend to report lower levels of the Dark Triad dimensions (Muris et al., 2017; Vize et al., 2018) and that parental education is inversely related to adolescent bullying perpetration (Shetgiri et al., 2012), following others (e.g., Geng et al., 2017) we controlled for sex and parental education in the RI-CLPM analyses.

Many argue that the Dark Triad are differentially related to aggressive behaviour (reviewed in Paulhus et al., 2018), and meta-analytic work suggests the bivariate relations between narcissism and bullying may be small to moderate (Kjærvik & Bushman, 2021; van Geel, Toprak et al., 2017). In line with previous cross-sectional research (e.g., Safaria et al., 2020; Sehar & Fatima, 2016; van Geel, Goemans et al., 2017), we predicted that the positive correlations for Machiavellianism and psychopathy with bullying would be significantly stronger than the associations between narcissism and bullying at each time point (Hypothesis 1). We further expected that the between-person latent random intercepts for narcissism, Machiavellianism, psychopathy, and bullying would be positively intercorrelated with one another (Hypothesis 2). Previous work has supported significant between-person temporal stability in narcissism (e.g., Fanti & Henrich, 2015) and Machiavellianism (e.g., Geng et al., 2017). Furthermore, significant within-person residual autoregressive pathways have been supported for bullying in research where RI-CLPM was used (Doty et al., 2020). Therefore, we predicted that the autoregressive paths for narcissism, Machiavellianism, and bullying would be significant, indicating moment-to-moment within-person stability (Hypothesis 3). In contrast, we expected the within-person autoregressive paths for psychopathy to be non-significant. Although several researchers have supported mean-level temporal stability in psychopathy among youth at the between-person level (Forsman et al., 2010; Lynam et al., 2009; Neumann et al., 2011), these stabilities have been moderate in strength (Barry, 2008) or sometimes significant only in girls (Sijtsema et al., 2019). Frick et al. (2003) also argued "While these data support the stability of psychopathic traits in youth, they also clearly indicate that there is some variability in the level of the traits across time" (p. 730). Moreover, traditional CLPM, which has often been used to support the stability of psychopathy, tends to produce higher stabilities in constructs across time when compared to the autoregressive paths in RI-CLPM (Mulder & Hamaker, 2021). At the within-person level, Vaillancourt and Britain (2019) found that the residual autoregressive pathways for primary (callous-unemotional traits) and secondary psychopathy (impulsivity) were small or non-significant. Given that between- and within-person correlations tend to be similar to

one another rather than discrepant (see Orth et al., 2021), we further expected the within-time correlations between the Dark Triad traits, as well as the within-time relations between the Dark Triad with bullying perpetration, to be significant (Hypothesis 4).

In keeping with previous longitudinal work (e.g., Fanti & Henrich, 2015; Forsman et al., 2010; Geng et al., 2017), we predicted that elevated narcissism, Machiavellianism, and psychopathy would positively predict greater bullying across time (i.e., disposition-driven pathways; Hypothesis 5). Nonetheless, given the finding by Frick et al. (2003) that conduct problems preceded elevated psychopathy in adolescents and that researchers tend to assume "disposition-driven pathways" (Sijtsema et al., 2019), we explored cross-lagged relations from bullying perpetration to each Dark Triad trait (i.e., perpetration-driven pathways). In case evidence emerged for both pathways, we intended to examine whether disposition- and perpetration-driven pathways were significantly and uniquely contributing to the final overall model.

Method

Participants

Participants were drawn from the McMaster Teen Study, which is an ongoing longitudinal cohort study in southern Ontario involving an examination of mental health and academic achievement over time. Beginning in 2008, 875 students in Grade 5 (M_{age} = 10.91, *SD* = 0.36) from 51 randomly selected public elementary schools agreed to participate in the study. Of this original sample, 703 students participated in at least one follow-up assessment between Grade 5 (Time 1) and Grade 12 (Time 8). Assessments have continued each year since the initial date of data collection. At Time, 1 median parental education corresponded to "*College diploma or trades certificate*" (*n* = 198, 38.5%). To be included in the analytic sample, participants needed to have data during at least one time point from Time 6 (Grade 10; ages 15–16), Time 7 (Grade 11; ages 16–17), or Time 8 (Grade 12; ages 17–18) from the larger dataset. Longitudinal data for *N* = 514 (56.8%, *n* = 292 girls) adolescents between 15–18 years of age were included in the final analytic sample. Time 6 was selected as the first time point because this is when Machiavellianism was first assessed. At Time 6, when students were in Grade 10, the average age was 16 years (*SD* = 0.34).

Procedure

Ethical approval for the McMaster Teen Study has been obtained for every year of data collection from an appointed institutional research ethics board. Parental consent and child assent have been obtained throughout the course of the study. For the first year of data collection, students were asked to complete paper-and-pencil surveys at school. At each subsequent time point, participants have been asked to complete either a paper-and-pencil or online questionnaire at their place of residence. Participants have been compensated with a gift card that has increased in monetary value throughout the study duration. Self-report measures for narcissism, Machiavellianism, psychopathy, and bullying perpetration were used for the present study. For a comprehensive description of the recruitment procedures for the McMaster Teen Study, please see Vaillancourt et al. (2013).

Materials

Narcissism

The 12-item Narcissistic Personality Questionnaire for Children-Revised (NPQC-R; Ang & Raine, 2009) was used to examine individual differences in narcissism. Specifically, a modified 10-item version of the NPQC-R was employed to examine two components of narcissism: superiority and exploitativeness. An example item included "*If I ruled the world it would be a better place*". Participants responded to items along a 5-point Likert-type response scale ranging from 0 (*Not at all like me*) to 4 (*Completely like me*). Items were averaged to create a total narcissism score (three items were allowed to be missing when calculating composite scores), with higher scores representing a stronger expression of narcissism. This abridged version of the NPQC-R had adequate reliability (Cronbach's alpha and McDonald's omega) in the current study ($\alpha = .81$ and $\omega = .79$ at Grade 10; $\alpha = .81$ and $\omega = .78$ at Grade 11; $\alpha = .82$ and $\omega = .79$ at Grade 12).

Machiavellianism

The 20-item self-report Kiddie-Mach Scale (KMS; Christie & Geis, 1970) was employed to measure aspects of a Machiavellian personality in youth, including the absence of faith in human nature, dishonesty, and interpersonal distrust. An example item included, "*It is never right to tell a lie*" (reverse-scored). Participants responded to items using a 5-point Likert-type scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Mean scale scores were calculated by averaging all of the items on the KMS (six items were permitted to be missing when generating total scale scores), with higher scores reflecting a greater expression of

Machiavellianism. In the current study, the KMS had adequate reliability at each time point (α = .77 and ω = .78; at Grade 10; α = .80 and ω = .80 at Grade 11; α = .81 and ω = .81 at Grade 12).

Psychopathy

The 20-item Antisocial Personality Screening Device–Self-Report (APSD-SR) instrument created by Frick and Hare (2001) was used to examine psychopathic traits. This instrument contains three subscales: the 6-item Callous-Unemotional (e.g., "*You act charming and nice to get what you want*"), 7-item Narcissism (e.g., "*You brag a lot about your abilities, accomplishments, or possessions*"), and 5-item Impulsivity subscale (e.g., "*You do not plan ahead or leave things until the 'last minute'*"). Two additional items were included for the total psychopathy score. Participants responded to items along a 3-point Likert-type response scale ranging from 0 (*Not at all true*) to 2 (*Definitely true*). To prevent statistical artifacts resulting from cross-contamination of item content between the APSD-SR and the psychometric measure for narcissism used in the present study (the NPQC-R), items for the Narcissism subscale were removed. The remaining 13 items were averaged to create a total psychopathy score (four items were allowed to be missing in calculating composite scores), with higher scores describing the heightened expression of psychopathy traits. This abridged version of the APSD-SR had low to adequate reliability in the present study at each time point (α = .73 and ω = .73 at Grade 10; α = .67 and ω = .68 at Grade 11; α = .70 and ω = .70 at Grade 12). The average measure intraclass correlation (ICC) for the abridged APSD-SR subscale for the three time points was $r = .88$, $p < .001$, indicating excellent reliability over time (Koo & Li, 2016).

Bullying Perpetration

Participants first read the following definition of bullying: "There are lots of different ways to bully someone but a bully wants to hurt the other person (it's not an accident), and does so repeatedly and unfairly (the bully has some advantage over the victim). Sometimes a group of students will bully a student. It is not bullying when two students of the same strength quarrel or fight." Respondents were then asked to complete a 5-item bullying perpetration questionnaire (Vaillancourt et al., 2010), with one item assessing general bullying tendencies ("*Since the start of the school year [September], how often have you taken part in bullying another student?*"), physical bullying ("*How often have you taken part in physically bullying others by hitting, shoving, kicking, spitting or beating up others*"), verbal bullying ("*How often have you taken part in verbally bullying others by insults, put downs, or threats?*"), social bullying ("*How often*

have you taken part in bullying others by exclusion, rumors, or getting others not to like someone?"), and cyberbullying respectively ("*How often have you taken part in bullying others using the computer, text messages, or email messages/pictures to threaten someone or make them look bad?*"). Items were rated on a 5-point Likert-type scale, ranging from 0 (*Not at all*) to 4 (*Many times a week*). Items were averaged to create composite scores (one item was allowed to be missing to calculate mean scale scores), which were internally consistent across time points (α = .77 and ω = .83 at Grade 10; α = .81 and ω = .85 at Grade 11; α = .80 and ω = .84 at Grade 12).

Analytic Plan

SPSS (version 27) and Mplus (version 8.1) were used for analyses in the present study. SPSS was used to calculate mean scale scores and to examine missing data. In comparison to those who were not selected, participants in the analytic sample were more likely to identify as a girl, χ^2 (1, N = 875) = 8.04, p = .005; although, this difference was characterized by a small effect (ϕ_{Cramer} = .10; Ferguson, 2016). Parental education was significantly higher for adolescents in the analytic sample in comparison to those who were not selected, t(805) = -7.96, p < .001. This difference was characterized by a medium effect (d = .57; Cohen, 1988). In the analytic sample, across measured variables, an average of 13.7% of the data were missing (min. = 11.9%, max. = 16.1%). To assess whether data were missing at random in the analytic sample, Little's Missing Completely at Random (MCAR) test was run, which indicated that data were missing completely at random, χ^2 (173) = 161.85, p = .718. Nonetheless, there was evidence of covariate-dependent missingness in regard to sex and parental education, which is distinct from Little's MCAR, indicating that these covariates should be controlled for statistically (discussed in Matta et al., 2018).

SPSS was further used to assess evidence of skewness and kurtosis. Structural equation modeling (SEM) procedures depend on the assumption that data are approximately normally distributed with skew values < +/- 3 and kurtosis values < +/- 10 (Kline, 2016). Skewed and kurtotic data can increase the risk of Type I errors by basing parameter and model fit estimates with SEM (Ryu, 2011). If normality was violated, outliers (i.e., extreme scores) were winsorized to the next less extreme value, which helps to retain data and improve statistical power (Reifman & Keyton, 2010). It was expected that bullying perpetration would be positively skewed and leptokurtic, because this has been the case in previous research on adolescents using the same measure of bullying employed in the current study (Farrell & Vaillancourt, 2020; Volk et al.,

2019). SPSS was also used to conduct independent and paired samples *t*-tests, and Pearson product-moment correlations. To test whether the links between bullying with Machiavellianism and psychopathy were significantly stronger than those between bullying and narcissism at each time point (Hypothesis 1), Steiger's *z* (Steiger, 1980) for dependent correlations was used.

Mplus was then used to estimate RI-CLPM models to separate within- from between-person associations within and across time points (Hamaker et al., 2015). To estimate models, full information maximum likelihood estimation (maximum likelihood robust estimation with missing data) was selected. To assess model fit, the χ^2 test of significance, comparative fit index (CFI), Tucker-Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) were used. A non-significant χ^2 suggests adequate model fit; however, this test has been shown to be sensitive to sample size (Kline, 2016). CFI and TLI values > 0.95, RMSEA values < 0.06, and SRMR values < 0.08 indicate adequate model fit (Hooper et al., 2008).

Following Hamaker et al. (2015), an RI-CLPM including between- and within-person model components was estimated. For the between-person portion of the model, random intercepts were generated for the Dark Triad dimensions and bullying. To statistically control for their influence, random intercepts were regressed onto parental education and sex. To test Hypothesis 2, we examined if the random intercepts for the Dark Triad and bullying shared positive correlations with one another. For the within portions of the model, autoregressive paths (e.g., Grade 10 narcissism → Grade 11 narcissism), within-time correlations (e.g., Grade 10 Machiavellianism with Grade 10 psychopathy), and cross-lagged paths (e.g., Grade 10 Machiavellianism → Grade 11 bullying) were estimated. As recommended by Hamaker et al. (2015), we compared this unconstrained base model (i.e., Model 1) to models with equality constraints in repeated parameters (i.e., constrained to be equal over time) for the residual autoregressions (Model 2), within-time correlations (Model 3), and cross-lagged paths (Model 4). We investigated invariance of autoregressions, within-time correlations, and cross-lagged parameters using the Satorra-Bentler scaled χ^2 difference test (Satorra & Bentler, 2001). A significant decline in model fit suggests that effects across time among measured variables are not equal, and that parameters should be freed. Where results yielded non-significant differences, parameter constraints were imposed in a final model (Model 5).

This final model was used to test whether narcissism, Machiavellianism, and bullying had significant "carry-over effects" and moment-to-moment stability (Hypothesis 3), as well as whether the Dark Triad and bullying perpetration shared significant positive within-time associations (Hypothesis 4). The final model was also used to test for disposition-driven pathways for the predicted cross-lagged relations between each Dark Triad characteristic with bullying perpetration one year later (e.g., Grade 10 Machiavellianism → Grade 11 bullying; Hypothesis 5). Evidence for perpetration-driven (e.g., Grade 10 bullying → Grade 11 Machiavellianism) as well as transactional (i.e., reciprocal) pathways were also explored. If evidence in favour of both pathways emerged, we further explored if each was contributing significantly to the final model. This was accomplished by constraining either perpetration-driven (Model 6) or disposition-driven paths (Model 7) to zero and comparing model fit to the final model (Model 5) via the Satorra-Bentler scaled χ^2 difference test. The Mplus syntax used for each model can be found in the supplemental materials file (Appendix A).

Results

Descriptive Statistics

Descriptive statistics were calculated for each measured variable across time points. Skewness (-0.30–0.53, *SE* = 0.15–0.18) and kurtosis (-0.29–0.67, *SE* = 0.23–0.24) values for the NPQC-R, KMS, and APSD-SR fell within acceptable ranges for each time point (skewness < +/-3 and kurtosis < +/-10; Kline, 2016). However, the distributions for bullying perpetration were positively skewed (2.47–4.00, *SE* = 0.11–0.12) and leptokurtic (9.11–30.13, *SE* = 0.22–0.23). Like others studying bullying perpetration (e.g., Farrell & Vaillancourt, 2020; Volk et al., 2019), extreme scores ($M \geq 1.60$; $n = 7$) were winsorized, which remedied issues with skewness (2.07–2.30, *SE* = 0.12) and kurtosis (4.94–6.23, *SE* = 0.22–0.23). A summary of the descriptive statistics can be found in Table 1.

Age and Sex Differences

A series of paired samples *t* tests were then conducted to examine age-related differences, whereas independent samples *t* tests were conducted to assess sex differences. Only one significant age-related difference was found: bullying was higher at Grade 10 in comparison to Grade 12, $t(394) = 2.27$, $p = .024$. Across time points, boys tended to report significantly higher levels of narcissism and Machiavellianism in comparison to girls (see Table 1). However, only

boys reported higher levels of psychopathy at Grade 11. There were no significant sex differences for bullying perpetration.

Bivariate Correlations

Pearson product-moment correlations were conducted to examine between-person associations (see Table 2). Of note, Machiavellianism, psychopathy, and bullying were positively intercorrelated at each time point, whereas narcissism at age Grade 10 and 11 was inconsistently related to the other two Dark Triad dimensions and bullying perpetration. At Grade 10, the correlation between narcissism and bullying was significantly lower than the association for Machiavellianism and bullying, as well as that for psychopathy and bullying (see Table 3; Hypothesis 1). The correlation for psychopathy and bullying was significantly higher than that for Machiavellianism and bullying perpetration. Similarly, at Grade 11 the correlation between narcissism and bullying was significantly lower than the associations for Machiavellianism and psychopathy with bullying. At Grade 12 the relation between narcissism and bullying was significantly lower than that for Machiavellianism and psychopathy with bullying perpetration. The association between psychopathy and bullying was also significantly higher than that for Machiavellianism with bullying.

RI-CLPM Analyses

An RI-CLPM model was first estimated, which included the random intercepts for the Dark Triad dimensions and bullying, along with the autoregressive paths, within-time correlations, and cross-lagged effects, as well as parental education and sex as covariates. This model (Model 1) had excellent fit to the data (see Table 4). Each subsequent model was compared to Model 1 using the Satorra-Bentler scaled χ^2 difference test. No significant difference was found between Model 1 and a model where the autoregressions were constrained to be equal (Model 2). Constraining the residual within-time correlations at Grades 11 and 12 to be equal did not significantly influence model fit (Model 3). In contrast, imposing equality constraints on the cross-lagged paths resulted in a significant deterioration in model fit (Model 4). Given these results, a final model was built (Model 5) where the autoregressive paths and within-time associations at Grades 11 and 12 were constrained, but the cross-lagged paths were free to vary across time.

For the between-person part of the model, unstandardized path estimates indicated that both the random intercept factors for Machiavellianism (0.22, $SE = 0.01$, $p < .001$) and

psychopathy correlated significantly with bullying (0.21, *SE* = 0.01, $p < .001$; Hypothesis 2). Significant standardized estimates can be seen in Figure 1. In contrast, the random intercept for narcissism did not correlate with bullying. Of note, the intercept for narcissism did not correlate with either of the intercepts for Machiavellianism or psychopathy, whereas the random intercepts for Machiavellianism and psychopathy were positively correlated with one another (0.06, *SE* = 0.01, $p < .001$).

Regarding covariates, parental education positively predicted the random intercept for narcissism ($b = 0.07$, *SE* = 0.03, $p = .007$), as well as negatively predicted the intercepts for Machiavellianism ($b = -0.04$, *SE* = 0.02, $p = .035$) and psychopathy ($b = -0.03$, *SE* = 0.01, $p = .007$; see Figure 1 for standardized estimates). Sex predicted the random intercepts for narcissism ($b = -0.20$, *SE* = 0.05, $p = < .001$), Machiavellianism ($b = -0.13$, *SE* = 0.04, $p = .001$), and psychopathy ($b = -0.05$, *SE* = 0.02, $p = .028$), indicating that on average boys scored higher in each dark trait across time. Covariates did not significantly predict the random intercept for bullying.

For the within-person portion of the mode, significant positive autoregressive paths were found for narcissism from Grade 10 to Grade 11, as well as from Grade 11 to 12 ($b = 0.31$, *SE* = 0.10, $p = .002$; estimates for autoregressions from Grades 10–11 and 11–12 are the same because they were constrained to be equal; Hypothesis 3). Significant standardized path estimates can be seen in Figure 2. The positive autoregression for Machiavellianism from Grade 10 to 11 was significant ($b = 0.25$, *SE* = 0.13, $p = .046$), but the pathway from Grade 11 to 12 was only significant for the unstandardized and not the standardized parameter estimate ($\beta = .25$, $p = .056$). In contrast, the autoregressive paths for psychopathy and bullying were not significant.

Most of the within-time correlations were statistically significant in a positive direction at each time point (Hypothesis 4). Of note, Machiavellianism and psychopathy shared significant within-time correlations at Grade 10 (0.02, *SE* = 0.01, $p = .001$), as well as at Grades 11 and 12 (0.02, *SE* = 0.00, $p < .001$; repeated paths at Grades 11 and 12 are the same because they were constrained to be equal). In contrast, narcissism did not correlate significantly with Machiavellianism at Grade 10 and was uncorrelated with psychopathy at each time point. Narcissism was positively related to Machiavellianism at age Grades 11 and 12 (0.03, *SE* = 0.01, $p = .001$). Bullying was related to narcissism at Grade 11 and 12 (0.01, *SE* = 0.01, $p = .009$), but not at Grade 10. Bullying perpetration correlated with Machiavellianism Grade 11 and 12 (0.01,

SE = 0.00, *p* = .002), but the within-time correlation at Grade 10 was only significant for the standardized (*p* = .022) and not the unstandardized path estimate (0.02, *SE* = 0.01, *p* = .064). Bullying correlated with psychopathy at each time point (Grade 10: 0.01, *SE* = 0.01, *p* = .021; Grades 11 and 12: 0.01, *SE* = 0.00, *p* = .005).

Several statistically significant cross-lagged effects emerged, some of which supported predicted disposition-driven pathways (Hypothesis 5). Narcissism at in Grade 10 predicted bullying perpetration at Grade 11 (*b* = 0.24, *SE* = 0.09, *p* = .005), as did Machiavellianism (*b* = 0.26, *SE* = 0.11, *p* = .021). Other cross-lagged effects describing perpetration-driven pathways also emerged. Bullying at Grade 10 predicted Machiavellianism at Grade 11 (*b* = 0.20, *SE* = 0.09, *p* = .017) and bullying at Grade 11 predicted narcissism at Grade 12, but only for the unstandardized (*b* = 0.34, *SE* = 0.17, *p* = .045) and not the standardized parameter estimate (β = .16, *p* = .051). Of note, narcissism at Grade 10 was also found to predict Machiavellianism at Grade 11 (*b* = 0.23, *SE* = 0.09, *p* = .011).

The Satorra-Bentler scaled χ^2 difference test indicated that a model where the disposition-driven paths were constrained to zero (Model 6) differed significantly from the final model (Model 5; see Table 4). Similarly, a model where the disposition-driven paths were fixed to zero (Model 7) differed significantly from the final model. These results suggested that both perpetration- and disposition-driven pathways made a unique contribution to the overall model.

Exploratory Traditional Cross-Lagged Panel Modeling

In previous longitudinal work, some researchers have directly compared traditional CLPM with RI-CLPM in the same study to contrast model fit and parameter estimates. In comparison to RI-CLPM, traditional CLPM tends to result in poorer fit to the data, more consistent cross-lagged effects, and stronger autoregressive path estimates (e.g., Orth et al., 2021). Following these researchers, a traditional CLPM was estimated for the Dark Triad and bullying perpetration, which included one-year autoregressive pathways, within-time correlations, and cross-lagged paths. Sex and parental education were regressed onto measured variables at Grades 10, 11, and 12 to statistically control for their influence. The same procedures used for the RI-CLPM were followed for constraining the autoregressions, within-time associations, and cross-lagged parameters and to compare model fit using the Satorra-Bentler scaled χ^2 difference test. In accordance with previous authors (e.g., Orth et al., 2021) and in line with the critiques of traditional CLPM (Hamaker et al., 2015; Mulder & Hamaker, 2021), we

found that, compared to the final RI-CLPM, the CLPM had poorer fit to the data and inflated stability estimates. These results can be seen in Table S1 and Figure S1 in the supplemental materials (Appendix A).

Discussion

A key issue that continues to stymie the development of research on the Dark Triad is the reliance on cross-sectional data with convenience samples of young adults (Miller et al., 2019; Muris et al., 2017; Vize et al., 2018). Therefore, the developmental unfolding of Dark Triad traits in adolescence has not received much empirical attention. Several researchers have conducted important longitudinal work on the Dark Triad in youth and adults (e.g., Sijtsema et al., 2019). Nonetheless, the analytic approaches used in these studies (e.g., traditional CLPM), have not allowed researchers to distinguish between- from within-person variability in the Dark Triad dimensions over time (Hamaker et al., 2015; Mulder & Hamaker, 2021). Disentangling these different sources of variability is important given evidence that the Dark Triad do not equally manifest and co-occur within individuals (Chabrol et al., 2015; Dinić et al., 2019).

Bivariate Associations between Bullying and the Dark Triad

Consistent with previous cross-sectional research on adolescents (e.g., Sehar & Fatima, 2016; van Geel, Goemans et al., 2017) at the bivariate level Machiavellianism and psychopathy correlated with bullying perpetration at each time point. However, narcissism did not consistently correlate with bullying. We examined whether the bivariate relations among the Dark Triad dimensions with bullying perpetration were significantly different from one another (Hypothesis 1; Miller et al., 2019). Psychopathy and Machiavellianism were found to share significantly stronger associations with bullying at each time point, in comparison to the relations between narcissism and bullying. These findings accord with previous research and provide further evidence for the primacy of psychopathy in the associations between the Dark Triad and bullying perpetration among adolescents (e.g., Safaria et al., 2020; Sehar & Fatima, 2016; van Geel, Goemans et al., 2017).

Random Intercept Cross-Lagged Panel Model Findings

In contrast to previous longitudinal research, RI-CLPM (Hamaker et al., 2015) was used to account for temporal stability as well as time-invariant stability in the Dark Triad and bullying. The inclusion of random intercepts with this approach permitted separating between- from within-person variability. For the between-person portion of the final model, controlling for

sex and parental education, the random intercepts for Machiavellianism and psychopathy were highly correlated (Hypothesis 2). However, the random intercept for narcissism was not significantly related to the intercepts of the other two Dark Triad dimensions. The intercepts for Machiavellianism and psychopathy also shared significant associations with the intercept for bullying perpetration. These findings suggest that, in general, adolescents higher in Machiavellianism and psychopathy, but not necessarily narcissism, are expected to engage in more bullying.

For the within-person portion of the model, controlling for the between-person random intercepts, the residual positive autoregressive paths were significant for narcissism and Machiavellianism from Grade 10 to 11 and Grade 11 to 12, but not for psychopathy or bullying perpetration (Hypothesis 3). This result suggests that there is "moment-to-moment" stability and significant within-person carry-over effects (i.e., inertia) in narcissism and Machiavellianism among adolescents, which is distinct from the trait-like stability captured by the random intercepts (Hamaker et al., 2015; Mulder & Hamaker, 2021). Stated differently, adolescents scoring above their expected means in narcissism and Machiavellianism at one time point were likely to score above their expected means at subsequent occasions (Hamaker et al., 2015; Mulder & Hamaker, 2020; Mund & Nestler, 2019). Although, the positive autoregression for Machiavellianism from Grade 11 to 12 was only significant for the unstandardized estimate. In contrast, psychopathy and bullying scores appeared to lack this moment-to-moment stability over and above the between-person stability accounted for by the random intercepts. Regarding bullying perpetration, this is consistent with some previous work with RI-CLPM wherein autoregressive pathways for bullying in adolescents were either small or non-significant (Filipponi et al., 2020). This could signal meaningful intra-personal change in psychopathy and bullying during adolescence, which could be examined via more rigorous longitudinal analytic procedures that involve estimating and modeling slope factors, such as autoregressive latent trajectory modeling with structured residuals (ALT-SR; see Mund & Nestler, 2019).

Accounting for the between-person correlations among random intercept factors, the residual within-time correlations were similar to the bivariate correlations discussed earlier. Within-individuals, Machiavellianism and psychopathy were positively correlated at each time point (Hypothesis 4). That is, adolescents reporting higher Machiavellianism scores than their expected person-specific mean also exhibited concurrent higher psychopathy scores than they

usually do (Mund & Nestler, 2019). The same relation was found for narcissism and Machiavellianism; however, narcissism shared no significant within-person links with psychopathy. Also complementing the bivariate analyses, the within-time correlations between narcissism and bullying were either small or non-significant. In contrast, the within-time links between Machiavellianism and psychopathy with bullying were significant at each time point. Although, the within-time correlation between Machiavellianism and bullying at Grade 10 was only significant for the standardized pathway. Therefore, at both the between- and within-person level among adolescents, the Dark Triad do not appear to be equally associated with the perpetration of antisocial and aggressive behaviour within specific time points.

Again, accounting for the trait-like time-invariant stability of the Dark Triad and bullying, several of the residual within-person cross-lagged effects were significant. In line with the idea that dark personality traits give rise to bullying perpetration (i.e., the disposition-driven pathway), both narcissism and Machiavellianism at Grade 10 positively predicted bullying at Grade 11 (Hypothesis 5). These cross-lagged effects indicate that increases above the person-specific means for these Dark Triad dimensions is related to higher-than-expected deviations for the person-specific means of bullying (Mund & Nestler, 2019). These findings align with those reported by Fanti and Henrich (2015) for narcissism, as well as Geng et al. (2017) for Machiavellianism. However, these paths were not replicated from Grade 11 to 12. Furthermore, in accordance with the notion that antisocial behaviour may promote more malevolent dispositions (i.e., perpetration-driven pathways), bullying at Grade 10 positively predicted Machiavellianism. This finding aligns with the longitudinal results by Sijtsema et al. (2019), but not with those found by Geng et al. (2017). In contrast to some previous results (e.g., Fanti & Henrich, 2015; Sijtsema et al., 2019), bullying at Grade 11 also positively predicted narcissism at Grade 12, although this pathway was only significant for the unstandardized estimate. We found that disposition- and perpetration-driven pathways were making significant and unique contributions to the final model. These results draw attention to the sentiment provided by Sijtsema et al. (2019) that researchers should be careful to not assume that dark personality traits always precede involvement in aggressive and antisocial behaviour.

Limitations

Despite several strengths of the present work (e.g., relatively large sample, longitudinal data, and within- and between-person analyses), there are important limitations to consider.

Although data across the Dark Triad dimensions and bullying were missing at random, girls and those with educated parents were more likely to be included in the analytic sample. This limits the generalizability of the findings. Some research also indicates that psychopathy may be the strongest correlate of direct forms of aggression (e.g., verbal and physical aggression), while Machiavellianism and narcissism may share stronger positive links with indirect aggression (e.g., malicious gossip and social exclusion; Klimstra et al., 2020). This pattern, however, is not always supported across studies (e.g., Baughman et al., 2012). In the current study, with only one item devoted to each kind of bullying perpetration, we did not feel confident in examining bullying subtypes, which might be fruitful for future researchers to explore. Nonetheless, previous work indicates that bullying severity takes precedence over type (e.g., Haltigan & Vaillancourt, 2018).

Narcissism, Machiavellianism, and psychopathy are also multi-dimensional personality traits, each with lower-order facets (Miller et al., 2019). It is possible that these facets may themselves differentially relate to bullying perpetration. For example, with the NPQC-R (Ang & Raine, 2009), Ang et al. (2010) found that the exploitativeness facet of narcissism correlated positively with bullying. Using the Kiddie Mac Scale (Christie & Geis, 1970), Andreou (2004) found that the manipulation facet of Machiavellianism predicted bullying for girls, whereas for boys a lack of faith in human nature predicted perpetration. Using the APSD-SR (Frick & Hare, 2001), Stellwagen and Kerig (2013) found that the positive correlations between "ringleader bullying" with impulsivity and callous-unemotional traits in youth were similar in strength. Relatedly, the dimensionality of the APSD-SR, which was used in the present research, seems to be a matter of ongoing debate (Collins et al., 2014; Zhang et al., 2019). Therefore, it would be prudent for future researchers to delve into these facets in more depth. Nonetheless, it is advantageous to first assess how the Dark Triad dimensions relate to bullying over time within individuals prior to taking this next step.

It is possible that there was insufficient statistical power to detect some effects in the final RI-CLPM. This might help to explain why some of the cross-lagged parameters, which were characterized by small effects (~β = .10; Adachi & Willoughby, 2015), did not replicate across time. For SEM procedures, which RI-CLPM falls under the umbrella of, a minimum of 300 participants is required (Kline, 2016). Since we are the first to examine within-person effects via RI-CLPM with the Dark Triad and bullying, it is uncertain whether the estimates in the current

study are reflective of the population under examination. In their simulation study, Masselink et al. (2018) indicated that small standardized autoregressive and cross-lagged effects (β ~ .10 to .20) may require over 1000 participants to have power > .80. These authors also demonstrated that traditional CLPM, despite its shortcomings, affords greater power in comparison to RI-CLPM. Nonetheless, the sample size employed in the presents study (N = 514) is consistent with previous research where RI-CLPM was used (e.g., Boer et al., 2020).

Conclusion

We assessed for the first time the between- and within-person relations among the Dark Triad traits and bullying perpetration in a randomly selected sample of Canadian adolescents from ages 15–18 using RI-CLPM (Hamaker et al., 2015). This investigation helps to address the call for more empirical work on the Dark Triad in youth recruited via non-convenience sampling techniques with longitudinal data (Muris et al., 2017; Vize et al., 2018). At the between-person level, we found that the Dark Triad dimensions were differentially related to bullying, with psychopathy sharing the strongest links with perpetration. Controlling for sex and parental education, both the random intercepts for Machiavellianism and psychopathy correlated with the intercept for bullying perpetration. At the between-person level, when accounting for the trait-like time invariant stability of constructs (i.e., the random intercepts), narcissism and Machiavellianism were found to have significant moment-to-moment stability. Residual within-time correlations were similar to the bivariate associations, indicating that only Machiavellianism and psychopathy shared consistent links with bullying. Cross-lagged effects emerged in support of both disposition- and perpetration-driven pathways. These findings are of critical importance to researchers, educators, and clinicians, because they suggest that bullying can be reduced by targeting particular “dark” dispositions, and that the expression of some malevolent personality traits can be diminished via bullying interventions. Our findings also suggest that it may be crucial to tailor bullying interventions “to the individual” in line with their specific personality characteristics, which honours heterogeneity in both the Dark Triad and bullying in youth (Farrell & Vaillancourt, 2020).

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Table 1

Descriptive Statistics and t-tests for all Measures for Each Time Point

			Total		Girls		Boys			
Measures	Min.	Max.	*M*	*SD*	*M*	*SD*	*M*	*SD*	*t*	*p*
NPQC-R										
Grade 10	0.10	4.00	2.09	0.69	1.99	0.72	2.23	0.63	3.73	<.001
Grade 11	0.00	3.90	2.10	0.67	2.02	0.70	2.20	0.61	2.89	.004
Grade 12	0.20	4.00	2.13	0.65	2.04	0.67	2.24	0.61	3.20	.001
KMS										
Grade 10	1.40	3.90	2.53	0.45	2.48	0.43	2.59	0.47	2.64	.009
Grade 11	1.45	4.25	2.55	0.47	2.50	0.45	2.62	0.49	2.68	.008
Grade 12	1.30	4.25	2.55	0.49	2.50	0.46	2.62	0.52	2.49	.013
APSD-SR										
Grade 10	0.00	1.46	0.60	0.30	0.58	0.31	0.62	0.29	1.48	.141
Grade 11	0.00	1.69	0.60	0.28	0.57	0.28	0.63	0.27	2.22	.027
Grade 12	0.00	1.62	0.62	0.29	0.60	0.29	0.65	0.28	1.80	.073
Bullying										
Grade 10	0.00	1.60	0.18	0.30	0.18	0.32	0.17	0.27	-0.29	.769
Grade 11	0.00	1.60	0.16	0.29	0.17	0.30	0.15	0.27	-0.44	.661
Grade 12	0.00	1.60	0.15	0.27	0.15	0.27	0.15	0.27	0.16	.874

Note. NPQC-R = Narcissistic Personality Questionnaire for Children-Revised; KMS = Self-Report Kiddie-Mach Scale; APSD-SR = Antisocial Personality Screening Device–Self-Report.

Table 2

Bivariate Correlations between Variables

	NPQC-R			KMS			APSD-SR			Bullying		
	1	2	3	4	5	6	7	8	9	10	11	12
NPQC-R												
1. Grade 10	---											
2. Grade 11	.71**	---										
3. Grade 12	.66**	.75**	---									
KMS												
4. Grade 10	.08	.11*	.10*	---								
5. Grade 11	.20**	.20**	.17**	.69**	---							
6. Grade 12	.11**	.16**	.18**	.65**	.69**	---						
APSD-SR												
7. Grade 10	.07	.06	.11*	.62**	.50**	.44**	---					
8. Grade 11	.10	.07	.10*	.53**	.59**	.46**	.73**	---				
9. Grade 12	.08	.10*	.12*	.53**	.48**	.59**	.67**	.71**	---			
Bullying												
10. Grade 10	.09	.07	.10*	.30**	.33**	.22**	.40**	.38**	.26**	---		
11. Grade 11	.19**	.21**	.22**	.33**	.38**	.30**	.33**	.40**	.32**	.57**	---	
12. Grade 12	.05	.07	.12*	.21**	.23**	.23**	.28**	.29**	.33**	.52**	.53**	---

Note. *$p < .05$ and **$p < .01$ (two-tailed) with pairwise deletion; NPQC-R = Narcissistic Personality Questionnaire for Children-Revised; KMS = Kiddie Mach Scale; APSD = Antisocial Process Screening Device–Self-Report.

Table 3

Comparison of the Strength of Correlations between the Dark Triad and Bullying

Between-Person Bivariate Correlations				
	Grade 10		*z*	*p*
Narc. ←→ Bull.	<	Mach. ←→ Bull.	3.37	<.001
Narc. ←→ Bull.	<	Psych. ←→ Bull.	5.07	<.001
Mach ←→ Bull.	<	Psych. ←→ Bull.	2.63	.004
	Grade 11			
Narc. ←→ Bull.	<	Mach. ←→ Bull.	2.98	.001
Narc. ←→ Bull.	<	Psych. ←→ Bull.	3.12	.001
Mach ←→ Bull.	<	Psych. ←→ Bull.	0.51	.306
	Grade 12			
Narc. ←→ Bull.	<	Mach. ←→ Bull.	1.85	.032
Narc. ←→ Bull.	<	Psych. ←→ Bull.	3.48	<.001
Mach ←→ Bull.	<	Psych. ←→ Bull.	2.44	.007

Note. *z* = Steiger's *z* for dependent correlations.

Table 4

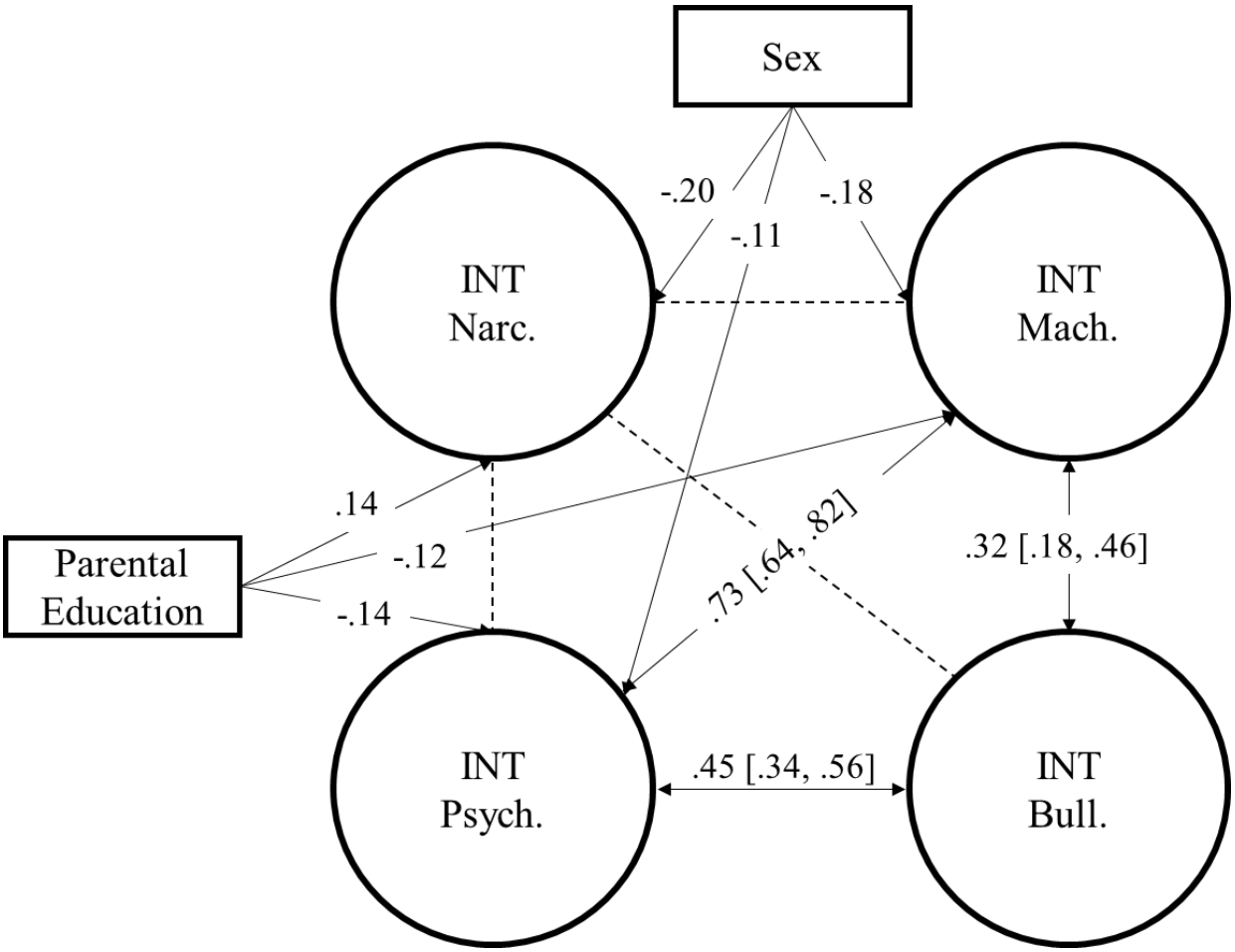
Summary of Model Fit Statistics for the RI-CLPM Analyses

Mod.	$\chi^2(df)$	*p*	CFI	TLI	RMSEA (90% CI)	SRMR	Comp.	$\Delta\chi^2_{SB}(\Delta df)$	*p*
1.	14.782(22)	.871	1.000	1.004	0.000 (0.000-0.019)	0.011	----	**----**	**----**
2.	16.936(26)	.911	1.000	1.010	0.000 (0.000-0.014)	0.014	M2 vs. M1	2.290(4)	.683
3.	23.931(28)	.685	1.000	1.006	0.000 (0.000-0.027)	0.016	M3 vs. M1	9.564(6)	.144
4.	38.151(34)	.286	0.998	0.995	0.015 (0.000-0.037)	0.023	M4 vs. M1	24.147(12)	.019
5.	**25.125(32)**	**.801**	**1.000**	**1.008**	**0.000 (0.000-0.022)**	**0.018**	**M5 vs. M1**	**10.003(10)**	**.440**
6.	40.849(38)	.346	0.999	0.997	0.012 (0.000-0.034)	0.023	M6 vs. M5	13.431(6)	.037
7.	40.623(38)	.356	0.999	0.997	0.012 (0.000-0.034	0.026	M7 vs. M5	13.359(6)	.038

Note. Mod. = model; χ^2 = Chi-square; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Comp. = model comparison; $\Delta\chi^2_{SB}$ = Satorra-Bentler scaled Chi-square difference test. Model 1 = base model; Model 2 = autoregressive paths constrained; Model 3 = within-time correlations at Grade 11 and 12 constrained; Model 4 = cross-lagged paths constrained; Model 5 = Final model (autoregressions across time points and within-time correlations at Grade 11 and 12 constrained to be equal); Model 6 = perpetration-driven pathways constrained to zero; Model 7 = disposition-driven pathways constrained to zero.

Figure 1

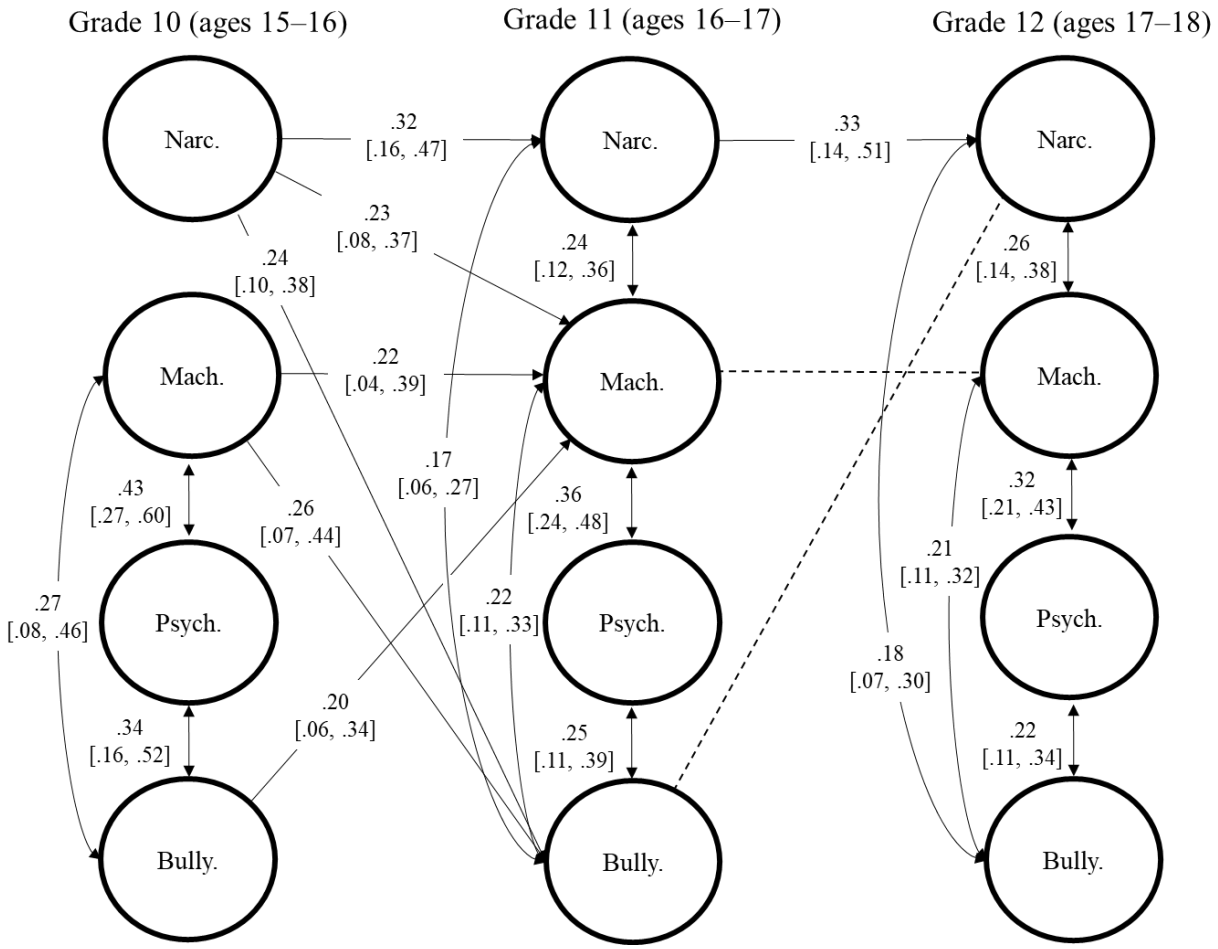
Between-Person Random Intercept Correlations of Dark Triad and Bullying from Grades 10 to 11



Note. Random intercept correlations for Dark Triad and bullying. Sex and parental education regressed onto random intercepts to statistically control for their influence. INT = random intercept. Values represent standardized correlations (*r*) and regression coefficients (β). Dotted lines indicate non-significant paths. Values in square brackets are 95% confidence intervals.

Figure 2

Final RI-CLPM for Dark Triad and Bullying from Grades 10 to 12 (Model 5)



Note. Final RI-CLPM (Model 5) includes autoregressions (constrained to be equal), cross-lagged effects, within-time correlations (constrained to be equal at Grade 11 and 12), and the covariates sex and parental education. Only statistically significant ($p < .05$) paths are shown. Values represent standardized correlations (r) and regression coefficients (β). Dotted lines describe significant paths with unstandardized, but not standardized, estimates. Values in square brackets represent 95% confidence intervals.

Chapter 4 – Longitudinal Associations between Primary and Secondary Psychopathic Traits, Delinquency, and Current Dating Status in Adolescence

Abstract

Many have examined the desirability and mate competition tactics of adults higher on psychopathy using cross-sectional data, but few have studied the longitudinal associations between the lower-order factors of psychopathy (e.g., primary and secondary psychopathy) with indices of mating behaviour in adolescents. More work is also needed to unravel how psychopathic youth outcompete rivals for mates. Delinquency has long been associated with dating and sexual behaviour in adolescents, which may help to explain the competitive success of youth higher in psychopathic traits in vying for mates. We used cross-lagged panel modeling with three waves of data from a randomly drawn sample of 514 Canadian adolescents who provided annual self-reports of primary and secondary psychopathy, delinquency, and dating involvement from Grades 10 to 12 (15–18 years of age). Constructs were temporally stable. Secondary psychopathy and delinquency had positive within-time correlations with current dating status in Grade 10. A cross-lagged pathway from delinquency to dating involvement was supported from Grade 10 to 11, which replicated from Grade 11 to 12. However, this effect was specific to boys and not girls. An indirect effect also emerged whereby secondary psychopathy at Grade 10 increased the likelihood of being in a dating relationship at Grade 12 via heightened delinquency at Grade 11.

Keywords: primary psychopathy; secondary psychopathy; dating; delinquency; adolescence; longitudinal; cross-lagged panel modelling

Introduction

Many researchers have studied the reproductive tactics and desirability of adults higher in psychopathy (Blanchard et al., 2016; Jauk et al., 2016; Jonason et al., 2009; Jones & de Roos, 2017; Rauthmann & Kolar, 2013; Visser et al., 2010). This body of work shows that those expressing heightened psychopathy devote more time and energy toward competing for and gaining access to mates than those lower in psychopathy, particularly in the context of brief romantic and sexual relationships (i.e., short-term mating). Although informative, most of this research has been cross-sectional with convenience samples of adults, precluding an assessment of the temporal ordering and developmental unfolding of these variables in adolescents. Psychopathy is also more often studied at the dimensional level, with less attention devoted to its lower-order factors, such as primary and secondary psychopathy, that appear to be differentially associated with various aspects of mating psychology (Blanchard et al., 2016; Lyons, 2015; Vaillancourt & Sunderani, 2011). Further research is also needed to elucidate the specific mechanism(s) by which individuals higher in psychopathic traits outcompete rivals for mates. Given its concurrent and longitudinal associations with both psychopathy (Geerlings et al., 2020) and mating behaviour in adolescents (e.g., dating; Rebellon & Manasse, 2004), delinquency may help to explain the mating success of those higher in psychopathic traits in adolescence. In the current study, we examined the longitudinal relations between primary and secondary psychopathy, delinquency, and current dating involvement in a randomly drawn sample of Canadian adolescents from Grades 10 to 12 (15–18 years of age).

Psychopathy: A Multidimensional Construct

Psychopathy is a subclinical personality dimension denoting the absence of remorse, impaired empathy, and a callous disposition, as well as erratic, impulsive, and antisocial tendencies (Cleckley, 1941; Hare, 2003). Psychopathy has long been conceptualized as representing two modestly related lower-order factors (Blackburn, 1975; Hare, 1991; Karpman, 1941; Lykken, 1995). The first factor, known as *primary psychopathy*, embodies callousness, flattened affect, manipulation, and a lack of remorse, in addition to low emotional empathy and fear. The second factor, labeled *secondary psychopathy*, encompasses impulsivity, boredom, irresponsibility, and antisocial behaviour. Primary and secondary psychopathy have been shown to be underpinned by unique neurophysiological systems, and exhibit differential relations with cognitive, affective, and psychosocial processes (Yildirim & Derksen, 2015). In comparison to

those higher in primary psychopathy, individuals with a stronger expression of secondary psychopathy have heightened cortisol levels and reactivity (O'Leary et al., 2007; Vaillancourt & Sunderani, 2011), as well as prefrontal (Lasko et al., 2019) and serotonergic deficits (Minzenberg & Siever, 2006), which predisposes them to elevated anxiety (Vaillancourt & Brittain, 2019), emotional instability (Ray et al., 2009), and reactive aggression (Reidy et al., 2011). These findings substantiate the importance of assessing heterogeneity in psychopathy at the factor level (Lilienfeld, 2018).

Psychopathy and Life History Trade-Offs

Given that psychopathy is heritable (Tuvblad et al., 2014), apparent across time (Hervé, 2007) and cultures (Cooke, 1998), shaped by specific developmental experiences (Farrington et al., 2010), and contains precursors (e.g., impulsivity) evident in non-human primates (e.g., chimpanzees; Lilienfeld et al., 1999), evolutionary researchers have considered how it may promote the execution of adaptive strategies that facilitate reproductive success (da Silva & Salekin, 2015; Krupp, 2013; Lalumière et al., 2008; Mealey, 1995; Međedović & Petrović, 2019). Through the lens of life history theory, personality traits like psychopathy are posited to embody resource investment trade-offs (e.g., time, energy, and material resources) between the different components of fitness (e.g., health, reproduction, and parenting; da Silva & Salekin, 2015; Gladden et al., 2009; Jonason et al., 2010; Lalumière et al. 2001; McDonald et al., 2012; Mishra & Lalumière, 2008; Patch & Figueredo, 2017; Visser et al., 2020). Those with elevated levels of psychopathy devote more resources toward short-term mating effort and fewer resources toward personal health, long-term mating effort, and parental investment. Trade-offs in the adaptive costs and benefits of personality characteristics are posited to influence various life history outcomes, including pubertal timing, reproductive age, and longevity (Sear, 2020). For example, higher psychopathy is related to precocious sexual development and an earlier onset of sexual activity (Harris et al., 2007; Sadeh et al., 2021), which has been supported for both primary and secondary psychopathy (Visser et al., 2010).

Psychopathy and Mate Competition

Following this life history perspective, psychopathy is argued to be part of an organized system of co-adapted traits that facilitates investment in early sexual development, short-term mating strategies, risk-taking, sexual deviance, coercion, delinquency, and aggression; a so-called "fast life history strategy" (da Silva & Salekin, 2015; Gladden et al., 2009; Jonason et al.,

2010; Jonason & Webster, 2010; Lalumière et al., 2001; Mishra & Lalumière, 2008; Visser et al., 2020). This is contrasted with personality traits like honesty-humility (avoidance of exploiting others) that are linked to a "slower life history strategy" whereby resources are invested in producing fewer offspring later in development, heightened parental care, risk-aversion, as well as greater physical and psychosocial health (Davis et al., 2019). However, there have been several criticisms of life history theory in evolutionary psychology, particularly regarding personality, which has become fractioned from its roots in biology (Nettle & Frankenhuis, 2020). Some are skeptical that large suites of traits aggregate along a single "fast–slow continuum" (Holtzman & Senne, 2014; Sear, 2020). Others contend that the evolutionary processes that lead to differences *between* species in life history (i.e., Darwinian evolution) are not the same as those that lead to differences in psychological traits among members *within* a species (e.g., developmental plasticity; Zietsch & Sidari, 2020). Some have responded that these critiques are overstated and that several evolutionary mechanisms have been delineated that can align trait covariation at the between- and within-species levels, including frequency-dependent and fluctuating selection (Menie et al., 2021). Regardless of the validity of "fast" or "slow" life history strategies, researchers continue to show how life history theory is useful in studying adaptive trade-offs in various psychological traits, such as psychopathy (Međedović, 2019; Međedović & Petrović, 2019; Viser et al., 2020).

To explain their heightened short-term mating success, researchers have proposed that those higher on psychopathy more often mate opportunistically by lowering their mate preference standards for short-term partners (Jonason et al., 2011) and by committing sexual infidelity in comparison to those lower on psychopathy (Brewer et al., 2015; Jones et al., 2014). People high in psychopathy also use sexually exploitive tactics to manipulate and take advantage of mates, such as by expressing rape-enabling attitudes (Jonason et al., 2017), deceptively self-promoting traits valued by potential mates (Book et al., 2015; Brazil & Forth, 2020), and by abusing partners to retain them through intimidation, fear, and violence (Cunha et al., 2021). Other researchers have speculated that psychopathic individuals may possess "good genes" and attract mates via dominance and flashy displays of status (i.e., conspicuous consumption), as well as by exuding sexiness, confidence, and charisma (Blanchard et al., 2016). These signals would presumably operate in a sex-differentiated manner in line with men's and women's mate preferences (Buss, 1989): psychopathic men's desirability may hinge on dominance and

indicators of resource holding (e.g., status), whereas psychopathic women's attractiveness may be driven by signaling sexual availability. Nonetheless, evidence is mixed regarding whether hypothetical and real psychopathic men and women are actually perceived to be more attractive as short- or long-term mates (Blanchard et al., 2016; Carter et al., 2014; Jauk et al., 2016; Jonason et al., 2015; Rauthmann & Kolar, 2013).

Although informative, most previous research on the relations between psychopathy and mating behaviour has focused on psychopathy at the dimensional level, with less attention devoted to its lower-order factors (Blanchard et al., 2016; Brazil & Forth, 2020; Visser et al., 2010). Across species, mating behaviour encompasses the formation of a pair-bond, courting, copulatory and post-copulatory actions, as well as mate retention (Alexander et al., 1997). Another important limitation of previous work on psychopathy and mating behaviour is that almost all research has involved convenience samples of adults with cross-sectional data. Therefore, much less is known about how the lower-order factors embodying psychopathy in adolescence may be differentially associated with mating behaviour across time.

Adolescent Development, Mating Behaviour, and Personality

Adolescence is a developmental period characterized by emotional, social, morphological, and physiological changes in conjunction with puberty (Baams et al., 2015). This stage of life is marked by increases in peer affiliation, the importance of status hierarchies, risk-taking, sensation-seeking, and heightened emotional reactivity (Ellis et al., 2012; Hymel et al., 2014; Steinberg et al., 2008). Furthermore, competition with peers for mating opportunities intensifies during adolescence (Gallup et al., 2011; Volk et al., 2015). For instance, dating is a salient feature of adolescent courtship and social dynamics, wherein youth assess the romantic and/or sexual compatibility of desired mates (Collins et al., 2009; Seffrin et al., 2009). The expression of "dark" personality characteristics, including psychopathy (Hartung et al., 2021), and the perpetration of peer aggression also increases for many across adolescence (Reijntjes et al., 2013). Antisocial personality traits (Volk et al., 2012; Volk et al., 2015) and aggression (Arnocky & Vaillancourt, 2012; Lee & Vaillancourt, 2018) can promote mating effort and mating success in youth. For example, bullying among adolescents is associated with having more sex partners, which is explained by the expression of heightened antisocial personality characteristics (e.g., lower honesty-humility; Provenzano et al., 2018). Nonetheless, limited

research has been devoted to studying psychopathy and mating behaviour in non-referred adolescents.

Among adolescents in Grades 7 to 12, primary and secondary psychopathic traits were positively correlated with risky sexual behaviour, including number of sex partners and frequency of unprotected sex (Ručević, 2010). These relations were similar for boys and girls. Although, consistent with previous research (Hoyle et al., 2000), secondary psychopathy shared stronger links with risky sexual behaviour. Controlling for sex, callous-unemotional traits in adolescents positively predicted risky sexual behaviour six years later (McCauley et al., 2016). Psychopathy, particularly secondary psychopathy, also positively predicts engaging in various forms of delinquency, and this relation does not appear to be moderated by sex (see Geerlings et al., 2020 for meta-analysis). Like psychopathy, delinquency has long been associated with dating and sexual behaviour (Haynie et al., 2005; Miller & Simon, 1974; Rosenbaum & Kandel, 1990; Savioja et al., 2017).

Relations between Psychopathy, Delinquency, and Mating

Despite its damaging personal, interpersonal, and societal-level outcomes, delinquency, like psychopathy, may function to adaptively confer important social (e.g., status) and reproductive (e.g., dating and sexual partners) benefits to youth (Rebellon & Manasse, 2004). Among boys and girls aged 11–17 years, dating status and delinquent behaviour demonstrated temporal stability, and earlier delinquency positively predicted dating involvement two years later (Rebellon & Manasse, 2004). The reverse pathway from dating to later delinquent behaviour was not supported. Although perceived dating importance did predict later delinquency. In adolescents in Grades 7–11, earlier self- and teacher-reported delinquency (e.g., antisocial behaviour and substance use) correlated with an earlier age of sexual intercourse and number of years of sexual activity (Schofield & Bierman, 2008). In a three-wave longitudinal study of adolescents aged 15–18, dating effort and number of dating partners positively predicted delinquency across time (Seffrin et al., 2009). In adolescents aged 16–18, sexual behaviour in non-romantic relationships positively predicted delinquency six years later (Harden & Mendle, 2011). Therefore, longitudinal research indicates that delinquency and mating behaviour may positively predict one another across time in adolescence.

In some longitudinal work, delinquency, or conduct problems, were assessed alongside psychopathy and mating behaviour in adolescents. Among students in Grade 6, parent-rated

primary psychopathy interacted with conduct problems in predicting sexual debut by Grade 8, but not engagement in unprotected sex in Grade 12 (Wymbs et al., 2013). Conduct problems, but not primary psychopathy, predicted an increased risk of pregnancy by Grade 12. Sex did not moderate these associations. Controlling for sex, race, age, socioeconomic status, and severity-risk screening scores, parent-rated conduct problems positively predicted a composite of self-reported risky sexual behaviour (sexual debut, condom use, and sexual solicitation) among students in Grade 7 (Anderson et al., 2017). In first-time offender adolescent boys aged 13–17, baseline self-reported primary psychopathy positively predicted risky sexual behaviour 18 to 24 months later, which was mediated by increased substance use (controlling for delinquency; Thornton et al., 2019). Thus, previous work supports both concurrent and longitudinal links between psychopathic traits, delinquency, and sexual behaviour in adolescents. Furthermore, evidence suggests that delinquency may mediate (i.e., explain) the positive relations between psychopathic traits and mating outcomes (Thornton et al., 2019).

Delinquency likely increases mating success in sex specific ways, despite largely sex-invariant links between delinquent behaviour with dating and risky sexual activity among adolescents (Anderson et al., 2017; Rebellon & Manasse, 2004; Ručević, 2010; Schofield & Bierman, 2009; Wymbs et al., 2013; but see Seffrin et al., 2009). Like the argument for those who are psychopathic (Blanchard et al., 2016), delinquency in boys might signal desirable attributes such as dominance, bravery, and toughness; qualities that can speak to their possession of "good genes" and the capacity to win physical contests, fend off predators, and provide protection. Women rate these characteristics as attractive in men across societies (Buss, 1989). In contrast, men are especially attentive to cues of sexual availability in the context of short-term mating (Schmitt & Buss, 1996). Since delinquency in adolescent girls is linked to engaging in risky short-term sex with a variety of partners (Anderson et al., 2017; Miller et al., 2010), they may be regarded as attractive dating partners because they signal a greater opportunity for sex. In addition, delinquency can facilitate the acquisition of status in contexts where risk-taking propensities are valued (Rebellon & Manasse, 2004). Although delinquency does not unequivocally grant youth acceptance among their peers (Rulison et al., 2014), minor delinquent acts (e.g., sneaking into a movie without paying) can promote popularity, while more serious forms of delinquency (e.g., assault) can decrease popularity (Allen et al., 2005). Indeed, delinquent youth may be socially magnetic in childhood and early adolescence, but their

antisocial tendencies appear to harm their likeability (i.e., sociometric popularity) in later adolescence (Cillessen & Borch, 2006; Rulison et al., 2014; Young et al., 2014). Furthermore, even if they are not well liked by peers, different kinds of delinquent behaviour can afford adolescents greater social rank, power, and autonomy (Agnew, 1990; Agnew et al., 2008; Garandeau & Lansu, 2019). Evolutionary scholars have emphasized how social status can facilitate outcompeting peers for desired mates in boys and girls, through the strategic use of intimidation and aggression to subordinate rivals (Lee & Vaillancourt, 2018; Vaillancourt & Krems, 2018). Therefore, delinquent youth may both self-promote desirable qualities (i.e., intersexual selection) and exercise their power over peers (i.e., intrasexual competition) to enhance their success when competing for mates (Rebellon & Manasse, 2004).

The Present Study

Many have examined the cross-sectional links between psychopathy with mating behaviour among adults (Jauk et al., 2016; Jonason et al., 2009; Jones & de Roos, 2017; Rauthmann & Kolar, 2013; Visser et al., 2020). However, far fewer have used an evolutionary lens to study the lower-order factors of psychopathy, such as primary and secondary psychopathy, in relation to mating dynamics, particularly using longitudinal data with adolescents. It is also unclear what mechanism(s) account for the relation between more antisocial personality traits and mating behaviour in youth (Provenzano et al., 2018). Delinquency may signal the possession of desirable qualities, including courage, bravery, and formidability in boys and a greater willingness to engage in sexual behaviour in girls (Rebellon & Manasse, 2004), which might help to explain the heightened mating success of youth higher in psychopathic traits. Delinquency shares both cross-sectional and longitudinal relations with psychopathic traits (see Geerlings et al., 2020 for meta-analysis), dating, and sexual behaviour in youth (Eklund et al., 2010; Giordano et al., 2010; McCarthy & Casey, 2008; Miller et al., 2010; Rebellon & Manasse, 2004; Savioja et al., 2017; Seffrin et al., 2009). Few, however, have examined the longitudinal relations between psychopathy, delinquency, and indices of mating behaviour in adolescents (e.g., Anderson et al., 2017; Thornton et al., 2019; Wymbs et al., 2013), and there are some limitations of this empirical work. In this research, risky sexual behaviour (e.g., frequency of unprotected sex) has been measured primarily at the exclusion of more normative forms of mating behaviour during adolescence, such as dating (Rebellon & Manasse, 2004). Furthermore, despite research indicating that secondary psychopathy may share stronger

links with mate-seeking and copulatory behaviour in youth (e.g., Ručević, 2010), primary psychopathic traits have also been the center of attention in previous longitudinal studies.

In this literature, researchers also do not often employ longitudinal analytic techniques that permit controlling for the stability of constructs across time and their concurrent associations within-time, while estimating cross-lagged associations to gather insight into change, such as cross-lagged panel modeling (CLPM; Masten & Cicchetti, 2010). A related point is that many investigators tend to assume that sexual behaviour is an outcome, and not potentially an antecedent, of psychopathy or delinquency (Harden & Mendle, 2011; Seffrin et al., 2009). CLPM enables researchers to simultaneously estimate the direction of cross-lagged effects and to establish temporal priority among constructs (i.e., their sequential ordering over time), which provides critical insight into dynamic developmental processes (Masten & Cicchetti, 2010). In the current study, we generated a three-wave CLPM of primary and secondary psychopathy, delinquency, and dating involvement in a randomly drawn sample of Canadian adolescents from Grades 10 to 12 (15–18 years of age).

Several researchers have posited that psychopathy is part of a "male-typical" strategy that facilitates investment in short-term and exploitive mating tendencies (Brazil & Forth, 2020; Glenn, Kurzban, & Raine, 2011; Jonason et al., 2009). Among youth, boys often self-report higher primary, but not necessarily secondary, psychopathic traits (e.g., Ručević, 2010). Boys also tend to score higher in different measures of delinquency (Seffrin et al., 2009). At the dimensional level, meta-analytic work shows that the relations between psychopathy and delinquency are not moderated by sex in youth (Geerlings et al., 2020), despite some evidence that the link between secondary psychopathy and delinquent behaviour is stronger for boys than for girls (Ručević, 2010). Adolescent boys report greater dating effort and number of dating partners, whereas adolescent girls are more likely to be involved in a dating relationship (Seffrin et al., 2009). Nonetheless, the relations between delinquency and mating behaviour are often not moderated by sex (Anderson et al., 2017; Ručević, 2010; Schofield & Bierman, 2009; Wymbs et al., 2013). Therefore, the relations between psychopathy, delinquency, and dating were not expected to differ by sex. Considering findings from previous cross-sectional and longitudinal research on these constructs in youth, we set out to test the following hypotheses:

Hypothesis 1: Primary and secondary psychopathy, delinquency, and current dating status would be stable across time.

Hypothesis 2: Primary and secondary psychopathy, as well as delinquency would be positively correlated with being in a dating relationship within each time point.

Hypothesis 3: Primary and secondary psychopathy, as well as delinquency would positively predict being in a dating relationship one year later.

Hypothesis 4: Indirect effects would emerge from elevated primary and secondary psychopathy at Grade 10 through increases in delinquent behaviour at Grade 11 to being in a dating relationship one year later.

Method

Participants

Participants were drawn from the McMaster Teen Study, which is an ongoing longitudinal cohort study in southern Ontario of the relations between mental health, well-being, and social behaviour. In 2008, 875 students in Grade 5 (M_{age} = 10.91, SD = 0.36) were randomly recruited from 51 public elementary schools and agreed to participate in the study. Of this initial sample, 704 students agreed to participate in at least one follow-up assessment. Assessments have continued each year since the beginning of data collection. For the current study, longitudinal data for N = 514 (56.8%, n = 292 girls) adolescents between 15 to 18 years of age were drawn from Time 6 (Grade 10; ages 15–16), Time 7 (Grade 11; ages 16–17), and Time 8 (Grade 12; ages 17–18) from the larger dataset. Time 6 was selected as the first time point because this is when dating behaviour was first assessed. At Time 6, when students were in Grade 10, the average age was 16.00 (SD = 0.34).

Procedure

The McMaster Teen Study has received ethical approval for every year of data collection from an institutional research ethics board. Parental consent and child assent have been obtained throughout the course of the study. At each time point, participants have been asked to complete either a paper-and-pencil or online questionnaire at their place of residence. Participants have been compensated with a gift card that has increased in monetary value throughout the study. Self-report measures for psychopathy, delinquency, and dating behaviour were used for the present study (see Vaillancourt et al., 2013 for a discussion of recruitment procedures for the McMaster Teen Study).

Measures

Primary and Secondary Psychopathy

The 20-item Antisocial Personality Screening Device–Self Report (APSD-SR; Frick & Hare, 2001) was used to assess primary and secondary psychopathic traits. The 6-item Callous-Unemotional subscale (e.g., "*You act charming and nice to get what you want*") was used to measure primary psychopathy, whereas the 5-item Impulsivity subscale (e.g., "*You do not plan ahead or leave things until the 'last minute'*") was used to assess secondary psychopathy. Following Vaillancourt and Brittain (2019), the items "*You hide your feelings or emotions from others*" and "*You keep the same friends*" were omitted because they produced unacceptable internal consistencies (α = .37–.47). Participants responded to items along a 3-point scale ranging from 0 (*Not at all true*) to 2 (*Definitely true*). Items were averaged to calculate mean scale scores (no items were allowed to be missing), with higher scores denoting heightened primary and secondary psychopathy. The Callous-Unemotional (α = .61 for Grade 10; α = .54 for Grade 11; α = .54 for Grade 12) and Impulsivity subscales (α = .63 for Grade 10; α = .60 for Grade 11; α = .62 for Grade 12) had low internal consistency in the present study. Average measure intraclass correlations (ICCs) for the Callous-Unemotional (r = .76, p < .001) and the Impulsivity subscales (r = .84, p < .001) suggested good to excellent reliability across time (Koo & Li, 2016).

Delinquency

Delinquent behaviour was assessed using 15 items from the Rule Breaking Behavior Scale of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) youth-report. Respondents reported the degree to which they perpetrated of delinquent acts (e.g., "*I break rules at home, school, or*) over the past six months using a 3-point scale ranging from 0 (*Not true*) to 2 (*Very or often true)*. Items were averaged to create a total score (four items were allowed to be missing), with higher scores describing greater delinquency. The Rule Breaking Behavior Scale was internally consistent across time in the current study (α = .83 for Grade 10; α = .80 for Grade 11; α = .80 for Grade 12).

Current Dating Status

To assess current dating status, participants were asked "*Are you currently dating someone?*" to which they responded either *Yes* (coded 1) or *No* (coded 0). This item serves as an indicator of competitive success in the domain of mate competition and has been successfully employed in previous research on the longitudinal links between aggression and dating behaviour in adolescents (Arnocky & Vaillancourt, 2012).

Analytic Plan

SPSS (version 27) and Mplus (version 8.1) were used to conduct analyses in the present study. SPSS was used to examine missing data, as well as calculate descriptive statistics and independent samples *t*-tests. Cross-lagged panel modeling (CLPM) in Mplus was used to examine the dynamic relations among primary and secondary psychopathy, delinquency, and current dating status over time. Due to the dichotomous nature of the dating status variables, weighted least squares mean and variance adjusted (WLSMV) estimation was used with theta parameterization (DiStefano & Morgan, 2014). The following statistics were employed to assess model fit: the χ^2 test of significance, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the weighted root mean square residual (WRMR). A non-significant χ^2 suggests adequate model fit; however, this test is sensitive to variation in sample size (Kline, 2015). CFI and TLI values > 0.95, RMSEA values < 0.06, and WRMR values < 1 indicate adequate model fit (DiStefano et al., 2018; Hooper et al., 2008).

A series of CLPMs were estimated for primary and secondary psychopathy, delinquency, and current dating status. In each CLPM, one-year (e.g., Grade 10 primary psychopathy → Grade 11 primary psychopathy) and two-year autoregressive paths (e.g., Grade 10 primary psychopathy → Grade 12 primary psychopathy), within-time correlations (e.g., Grade 10 secondary psychopathy with Grade 10 dating status), and one-year cross-lagged paths (e.g., Grade 10 delinquency → Grade 11 dating status) were incorporated. Following others using CLPM (e.g., Kim et al., 2014), this unconstrained base mode was compared to models with equality constraints (i.e., paths constrained to be equal over time) imposed on the one-year autoregressive paths (Model 2), within-time correlations (Model 3), and one-year cross-lagged parameters (Model 4). Imposing equality constraints allows for greater degrees of freedom and aids in model interpretability. To assess invariance of autoregressive paths, within-time associations, and cross-lagged relations, the DIFFTEST command was used (Asparouhov et al., 2006) was used. Significant differences describing a deterioration in model fit suggest that effects across time between variables are unequal, and that the specific parameters of interest (e.g., the autoregressive paths) should be freed. Parameter constraints were imposed in a final Model (Model 5) when comparisons showed no differences. To test for the indirect effect of

delinquency on the predicted relations between primary and secondary psychopathy with dating involvement, 95% bootstrap confidence intervals (N = 5000) in Model 5.

Results

Descriptive statistics for variables can be seen in Table 1. For continuous variables, skewness and kurtosis values fell within acceptable ranges for each time point (skewness < +/-3 and kurtosis < +/-10; Kline, 2015). For dating status, 24.1% (n = 106 of 439) at Grade 10, 30.9% (n = 132 of 427) at Grade 11, and 39.3% (n = 172 of 438) at Grade 12 reported that they were currently in a dating relationship. Compared to those who were not selected, adolescents in the analytic sample were more likely to be a girl, χ^2 (1, N = 875) = 8.036, p =.005, ϕ_{Cramer} = .10. In comparison to those not selected, the parents of adolescents in the analytic sample had higher educational achievement, t(805) = 7.96, p < .001, d = 0.57. Across variables in the analytic sample, an average of 14.1% of the data were missing (min. = 12.6%, max. = 16.9%). Little's Missing Completely at Random test showed that data in the analytic sample were missing completely at random, χ^2 (172) = 173.135, p = .461.

Repeated measures ANOVA analyses showed that boys and girls differed in their expression of primary psychopathy across time points, F(1, 370) = 33.279, p < .001, η^2 = .08 (see Table 1 for means and standard deviations by sex). Pairwise comparisons indicated sex differences at each time point (p < .001), with boys reporting higher scores. No sex differences emerged for secondary psychopathy, F(1, 370) = 0.532, p = .466, η^2 = .00, or delinquency, F(1, 370) = 0.128, p = .721, η^2 = .00. Chi-square tests of independence indicated that there were no sex differences in dating status at Grade 10, χ^2 (1, N = 439) = 3.381, p = .072, Grade 11, χ^2 (1, N = 427) = 2.308, p = .140, or Grade 12, χ^2 (1, N = 438) = 3.044, p = .093.

Pearson correlations revealed that secondary psychopathy, delinquent behaviour, and dating involvement were all positively intercorrelated within and across time points (see Table 2). However, primary psychopathy did not correlate with dating status within and across time. Separate correlations were calculated for boys and girls (see Table 3). Fisher's r-to-z transformations indicated that the correlations between primary psychopathy at Grade 10 with current dating status at Grade 10 (z = -1.96, p = .025) and Grade 11 (z = -1.84, p = .033) were positive for girls and negative for boys. Similarly, the relations between primary psychopathy at Grade 11 with current dating status at Grade 10 (z = -1.85, p = .033), Grade 11 (z = -2.56, p =

.005), and Grade 12 (z = -2.88, p = .002) were positive for girls and negative (or uncorrelated) for boys.

Cross-Lagged Panel Model Analyses

A base CLPM model (Model 1) had excellent fit to the data (see Table 4). Imposing equality constraints on the one-year autoregressive paths (Model 2) resulted in a deterioration in model fit. In contrast, constraining the within-time correlations at Grade 11 and Grade 12 (Model 3) did not influence model fit. Likewise, a model wherein the cross-lagged pathways were constrained to be equal (Model 4) did not differ from the base model. Therefore, equality constraints were imposed on the within-time associations at Grade 11 and Grade 12, as well as the cross-lagged effects in a final model (Model 5). Standardized coefficients (r and β) are reported for analyses below, and unstandardized coefficients (covariances and b) are provided for the final model in Figure 1.

One-year stability paths from Grade 10 to 11 were supported for primary (β = .53, p < .001) and secondary psychopathy (β = .62, p < .001), delinquency (β = .68, p < .001), and dating status (β = .51, p < .001; Hypothesis 1). Likewise, one-year autoregressions from age Grade 11 to 12 for primary (β = .39, p < .001) and secondary psychopathy (β = .50, p < .001), delinquency (β = .21, p < .001), and dating involvement were found (β = .75, p < .001). Two-year autoregressive paths were further supported for primary (β = .22, p < .001) and secondary psychopathy (β = .20, p = .001), as well as for delinquency (β = .44, p < .001), but not for dating involvement.

At Grade 10, primary psychopathy correlated positively with secondary psychopathy (r = .24, p < .001) and delinquency (r = .39, p < .001). Secondary psychopathy also correlated with both delinquency (r = .59, p < .001) and dating involvement (r = .23, p < .001; Hypothesis 2). Delinquency further correlated with dating involvement at Grade 10 (r = .19, p < .001). At Grade 11, primary (r = .10, p = .003) and secondary psychopathy (r = .42, p < .001) correlated positively with delinquency. But dating status did not correlate with primary and secondary psychopathy, as well as delinquency, at Grade 11. At Grade 12, primary (r = .08, p = .002) and secondary psychopathy (r = .37, p < .001) correlated with delinquency, but none of the variables were associated within-time with dating involvement.

Both primary (β = .09, p < .001) and secondary psychopathy (β = .13, p < .001) positively predicted delinquency from Grade 10 to 11, and these paths were replicated from Grade 11 to 12

(primary psychopathy: β = .09, $p < .001$; secondary psychopathy: β = .12, $p < .001$). At Grade 10, secondary psychopathy positively predicted delinquency, (β = .13, $p < .001$), which replicated from Grade 11 to 12 (β = .12, $p < .001$). Cross-lagged effects also emerged for secondary psychopathy at Grade 10 predicting primary psychopathy at Grade 11 (β = .10, p = .001), which was replicated from Grade 11 to 12 (β = .10, p = .001). From Grade 10 to 11, there was a cross-lagged effect from delinquency to dating involvement (β = .15, p = .005), which replicated from Grade 11 to 12 (β = .12, p = .007; Hypothesis 3).

Bootstrap confidence intervals (95%) indicated that secondary, but not primary, psychopathy at Grade 10 was indirectly related to current dating status at Grade 12 through delinquency at Grade 11 (β = .02, p = .041, 95% CI = .004–.028; Hypothesis 4). This indirect association was characterized by a small effect size (~.02; Cohen, 1988).

Exploratory multi-group models for sex were created to test for differences between boys and girls. The DIFFTEST command showed that a model where parameters were free to vary by sex (Model 6) had better fit to the data than a model where paths were constrained to be equal between boys and girls (Model 7; see Table 3), indicating that sex was a moderator (see Figure 2 for boys and Figure 3 for girls). Inspecting the individual paths, the one-year autoregressive pathway from delinquency at Grade 11 to Grade 12 was supported for boys (β = .34, $p < .001$), but not for girls. Primary and secondary psychopathy at Grades 11 and 12 were negatively correlated in boys (Grade 11: r = -.13, p = .004; Grade 12: r = -.15, p = .005), and uncorrelated in girls. Delinquency and dating status at Grade 10 were also positively correlated in girls (r = .24, $p < .001$), but not in boys. And primary psychopathy correlated positively with delinquency at Grades 11 and 12 for girls (Grade 11: r = .17, $p < .001$; Grade 12: r = .16, $p < .001$), but not boys. Across time points, secondary psychopathy positively predicted primary psychopathy (Grade 10 to 11; β = .10, p = .031; Grade 11 to 12; β = .10, p = .025) and delinquency in girls (Grade 10 to 11; β = .20, $p < .001$; Grade 11 to 12; β = .20, $p < .001$), but not for boys. Delinquency only positively predicted dating status across time in boys (Grade 10 to 11: β = .21, p = .015; Grade 11 to 12; β = .18, p = .016), and not for girls. Furthermore, dating status positively predicted impulsivity in boys (Grade 10 to 11: β = .04, p = .035; Grade 11 to 12: β = .12, p = .026), but not for girls. Despite sex differences in the cross-lagged pathways for secondary psychopathy and delinquency, as well as delinquency and dating status, the indirect effect was not found in either model for boys (p = .596) or girls (p = .484).

Discussion

In the current study, the longitudinal associations between primary and secondary psychopathy, delinquency, and current dating involvement were examined in a randomly drawn sample of Canadian adolescents from ages 15–18 (Grades 10–12) via CLPM. There is limited work on the relations between multifaceted "dark" personality traits, like psychopathy, and indices of mating dynamics in youth across time (Volk et al., 2015; Provenzano et al., 2018). It is also important to unravel how adolescents higher in factors of psychopathy successfully appeal to and outcompete peers for mates over time. Because of its previous concurrent and longitudinal associations with both psychopathic traits and mating behaviour in adolescents (Andersen et al., 2017; Thornton et al., 2019; Wymbs et al., 2013), we assessed whether delinquency facilitated the mating success of youth in the context of dating (Rebellon & Manasse, 2004).

In support of Hypothesis 1, across time points the unconstrained one-year autoregressions for primary and secondary psychopathy, delinquency, and dating status were all positive, suggesting temporal stability in paths from Grades 10 to 12. This aligns with previous longitudinal research on youth (Diamantopoulou et al., 2011; Lynam et al., 2009).

In partial support of Hypothesis 2, dating status correlated positively with secondary psychopathy and delinquency at Grade 10. However, these within-time associations did not replicate at age Grade 11 or 12. When using CLPM, within-time correlations at the first wave of data are often stronger than subsequent waves because stability and cross-lagged associations have not yet been controlled for, leading to smaller effects across time points (Masten & Cicchetti, 2010). This may result in a failure to replicate paths, particularly when effect sizes are small, and the positive bivariate correlations for secondary psychopathy (r = .12–.22) and delinquency (r = .13–.25) with dating involvement were small to medium (r = .10–30; Cohen, 1988). Alternatively, these relations may not have replicated at Grade 11 and 12 because of development process whereby secondary psychopathy and delinquency are effective in middle, but not older, adolescence in appealing to and competing for a dating relationship. However, this seems less likely considering evidence that secondary psychopathy (Visser et al., 2010) and delinquency (Savioja et al., 2017) are related to mating outcomes (e.g., number of sex partners) among young adults.

In contrast to Hypothesis 2, primary psychopathy did not correlate with current dating in the final CLPM at any time point. Similar results were found for the bivariate correlations. This

result is consistent with some previous research where secondary psychopathy was a stronger and more reliable predictor of short-term and risky sexual behaviour in youth (Ručević, 2010), and young adults (Kastner & Sellbom, 2012; McDonald et al., 2012; Visser et al., 2010). This is important because primary psychopathic traits have been the predominant focus in previous longitudinal work on psychopathy, delinquency, and risky sexual activity (Anderson et al., 2017; Thornton et al., 2019; Wymbs et al., 2013). Therefore, our results help to demonstrate the importance of assessing both primary and secondary factors of psychopathy to avoid incorrectly attributing unique effects to one over the other when both are not collectively modeled and examined (Lilienfeld, 2018). Furthermore, from an evolutionary perspective, these findings align with the argument that there is an asymmetry in life history trade-offs between the different factors of psychopathy. Secondary psychopathy seems to encourage devoting significantly more resource toward short-term mating effort, at least in young adults (McDonald et al., 2012), at the expense of personal health and the well-being of offspring (Međedović & Kujačić, 2020). Secondary psychopathy also appears to be uniquely associated, at least in young adult women, with a range of risk-taking behaviour, including maintaining more than one long-term relationship simultaneously (Lyons, 2015). Similarly, secondary psychopathy shares stronger links with hypersexuality in young adults (e.g., sexual excitation and compulsivity; Kastner & Sellbom, 2012).

However, there were sex differences in the bivariate correlations and within-time associations for primary psychopathy and dating status. These variables were unrelated among boys. In contrast, in girls, primary psychopathy was positively associated, although inconsistently, with being in a dating relationship at the bivariate level, as well as at Grade 10 in the CLPM. Therefore, primary psychopathy may enhance the dating success of adolescent girls, but not boys. These results, however, contrast with previous findings where no sex differences were found in the relations between primary psychopathy and sexual behaviour among adolescents (Wymbs et al., 2013) and young adults (Visser et al., 2010).

Partial support was found for Hypothesis 3: the cross-lagged relations between delinquency and dating status were positive. Therefore, delinquent behaviour at Grades 10 and 11 increased the likelihood of being involved in a dating relationship one year later. This finding is consistent with past longitudinal work where delinquency predicted perceived dating importance (Rebellon & Manasse, 2004), as well as various indices of risky sexual behaviour,

including frequency of unprotected sex and number of sexual partners (e.g., Miller et al., 2010; Schofield & Bierman, 2008). However, evidence for the alternative pathway—dating status to greater delinquency one year later—was not supported. This contrasts with other work where number of dating partners and dating effort (Seffrin et al., 2009), sexual debut (Armour & Haynie, 2007), and sex in non-romantic contexts (Harden & Mendle, 2011; McCarthy & Casey, 2008) contributed to greater delinquency over time in youth. Also, in contrast to Hypothesis 3, there were no cross-lagged relations between primary and secondary psychopathy with dating. This is despite secondary psychopathy sharing significant positive bivariate relations with dating within and across time, as well as sharing a within-time correlation with dating involvement at Grade 10 in the final CLPM.

Importantly, however, examining pathways by sex indicated that delinquency predicted dating status across time in boys and not girls. This finding runs in contrast to some previous work where delinquency predicted dating involvement for both sexes (e.g., Rebellon & Manasse, 2004). Furthermore, dating status also predicted heightened secondary psychopathy across time among boys. These findings suggests that for boys, delinquency can contribute to future dating success, and that being in a dating relationship may encourage the expression of secondary psychopathy over time.

Primary and secondary psychopathy also both positively predicted delinquency across time, which accords with previous longitudinal work (Geerlings et al., 2020). Furthermore, consistent with past research (e.g., Walters, 2015), delinquency positively predicted secondary psychopathy across time. These findings suggest that secondary psychopathy and delinquency share reciprocal relations and potentiate each other across time in adolescence. The same cannot be said of primary psychopathy. A caveat is that secondary psychopathy only predicted delinquency across time in girls and not boys.

In partial support of Hypothesis 4, secondary, but not primary, psychopathy at Grade 10 was indirectly related to current dating status at Grade 12 through greater delinquency at Grade 11. Therefore, impulsivity appears to encourage mate-seeking behaviour and dating success over time in later adolescence, which is facilitated by engagement in delinquent behaviour. Delinquent youth may be attractive dating partners for sex-specific reasons (Rebellon & Manasse, 2004). Girls may be particularly drawn to delinquent boys because they display a willingness to take risks, bravery, and toughness which can signal a greater capacity to win

physical contests, fend off predators, and provide protection. In contrast, evolutionary scholars highlight how boys and men are particularly attentive to cues of sexual availability in the context of short-term mating (Schmitt & Buss, 1996), and delinquency in girls is reliably linked to engaging in risky short-term sex with a variety of partners (Anderson et al., 2017; Miller et al., 2010). Therefore, perhaps delinquency in girls signals a greater opportunity for sex, which boys find particularly appealing in the context of dating relationships. A similar argument was proposed regarding why more psychopathic women may be attractive to men in the context of short-term mating (Blanchard et al., 2016). Delinquency may also augment the mate value of adolescent girls and boys via heightened power and social status (Agnew, 1990; Agnew et al., 2008), and minor delinquent acts can grant youth popularity (Allen et al., 2005), particularly in early adolescence (Rulison et al., 2014; Young et al., 2014). Social status and popularity not only enhance attractiveness, but they also facilitate social and reproductive competition for boys and girls (Lee & Vaillancourt, 2018; Vaillancourt & Krems, 2018). Thus, delinquency may augment competition for dating relationships through self-promoting attractive qualities (Rebellon & Manasse, 2004), and exercising power over peers.

Limitations and Avenues for Future Work

Despite several important strengths of the current research, such as the use of a non-convenience sample of adolescents with annual repeated assessments, some limitations need to be addressed. Although consistent with previous research wherein the Antisocial Process Screening Device Self-Report (APSD-SR; Frick & Hare, 2001) was used (see Poythress et al., 2006), the internal consistencies of the subscales for Callous-Unemotional Traits (i.e., primary psychopathy) and Impulsivity (i.e., secondary psychopathy) were low. However, the ICC indicated that the subscales were reliable across time. Nonetheless, it would be prudent for future researchers to examine the longitudinal links between psychopathic traits, delinquency, and dating involvement in youth using a different well-validated psychometric instrument for assessing the factors of psychopathy (e.g., the Inventory of Callous-Unemotional Traits; Kimonis et al., 2008).

The way current dating status was assessed is also a limitation of the present study. Although familiar to adolescents, “dating” was not defined for participants, and it is uncertain whether youth and researchers have the same understandings of the construct. For example, youth and researchers are both familiar with the term “bullying,” but conceptualize the

phenomenon differently (Vaillancourt et al., 2008). Relatedly, we could not determine whether adolescents interpreted "dating" as involvement in a short- or long-term committed relationship. Therefore, we could not ascertain whether being in a current dating relationship was driven by short- versus long-term mating effort, which researchers often conflate (Albert et al., 2021). This is important given that psychopathy is associated with a short-term mating orientation (Jonason et al., 2009; Patch & Figueredo, 2017; Tsoukas & March, 2018). Therefore, it is sensible for future investigators to define "dating" for their participants and to use indices that better differentiate short- (e.g., having multiple dating partners) versus long-term dating effort (e.g., forming emotionally intimate dating relationships). Nonetheless, involvement in a dating relationship indicates competitive success in courting and securing a mate, even if non-exclusive and for a brief period (Arnocky & Vaillancourt, 2012).

We also focused on one prominent typology of psychopathy (i.e., primary and secondary psychopathy), but other conceptualizations of the construct have been advanced to capture its multidimensional structure. For example, the triarchic model encompasses three overlapping factors: disinhibition (impulsivity and hostility), meanness (low empathy and exploitativeness), and boldness (confidence and social assertiveness; Patrick & Drislane, 2015). Using this framework, the APSD-SR (Frick & Hare, 2001) emphasizes meanness and disinhibition, which are conceptually similar to primary and secondary psychopathy respectively. Among adult parents, disinhibition was the strongest positive correlate of mate-seeking behaviour (Međedović, 2019), which is consistent with the findings in the current study regarding the relations between secondary psychopathy and being more likely to be in a current dating relationship. Although direct evidence is lacking, some have argued that boldness may increase the desirability of adolescent boys and men in the context of dating (Brazil & Forth, 2020). Therefore, it would be fruitful in future research to examine the triarchic model of psychopathy in relation to delinquency and dating status across time in adolescence.

Also important, the cross-lagged paths were characterized by small effects (~β = .10; Adachi & Willoughby, 2015), as was the indirect effect (~*ab* = .09; Wu et al., 2018). This is common in CLPM analyses where autoregressive pathways are statistically controlled, because these paths tend to be described by large effects which "…removes a large portion of variance in the outcome that is shared with the predictors" (Adachi & Willoughby, 2015, p. 8). Therefore, although meaningful, the strength of the effects needs to be taken into consideration.

Conclusion

In contrast to the idea that psychopathy is indicative of dysfunction or neurological deficits, evolutionary scholars propose that psychopathy may be part of a system of co-adapted traits that encourages investment in brief romantic and sexual relationships (i.e., short-term mating effort) through the use of opportunistic and exploitive mate competition strategies (da Silva et al., 2015; Jonason et al., 2010; Krupp et al., 2013; Lalumière et al., 2001; Međedović & Petrović, 2019; McDonald et al., 2012; Visser et al., 2020). In the current study, a three-wave CLPM of self-reported primary and secondary psychopathic traits, delinquency, and dating involvement was used with a randomly recruited sample of adolescents aged 15–18 years (Grades 10–12). In accordance with previous research, primary and secondary psychopathy, delinquency, and current dating status were temporally stable (Hypothesis 1). Secondary psychopathy and delinquency shared within-time positive relations with dating involvement at age Grade 10, but not Grades 11 and 12 (Hypothesis 2). As predicted, cross-lagged effects emerged from delinquency at ages Grades 10 and 11 to being in a dating relationship at ages Grade 11 and 12 respectively (Hypothesis 3). However, these effects appeared to be specific to boys and not girls. There was also an indirect effect whereby secondary, but not primary, psychopathy at Grade 10 positively predicted being in a current dating relationship at Grade 12 through delinquency at Grade 11 (Hypothesis 4). Results support the utility of an evolutionary perspective in examining the lower-order factors of psychopathy in relation to mating dynamics in adolescents over time, as well as the role of delinquency in facilitating the mating success of youth higher in secondary psychopathic traits.

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Table 1

Descriptive Statistics for Primary and Secondary Psychopathy, and Delinquency

			Total			Boys		Girls	
Measures	*N*	Min.	Max.	*M*	*SD*	*M*	*SD*	*M*	*SD*
Primary Psychopathy									
Grade 10	449	0.00	2.00	0.38	0.39	0.48	0.41	0.31	0.35
Grade 11	434	0.00	2.00	0.37	0.37	0.46	0.39	0.30	0.34
Grade 12	447	0.00	2.00	0.36	0.36	0.44	0.40	0.29	0.32
Secondary Psychopathy									
Grade 10	449	0.00	1.80	0.75	0.41	0.74	0.41	0.75	0.42
Grade 11	434	0.00	1.80	0.73	0.40	0.75	0.42	0.71	0.39
Grade 12	447	0.00	2.00	0.75	0.40	0.76	0.41	0.74	0.40
Delinquency									
Grade 10	446	0.00	1.67	0.31	0.28	0.30	0.25	0.32	0.30
Grade 11	434	0.00	2.00	0.35	0.28	0.34	0.25	0.36	0.29
Grade 12	448	0.00	1.67	0.39	0.28	0.40	0.30	0.38	0.27

Note. Significant sex differences were found for primary psychopathy at Grades 10, 11, and 12.

Table 2

Bivariate Correlations between Measured Variables

	Primary Psychopathy			Secondary Psychopathy			Delinquency			Dating Status		
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Prim. Psy.												
1. Grade 10												
2. Grade 11	.54**											
3. Grade 12	.46**	.51**										
Secon. Psy.												
4. Grade 10	.24**	.23**	.22**									
5. Grade 11	.21**	.13**	.21**	.64**								
6. Grade 12	.23**	.14**	.21**	.58**	.66**							
Delinquency												
7. Grade 10	.39**	.28**	.22**	.57**	.45**	.39**						
8. Grade 11	.35**	.34**	.28**	.55**	.59**	.47**	.79**					
9. Grade 12	.35**	.31**	.26**	.50**	.43**	.56**	.68**	.67**				
Dating Stat.												
10. Grade 10	-.02	.04	.06	.18**	.18**	.17**	.17**	.18**	.13**			
11. Grade 11	.08	.06	.06	.22**	.19**	.15**	.24**	.25**	.17**	.48**		
12. Grade 12	.05	.09	.05	.14**	.10*	.12*	.22**	.23**	.18**	.28**	.51**	

Note. Bivariate correlations significant at *$p < .05$ and **$p < .01$ (two-tailed).

Table 3

Bivariate Correlations for Boys and Girls

	Primary Psychopathy			Secondary Psychopathy			Delinquency			Dating Status		
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Prim. Psy.												
1. Grade 10	-----	.50**	.47**	.28**	.27**	.22**	.41**	.38**	.37**	.09$_a$	.17*	.15$_b$*
2. Grade 11	.54**	-----	.52**	.28**	.22$_c$**	.17**	.34**	.45$_d$**	.35**	.14$_e$*	.19$_f$**	.24$_g$**
3. Grade 12	.39**	.47**	-----	.32$_h$**	.26**	.35$_i$**	.29**	.38$_j$**	.34$_k$**	.12	.10	.14*
Secon. Psy.												
4. Grade 10	.20**	.18*	.13$_h$	-----	.61**	.51$_l$**	.60**	.61$_m$**	.50**	.20**	.29$_n$**	.21**
5. Grade 11	.14	.02$_c$	.15*	.68**	-----	.60$_o$**	.47**	.64**	.45**	.18**	.15*	.12
6. Grade 12	.23**	.10	.08$_i$	.65$_l$**	.72$_o$**	-----	.33$_p$**	.46**	.52**	.15*	.09	.14*
Delinquency												
7. Grade 10	.42**	.25**	.17*	.52**	.44**	.48$_p$**	-----	.79**	.65$_q$**	.21**	.26**	.24**
8. Grade 11	.33**	.22$_d$**	.18$_j$*	.46$_m$**	.54**	.49**	.77**	-----	.63$_r$**	.26$_s$**	.28**	.28**
9. Grade 12	.33**	.26**	18$_k$*	.51**	.41**	.59**	.75$_q$**	.75$_r$**	-----	.16*	.15*	.22**
Dating Stat.												
10. Grade 10	-.10$_a$	-.05$_e$	.03	.15*	.20*	.22**	.09	.05$_s$	.10	-----	.54$_t$**	.36$_u$**
11. Grade 11	.01	-.06$_f$	.05	.11$_n$	.24**	.22**	.20**	.21**	.21**	.38$_t$**	------	.57$_v$**
12. Grade 12	-.04$_b$	-.05$_g$	-.00	.05	.09	.10	.17**	.15	.14	.15$_u$	.41$_v$**	-----

Note. Bivariate correlations significant at $^{*}p < .05$ and $^{**}p < .01$ (two-tailed). Correlations for boys are below and for girls above the diagonal. Correlations with matching subscripts differ between boys and girls at the $p < .05$ (two-tailed) level using Fisher's *r*-to-*z* transformations.

Table 4

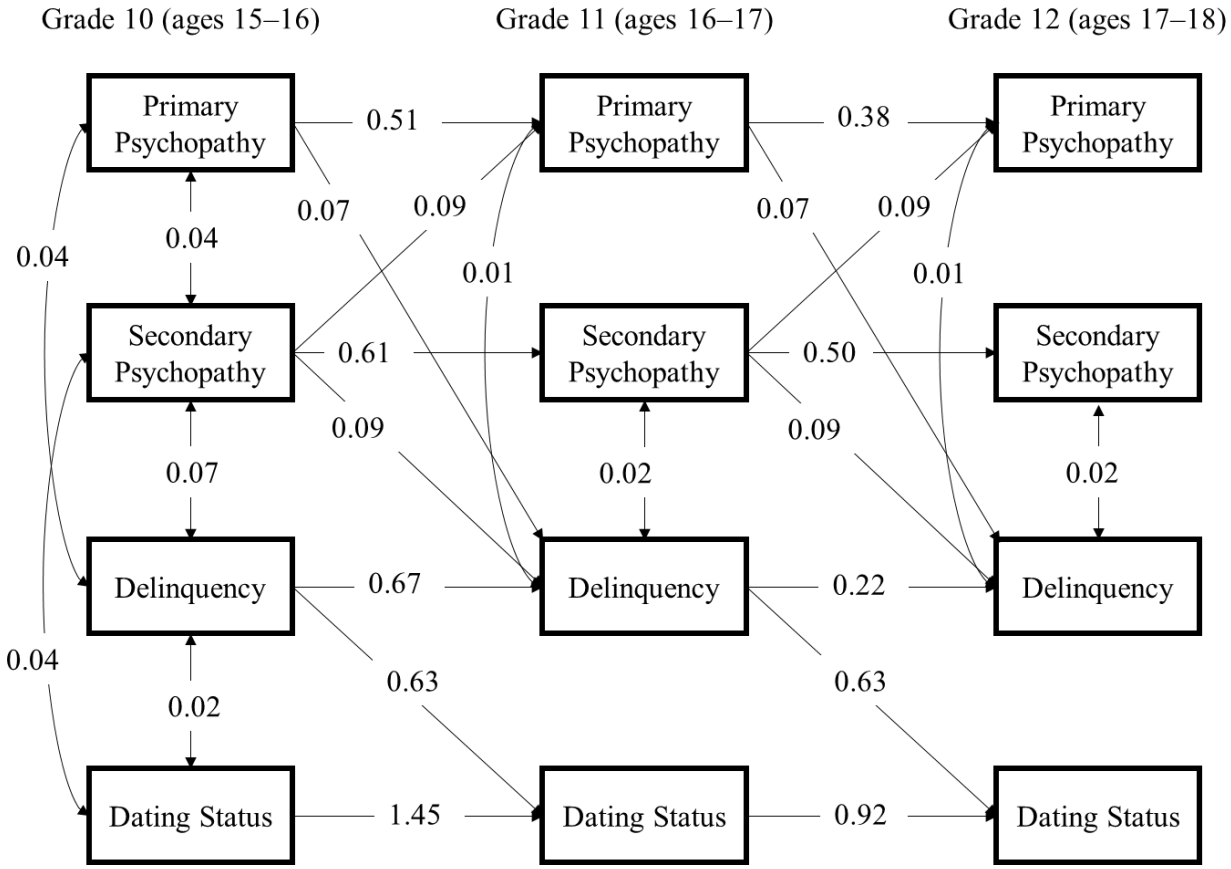
Model fit Statistics for CLPM Analyses

Mod.	χ^2 (*df*)	*p*	CFI	TLI	RMSEA (90% CI)	WRMR	Comp.	$\Delta\chi^2$(*df*)	*p*
1.	10.624(12)	.561	1.000	1.005	0.000 (0.000-0.041)	0.155	----	----	----
2.	35.588(16)	.003	0.988	0.951	0.049 (0.027-0.070)	0.314	2 vs. 1	19.290(4)	<.001
3.	23.716(18)	.165	0.997	0.987	0.025 (0.000-0.049)	0.250	3 vs. 1	11.830(6)	.066
4.	28.261(24)	.249	0.997	0.993	0.019 (0.000-0.042)	0.329	4 vs. 1	15.849(12)	.198
5.	**40.698(30)**	**.092**	**0.993**	**0.986**	**0.026 (0.000-0.045)**	**0.419**	**5 vs. 1**	**27.375(18)**	**.072**
6.	71.468(60)	.148	0.993	0.984	0.027 (0.000-0.049)	0.538	----	----	----
7.	148.758(96)	<.001	0.966	0.954	0.046 (0.031-0.060)	1.233	7 vs. 6	68.757(36)	.001

Note. Mod. = model; χ^2 = Chi-square; CFI = comparative fit index; TLI=Tucker-Lewis index; RMSEA = root mean square error of approximation; WRMR = weighted root mean square residual; Comp. = model comparison; $\Delta\chi^2$ = Chi-square difference for DIFFTEST. Model 1 = base model; Model 2 = one-year autoregressive paths constrained; Model 3 = within-time correlations at Grades 11 and 12 constrained; Model 4 = cross-lagged paths constrained; Model 5 = within-time correlations at Grades 11 and 12 and cross-lagged effects constrained to be equal (Final Model); Model 6 = multi-group model where paths were free to vary by sex; Model 7 = multi-group model where paths for boys and girls were held equal.

Figure 1

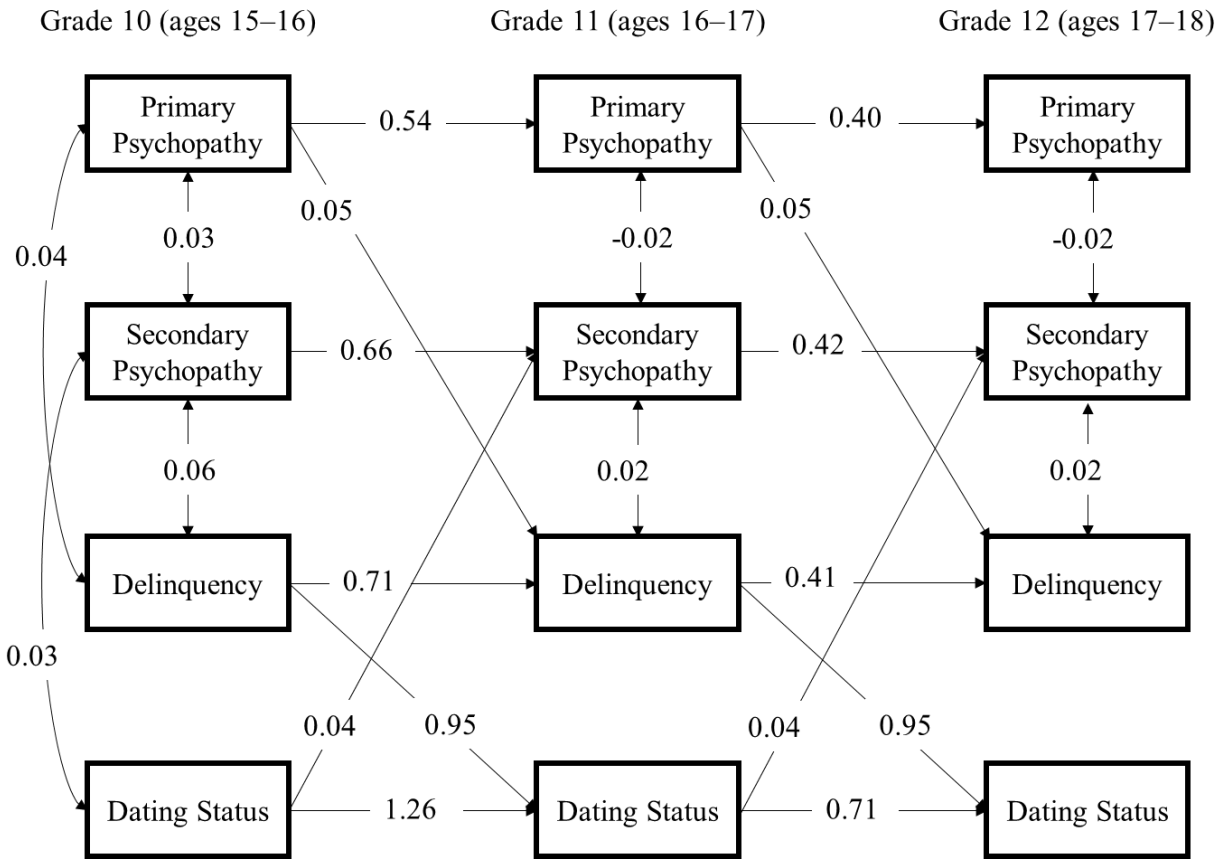
CLPM for Primary and Secondary Psychopathy, Delinquency, and Dating from Grades 10 to 12



Note. Above CLPM (Model 5) includes one- and two-year autoregressions, within-time correlations, and cross-lagged effects. Equality constraints imposed on within-time correlations at Grade 11 and 12, as well as the cross-lagged paths. Statistically significant ($p < .05$) values are unstandardized covariances and regression coefficients (*b*).

Figure 2

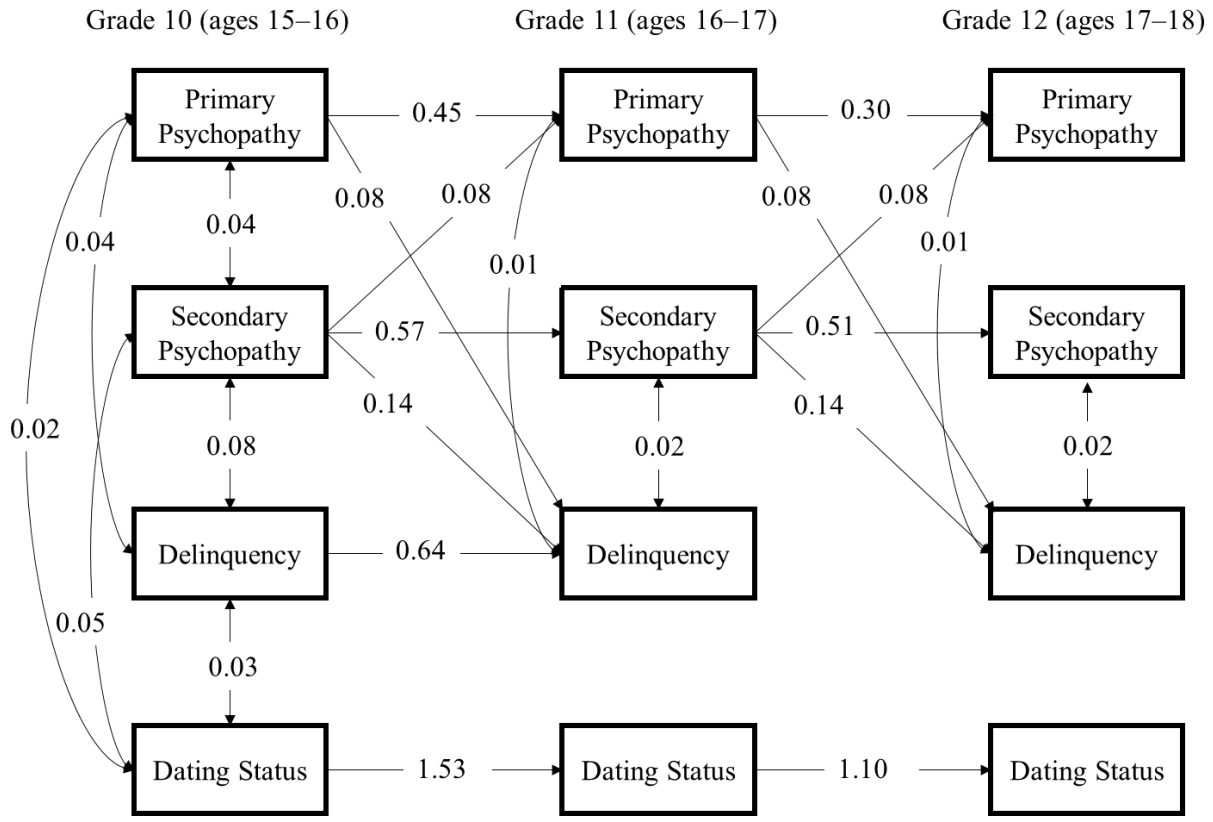
CLPM for Primary and Secondary Psychopathy, Delinquency, and Dating from Grades 10 to 12 for Boys



Note. Above CLPM for boys includes one- and two-year autoregressions, within-time correlations, and cross-lagged effects. Equality constraints imposed on within-time correlations at Grade 11 and 12, as well as the cross-lagged paths. Statistically significant ($p < .05$) values are unstandardized covariances and regression coefficients (*b*).

Figure 3

CLPM for Primary and Secondary Psychopathy, Delinquency, and Dating from Grades 10 to 12 for Girls



Note. Above CLPM for girls includes one- and two-year autoregressions, within-time correlations, and cross-lagged effects. Equality constraints imposed on within-time correlations at Grade 11 and 12, as well as the cross-lagged paths. Statistically significant ($p < .05$) values are unstandardized covariances and regression coefficients (*b*).

Chapter 5 – The Differential Relations between the Dark Triad with Dominance and Prestige Status-Striving Through Indirect Aggression

Abstract

Evolutionary scholars have highlighted how there are two normative approaches to enhancing one's status: dominance and prestige. Several individual differences have been found to differentially predict dominance and prestige status-seeking. The four socially aversive personality dimensions embodied within the Dark Tetrad (narcissism, Machiavellianism, psychopathy, and sadism), seem to be important in understanding the nuance between dominance and prestige. Nonetheless, few researchers have assessed these relations and it is unclear what behavioural mechanisms may facilitate status-striving orientations among those with "darker" personality traits. In the current study, 516 North American adults (M_{age} = 37.90, SD = 12.76; 53.1% women) completed self-report measures for the Dark Tetrad, dominance and prestige status-striving, and the perpetration of indirect aggression. Using path analysis, narcissism, Machiavellianism, and psychopathy, but not sadism, positively predicted dominance status-striving, whereas only narcissism positively predicted prestige. The perpetration of indirect aggression was found to mediate the links between psychopathy and sadism with dominance status-striving. Results reaffirm the importance of considering more malevolent personality characteristics regarding the different ways in which adults strive for, accrue, and maintain status. The strategic use of indirect aggression may be a salient means through which those higher in psychopathy and sadism pursue dominance status-striving.

Keywords: Dark Tetrad; status; dominance; prestige; indirect aggression; path analysis

Introduction

Human beings are a highly social species, which is reflected in our extensive social networks, our enhanced capacity for cooperation, and our proclivity toward reciprocal altruism (i.e., the helping of unrelated individuals in the absence of immediate repayment; Brañas-Garza et al., 2017; Melis & Semmann, 2010; Tomasello, 2014; Trivers, 1971). Prosocial behaviour (i.e., behaviour intended to benefit another) is argued to be important for encouraging mutual helping, maintaining social harmony, and achieving societal stability (Stürmur & Snyder, 2009; Guo, 2017). As such, prosocial tendencies can effectively enhance one's likeability and social status (Kafashan et al., 2014). However, several occupations in modern society, such as positions in law, medicine, and business, may encourage the use of callous, exploitive, and "cutthroat" tactics to get ahead and reach the upper echelons of an organization (Hare, 2006; Kay & Saucier, 2020; Pan & Yu, 2017). This suggests that there may qualitatively different ways that people strive for and augment their social standing.

Dual Model of Social Hierarchy

According to Henrich and Gil-White's (2001) dual model of social hierarchy, humans express two general strategies that function to accrue status: dominance and prestige. Dominance involves the use of intimidation, manipulation, and coercion to gain status, which has a long evolutionary history and can been observed in several species of primates (de Waal, 1986; Cheng et al., 2013; Cheng et al., 2010; Maner, 2017; Roberts et al., 2019; Van Vugt & Smith, 2019). In contrast, prestige encompasses gaining status through admiration and respect by displaying one's positive qualities (e.g., leadership abilities), which is more recent in terms of its evolutionary development. This dichotomy is like the distinction between explicit and implicit power advanced by other researchers (LaFreniere & Charlesworth, 1983; Vaillancourt et al., 2010). Explicit power is achieved via fear, coercion, and compliance from the peer group, whereas implicit power is acquired by signalling valued and admired competencies and assets (e.g., being socially skillful). It is intuitive that those higher in prestige status-striving likely express more agreeable and socially harmonious dispositions accompanied by prosociality and reciprocity (Cheng et al., 2010; Maner, 2017). In contrast, those higher in dominance appear to express dispositions such as social-boldness, arrogance, and a lack of empathy toward colleagues that signal the heightened expression of certain "dark" (i.e., malevolent) personality traits (Semenyna & Honey, 2015).

Dark Personality Traits and Status Competition

From an evolutionary perspective, socially aversive personality traits are posited to constitute an organized system of co-adapted traits that facilitate competition for mates and social resources that contribute to mating success, including status (Jonason & Webster, 2012; Jonason et al., 2014, 2015; Semenyna & Honey, 2015). Guided by the status elevation hypothesis, evolutionary researchers have argued that the so-called "Dark Triad," which includes narcissism (egoistic and grandiose), Machiavellianism (cynical and manipulative), and psychopathy (impulsive and antisocial), may promote the use of exploitive, manipulative, risky, and aggressive behaviour to negotiate status and power hierarchies (Semenyna & Honey, 2015). For example, the Dark Triad dimensions have been shown to positively predict a desire for power, and the purchase of expensive materialistic goods to signal wealth and status (i.e., conspicuous consumption; Lee et al., 2013).

Researchers studying the links between dark personality traits and the accrual of status have focused on the deleterious role of these traits in occupational settings (Boddy, 2010; Galperin et al., 2010; Rosenthal & Pittinsky, 2006). Others have studied how those higher in the Dark Triad "get their way" in the workplace (Jonason et al., 2012), as well as the links between the Dark Triad and perceptions of work climate, workplace fit, and occupational satisfaction (Jonason et al., 2015). Given the disagreeable, aggressive, and manipulative nature of the Dark Triad traits (Furnham et al., 2013; Jones & Neira, 2015), and the inclination toward social stratification among those higher in these dark personality characteristics (Lee et al., 2013), it is sensible to predict that each Dark Triad dimension should be positively linked to dominance status-striving (Semenyna & Honey, 2015). In contrast, self-promotion and self-enhancement are inherent in prestige status-status striving, and therefore likely associated with narcissism, as opposed to Machiavellianism, psychopathy.

Cheng et al. (2010) found that narcissistic self-aggrandizement shared positive links with both self-reported dominance and prestige status-striving. Semenyna and Honey (2015) showed that each Dark Triad dimension correlated positively with dominance status-striving, whereas only narcissism consistently correlated with prestige. These researchers also found that the links between the Dark Triad and status-striving were stronger for men in comparison to women. The accrual of status may be particularly important for heterosexual men because women find men with higher earning potential to be more attractive (Buss, 1994). Comparatively, men place

less importance on the status of women in the realm of mate selection. Traits such as ambition, status-seeking, and dominance can help men to augment their social standing and may testify to their ability to provide important economic resources for their mates and offspring (Buss, 1994). Nonetheless, researchers have argued and shown that women's status accrual can facilitate their success in the realms of intrasexual rivalry and social competition, which is an underappreciated aspect of women's evolved psychology (Blake, 2021; Bradshaw & Delpriore, 2021; Vaillancourt & Krems, 2018). Indeed, sex differences in prestige and dominance status-striving have been inconsistent (Cheng et al., 2013; Semenyna & Honey, 2015).

Despite the examples discussed above (e.g., Semenyna & Honey, 2015), there is limited research regarding how those higher in the Dark Triad strive for, accrue, and maintain status in line with the dual model of social hierarchy. In this literature, researchers also tend not to include each Dark Triad dimension in the same statistical model (i.e., no shared overlap is considered). This is pertinent given significant shared variability among the Dark Triad (Book et al., 2015), which should be statistically controlled for to avoid misattributing unique effects to one construct over another (Furnham et al., 2013). Furthermore, several scholars have encouraged expanding the umbrella of dark personality characteristics from the tripartite model of the Dark Triad to the four-variable model of the Dark Tetrad, which includes sadism (i.e., taking pleasure in the pain and suffering of others; Book et al., 2016; Buckels et al., 2013; Chabrol et al., 2017; Paulhus et al., 2021).

To our knowledge, none have collectively examined the Dark Tetrad dimensions in relation to dominance and prestige status-striving orientations. This is important considering that sadism provides unique information above narcissism, Machiavellianism, and psychopathy regarding certain psychosocial and behavioural outcomes, such as aggressive behaviour (Buckels et al., 2013; Paulhus et al., 2018; Reidy et al., 2011). In previous research, sadism has been positively associated with dominance (Dinić et al., 2019; Moshagen et al., 2018), suggesting that these individuals not only enjoy hurting others, but also exerting power and influence over them. Furthermore, those higher in sadism are willing to incur risk of physical harm to augment their social standing, as well as to gain material and financial assets (i.e., status-driven risk taking; Davis et al., 2019). Therefore, it is sensible to predict that sadism should share a positive link with dominance status-striving. Like the other Dark Tetrad dimensions, sadism is also positively related different kinds of interpersonally damaging behaviour, such as aggression (Paulhus et al.,

2018), which has been linked to the accrual of status in human (Johnson et al., 2007) and non-human animals (Bernstein, 1976).

Dark Tetrad, Status-Striving, and Aggression

Previous researchers have emphasized how direct aggression (e.g., physical and verbal aggression) is core to dominance status-striving, but appears to be unrelated or negatively associated with prestige status-seeking (Cabral & de Almeida, 2019; Cheng et al., 2013; Cheng et al., 2010; Henrich & Gil-White, 2001; Johnson et al., 2007; Monge-López & Álvarez-Solas, 2017). Similarly, direct forms of bullying—aggression that is repetitive and occurs in the presence of a power imbalance (Olweus, 1994)—are linked to achieving explicit power (see Vaillancourt et al., 2010). But direct aggression is only one type of aggressive behaviour. Indirect aggression is another form of aggression that is more covert and circuitous, which includes malicious gossip, rumor spreading, and social exclusion (Björkqvist et al., 1994). It is currently unclear how indirect aggression may relate to the motivation to gain status through dominance and/or prestige strategies. Studying indirect aggression in this dynamic is prudent because it is the most common form of aggression used by adults that is often viewed as socially acceptable (Coyne & Archer, 2004; Vaillancourt & Farrell, 2021). Given that those with prestige status-striving seem to use more prosocial and cooperative strategies to lead others and gain status, such as displaying valued skills and coalition building (Gilbert & Barsan, 2019; Maner et al., 2017; Semenyna & Honey, 2015), indirect aggression may relate positively to dominance and negatively to prestige.

The perpetration of indirect aggression might also help to account for how those higher in the Dark Tetrad dimensions manage to successfully strive for, accrue, and maintain status. Each Dark Tetrad dimension has been linked to indirect aggression in previous work (Russell & King, 2017). Furthermore, as previously described, dominance has been consistently associated with direct aggression (e.g., Johnson et al., 2007). Moreover, although distinct, direct and indirect forms of aggression are positively correlated with each other (Card et al., 2008). Therefore, evidence suggests that the strategic use of indirect aggression could explain (i.e., mediate) the relations between the Dark Tetrad and dominance status-striving. Addressing this question is of theoretical importance to gather further insight into the evolution of human status competition and the divergent ways in which people acquire status. From clinical and organizational perspectives, it is also important to discern what kinds of social benefits are afforded to those

higher in malevolent dispositions. This information may be useful in helping to reduce status-striving strategies that are underpinned by more interpersonally harmful behaviour.

Current Study

In the current study, we examined the cross-sectional links between the Dark Tetrad dimensions, dominance and prestige status-striving, and indirect aggression among North American adults. Specifically, we assessed whether the Dark Tetrad characteristics differentially predicted dominance and prestige status-striving orientations. In line with previous findings (e.g., Semenyna & Honey, 2015), we tested the hypothesis that narcissism, Machiavellianism, and psychopathy, would all positively predict dominance status-striving, whereas only narcissism would positively predict prestige status-striving (Hypothesis 1). Furthermore, considering the positive relations between sadism with antisocial behaviour (e.g., Chabrol et al., 2017), dominance (Dinić et al., 2019; Moshagen et al., 2018), and status-driven risk taking (Davis et al., 2019), we expected that sadism would positively predict dominance status-striving.

In accordance with previous research on the Dark Triad (Heym et al., 2019) and sadism (Russell & King, 2017) with indirect forms of aggressive behaviour, we expected that narcissism, Machiavellianism, psychopathy, and sadism would all positively predict the use of indirect aggression (Hypothesis 2). Several researchers have found that direct aggression contributes to dominance, and not prestige status-striving (e.g., Cabral & de Almeida, 2019; Johnson et al., 2007), but investigators have not assessed whether indirect aggression may share similar relations with these two kinds of status-striving. Although distinct subtypes of aggressive behaviour, given that direct and indirect aggression share strong positive correlations with one another (Card et al., 2008), we expected that indirect aggression would positively predict dominance and negatively predict prestige status-striving (Hypothesis 3).

We further tested the novel prediction that indirect aggression might help to explain how those with dark personality traits pursue certain status-striving strategies. Specifically, we predicted that indirect aggression would mediate the positive relations between narcissism, Machiavellianism, psychopathy, and sadism with dominance status-striving (Hypothesis 4).

Method

Participants

A total of 564 North American participants volunteered to participate in the “Status, Personality, and Aggression Study” through Amazon Mechanical Turk (MTurk), an online

crowdsourcing platform, to complete an online questionnaire hosted by SurveyMonkey. Thirty-one participants failed to complete the entire survey and provide a unique survey code and were removed from the sample. Thirteen participants had duplicate IP addresses and provided identical responses on the demographic questionnaire. We interpreted this as evidence that they completed the survey more than once. Their first survey responses were retained and their second survey responses were deleted. Two participants were removed because they fell outside of the eligible age range (18–65 years). The recruitment was capped at age 65 because of research indicating that dark personality traits (Klimstra et al., 2020), dominance (Jones et al., 2017), and aggression (Kokko et al., 2005) decline across the lifespan, particularly among seniors. This age limit also served as an attentional check to ensure that participants were reading the recruitment information, which described that the age limit was 65. Another two participants were excluded because they answered three or more of the validity check items incorrectly (see scale below in Materials). This resulted in a final sample size of 516 with a mean age of 37.90 years (*SD* = 12.76; range 18–61). Of the sample, 274 (53.1%) indicated that their assigned sex at birth was female and 416 (80.6%) selected "White" to describe their ethnic/racial background. Median education corresponded to "completed undergraduate degree" (*n* = 175, 34.1%), followed by "some college/vocational school" (*n* = 87, 17%).

Materials

Dark Personality Traits

The 28-item Short Dark Tetrad (SD4; Paulhus et al., 2020) was used to assess individual differences in narcissism (e.g., "*I know that I am special because people keep telling me so*"), Machiavellianism (e.g., "*It's not wise to let people know about your secrets*"), psychopathy (e.g., "*People often say I'm out of control*"), and sadism (e.g., "*Some people deserve to suffer*"). Participants responded to items along a 5-point Likert-type scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Items for each subscale were averaged to calculate mean scale scores (no missing data was permitted), with higher scores describing a stronger expression of dark personality characteristics. In the current study, the Narcissism (α = .88), Machiavellianism (α = .80), Psychopathy (α = .90), and Sadism subscales (α = .86) were all found to be internally consistent.

Dominance and Prestige Status Orientations

The 17-item Dominance-Prestige Scale (Cheng et al., 2010) was used to analyze respondent's tendencies toward two general status-striving orientations: dominance (e.g., "*I enjoy having control over others*") and prestige (e.g., "*Members of my peer group respect and admire me*"). All items were responded to along a 7-point Likert-type response scale, ranging from 1 (*Not at all*) to 7 (*Very much*). Items for each subscale were averaged to calculate mean scale scores (no missing data was allowed), with higher scores describing stronger dominance or prestige status-striving. Both the Dominance ($\alpha = .87$) and Prestige Status-Striving subscales ($\alpha = .84$) demonstrated evidence of internal reliability consistency in the current study.

Indirect Aggression

The 35-item Indirect Aggression Scale Aggressor Version (IAS-A; Forrest et al., 2005) was used to examine self-reported perpetration of indirect aggression. Participants were asked "*How often have you done the following to your peers*" and responded to items using a 5-point Likert-type scale ranging from 1 (*Never*) to 5 (*Very often*). Example items included: "*Criticized them in public*," "*Turned other people against them*," and "*Spread rumours about them*." Items were summed to create a total frequency score (no missing data was permitted), with higher scores denoting a greater use of indirect aggression. In the current study, the IAS-A was found to have high internal consistency reliability ($\alpha = .98$).

Validity Check

Based on the Conscientious Responder Scale by Marjanovic et al. (2014), five items were created to assess evidence of non-purposeful responding (e.g., "*To answer this question, please choose option number four, 'Very likely'*"). These items appeared at the end of randomly selected scales in the online survey. Participants who responded incorrectly to three or more items were flagged for non-purposeful responding.

Procedure

Participants on Mturk were invited to participate in the "Status, Personality, and Aggression Study" through a "human intelligence task" (i.e., HIT), which contained a brief description of the research. To be eligible to participate, participants needed to be an adult between the ages of 18–65, from either Canada or the United States, and to have a lifetime HIT approval rating ≥ 80 (i.e., the number of assignments approved divided by the number of assignments ever completed and submitted by a participant). If interested, participants were redirected to an online survey hosted by SurveyMonkey where they consented to participate and

completed several self-report measures (randomly ordered) on status-striving, dark personality characteristics, and aggressive behaviour, in addition to instruments for jealousy, envy, and social media usage. Participants who completed the entire survey and responded correctly to at least three of the five validity check items were awarded with $5.00CAD. This research received approval from an appointed research ethics board from the University of Ottawa. Participants were also informed that a goal of the research project was to publish the results in an academic journal, which they consented to.

Analytic Plan

SPSS (version 27) and Mplus (version 8.1) were used to conduct all analyses in the present study. SPSS was used to calculate descriptive statistics, bivariate correlations, and independent samples *t*-tests. Path analysis via structural equation modeling (SEM) in Mplus (Muthén & Muthén, 1998-2017) was used to examine the predictive relations between the Dark Tetrad dimensions, status acquisition, and indirect aggression, with maximum likelihood robust estimation. In the estimated path model, observed mean scores for narcissism, Machiavellianism, psychopathy, and sadism were allowed to correlate to control for their shared overlap. Similarly, dominance (i.e., using fear and intimidation to acquire status) and prestige status-striving (i.e., gaining status through respect and admiration) were permitted to correlate. Dominance and prestige acquisition strategies were regressed onto each Dark Tetrad dimension (e.g., psychopathy → dominance status-striving), as was indirect aggression (e.g., Machiavellianism → indirect aggression). Dominance and prestige status-striving were also regressed onto indirect aggression (e.g., indirect aggression → dominance; see Figure 1 for theoretical model). For this estimated path model, global model fit statistics were not available because the proposed theoretical model was saturated (i.e., just-identified), meaning that the model had "…the same number of observations as free parameters" (Kline, 2016, p. 147). Therefore, model fit could not be evaluated. However, the goal in the current study was not to compare different models based on fit, but to assess model parameters with associated standard errors in a novel way, which can be accomplished with saturated models (Raykov et al., 2013). Because younger participants tend to express higher levels of antisocial personality characteristics (Klimstra et al., 2020) and self-report a greater frequency of aggressive behaviour (Kokko et al., 2005), age was statistically controlled. Considering evidence that men tend to report higher levels of the Dark Tetrad traits (e.g., March et al., 2017), dominant acts (Buss, 1981), and dominance status-striving (Semenyna

& Honey, 2015), sex was statistically controlled for in the path model. To test for the proposed indirect (i.e., mediating) effect of indirect aggression on the Dark Tetrad dimensions with dominance status-striving (e.g., psychopathy → indirect aggression → dominance status-striving), 95% bootstrap confidence intervals (N = 5000) with were used.

Results

Descriptive Statistics and Demographics

Descriptive statistics were calculated for each measured variable, which can be seen in Table 1. Skewness and kurtosis values for measured variables all fell within acceptable ranges (skewness < +/-3 and kurtosis < +/-10; Kline, 2016). Independent samples t-tests indicated that only sadism differed significantly between the sexes, $t(512) = -5.37$, $p < .001$, $d = 0.48$, with men ($M = 2.79$, $SD = 0.90$) scoring higher than women ($M = 2.33$, $SD = 1.03$). No other statistically significant sex differences were found. Similarly, bivariate correlations indicated that only sadism correlated significantly with sex in a positive direction, indicating higher sadism scores for men (see Table 1). Age was found to correlate negatively with each Dark Tetrad dimension, dominance status-striving, and indirect aggression, indicating that younger participants scored significantly higher in each of the above constructs. In contrast, age did not correlate significantly with prestige status-striving.

Bivariate Correlations

A series of bivariate correlations were also run to examine the associations between measured constructs (see Table 1). Of note, each Dark Tetrad dimension correlated positively with dominance status-striving and indirect aggression. Only narcissism correlated positively with prestige status-striving.

Path Analytic Model Results

A path model was estimated whereby dominance and prestige status-striving, as well as indirect aggression were regressed onto each Dark Tetrad dimension. The two status-striving orientations were also regressed onto indirect aggression. In the path model, the Dark Tetrad traits were allowed to correlate to control for their shared variability, as were the two status-striving orientations. To control for their influence, age and sex were regressed onto each variable in the model. Standardized bivariate correlations and beta coefficients (β) are reported for all significant paths ($p < .05$) in Figure 2. Unstandardized covariances and regression coefficients (b) are reported below.

Narcissism (b = 0.62, p < .001), Machiavellianism (b = 0.26, p < .001), and psychopathy (b = 0.37, p < .001) all predicted dominance status-striving (Hypothesis 1). Only narcissism positively predicted prestige status-striving (b = 0.91, p < .001), whereas psychopathy negatively predicted this outcome (b = -0.29, p <.001). Machiavellianism (b = 3.12, p = .002), psychopathy (b = 15.73, p < .001), and sadism (b = 9.12, p < .001), but not narcissism, also positively predicted indirect aggression (Hypothesis 2). Furthermore, indirect aggression positively predicted dominance status-striving (b = 0.01, p = .034), and negatively predicted prestige (b = -0.01, p < .001; Hypothesis 3).

For the mediation analyses, the total effect of psychopathy on dominance status-striving (b = 0.44, p < .001, β = .33, p < .001) was reduced but still significant with the inclusion of indirect aggression in the analysis (i.e., the direct effect; b = 0.37, p < .001, β = .27, p < .001), suggesting partial mediation (Hypothesis 4). The indirect effect of indirect aggression was found to be significant (b = 0.08, p = .046; β = .06, p = .044) with zero missing from the 95% bootstrap confidence interval range (b = 0.02–0.15; β = .01–.11). Despite a non-significant total effect (b = 0.09, p = .180, β = .06, p = .181) and direct effect between sadism and dominance status-striving (b = 0.04, p = .545; β = .03, p = .546), the indirect effect of indirect aggression was significant (b = 0.05, p = .043; β = .03, p = .041) with zero absent from the confidence interval range (b = 0.10–0.08; β = .01–.06). This result also suggested partial mediation.

Exploratory Multigroup Analysis by Sex

Given that Semenyna and Honey (2015) found that the relations between the Dark Triad dimensions and dominance status-striving were stronger for men in comparison to women, a multigroup analysis for sex was conducted and parameters were compared using the Wald test in Mplus (Kline, 2016). The paths from narcissism, Machiavellianism, psychopathy, and sadism to dominance status-striving were found to be sex invariant, Wald χ^2 (4) = 3.55, p = .471. Similarly, the paths from indirect aggression to dominance also did not differ significantly by sex, Wald χ^2 (1) = 0.49, p = .484.

Exploratory Redundancy Analyses

Because sadism and dominance were positively correlated, but that sadism did not predict dominance in the path model, we examined potential redundancy effects. Controlling for age and sex, sadism alone positively predicted dominance β = .62, p < .001. The relation between sadism and dominance was significantly reduced ($R^2\Delta$ = .14, p < .001) when psychopathy was included

into the regression model, β = .20, $p < .001$. By itself, psychopathy positively predicted dominance, β = .70, $p < .001$, and this association was significantly reduced ($R^2\Delta = .02$, $p < .001$) when sadism was included into the model, β = .56, $p < .001$. These results suggest a redundancy situation between sadism and psychopathy in predicting dominance status-striving (Paulhus et al., 2004).

Exploratory Multicollinearity Analyses

The bivariate correlations between the Dark Tetrad with dominance status-striving were quite high ($r = .50–.73$), as was the predictive relation between narcissism and prestige status-striving in the path model (β = .79). Furthermore, the items for several of the measures used in the current study were very similar to each other, such as those used to assess psychopathy and Machiavellianism on the SD4 (Paulhus et al., 2020) with items on the Dominance subscale (Cheng et al., 2010). Therefore, associations might have been inflated because of cross-contamination in item content. A series of multiple regression analyses were thus conducted to examine evidence of multicollinearity. Tolerance values (.27–.82) fell within an acceptable range (> 0.20), and the variance inflation factor estimates (1.47–3.66) did not cross a problematic threshold (< 5; Thompson et al., 2017). These results suggested that multicollinearity was not an issue in the current study (see Supplemental Materials Table 1S and Table 2S).

Discussion

Social stratification and hierarchy negotiations, although variable across time and culture, are central to human sociality and our evolutionary histories (Buss et al., 2020; Cheng et al., 2010). Evolutionary scientists have stressed that humans employ two general leadership and status-striving strategies in the realms of mating and social competition: dominance and prestige (Cheng et al., 2013; Henrich & Gil-White, 2001; Maner, 2017; Van Vugt & Smith, 2019). This typology mirrors the distinction between explicit (i.e., gaining power via fear and coercion) and implicit power (i.e., gaining power through respect and admiration) advanced by other researchers (LaFreniere & Charlesworth, 1983; Vaillancourt et al., 2010). Dominance and prestige status-striving orientations appear to have unique nomological networks and share differential relations with various socially harmonious and socially noxious higher-order dimensions of personality (Cheng et al., 2010; Gilbert & Barsan, 2020; Semenyna & Honey, 2015). Indeed, several researchers have commented on how those with elevated levels of more malevolent personality characteristics, including narcissism (Cheng et al., 2010; Grapsas et al.,

2019), Machiavellianism (Hawley, 2003), and psychopathy (Pavlić & Međedović, 2019), fiercely compete for status and occupational success, in unique ways. But few have collectively modeled the Dark Triad dimensions alongside dominance and prestige status-striving among adults (Semenyna & Honey, 2015), and to our knowledge, none of modeled the Dark Tetrad with these two status-striving strategies. It is also uncertain what behavioural mechanism(s) might help to explain how those with more malevolent personality characteristics pursue strategies when striving for status.

In the current study, our objectives were to examine the potential differential relations among the Dark Tetrad characteristics with dominance and prestige status-striving. We further assessed the putative mediating role of indirect aggression among the associations between the Dark Tetrad traits with dominance status-striving. In partial support of Hypothesis 1, narcissism, Machiavellianism, and psychopathy, but not sadism, were found to positively predict dominance status-striving in the path model. This is despite sadism correlating positively with dominance at the bivariate level. Some authors have posited that sadism may be redundant with psychopathy (e.g., Jonason et al., 2017), where the beta weights for both predictor variables are reduced when they are included in the same regression model (e.g., Davis et al., 2019). Indeed, our exploratory redundancy analyses suggest that psychopathy and sadism may be somewhat redundant in the prediction of dominance status-striving.

In further support of Hypothesis 1, only narcissism positively predicted prestige status-striving. This is consistent with the results reported by Semenyna and Honey (2015). Therefore, although prestige may relate to socially harmonious dispositions (e.g., agreeableness; Cheng et al., 2010) and displaying prosocial tendencies (Maner, 2017), this kind of status-striving orientation is also underpinned by the more socially noxious personality dimension of narcissism (Cheng et al., 2010; Semenyna & Honey, 2015). Furthermore, psychopathy, but not sadism, was found to negatively predict prestige. This result paired with the positive predictive relation between psychopathy and dominance suggests that psychopathic adults favour employing dominance-related strategies to accrue and maintain status. This makes sense given that those higher in prestige employ more socially harmonious tactics, such as coalition building, which shares a negative association with both psychopathy and dominance status-striving (Semenyna & Honey, 2015). In contrast, narcissism appears to be associated with the use of a wider array of strategies to vie for social rank.

It may appear surprising that, like Semenyna and Honey (2015), Machiavellianism was only positively linked to dominance and not prestige status-striving in the current study. Evolutionary researchers have argued that Machiavellians are bi-strategic and oscillate between prosocial and coercive resource control strategies in a context-specific manner given the demands of the current social-ecological environment (Davis et al., 2019; Hawley, 2003). If so, self-report measures of individual differences in status-striving orientations may not adequately capture how Machiavellians use prestige to their advantage in particular circumstances. This would be a fruitful avenue for future researchers to pursue.

In partial support of Hypothesis 2, Machiavellianism, psychopathy, and sadism positively predicted indirect aggression, but not narcissism. This is despite narcissism correlating positively with indirectly aggressive behaviour at the bivariate level. At the multivariate level, the relation between narcissism with indirect aggression may be accounted for by the other dimensions of the tetrad, which becomes evident when their shared overlap is controlled for. However, multivariate analyses complicate interpretations of the unique effects accounted for each Dark Tetrad characteristic (Miller et al., 2019). Indeed, it is evident that narcissism shares a significant concurrent and longitudinal relation with indirect aggression (Vaillancourt & Farrell, 2021), which may be suppressed when "darker" (i.e., more malevolent; Furnham et al., 2013) personality traits, like psychopathy, enter into the equation. Importantly, the finding that both psychopathy and sadism uniquely predicted indirect aggression indicates that these two dimensions may be redundant regarding some psychosocial outcomes (e.g., status-striving), but not others (e.g., aggressive behaviour; Buckels et al., 2013; Paulhus et al., 2018; Reidy et al., 2011).

In support of Hypothesis 3, indirect aggression positively predicted dominance and negatively predicted prestige status-striving. Therefore, those pursuing dominance strategies to augment their status appear to employ both directly (Cabral & de Almeida, 2019; Johnson et al., 2007; Monge-López & Álvarez-Solas, 2017) and indirectly aggressive strategies to succeed in social competition. In contrast, those expressing prestige status-striving avoid using aggressive behaviour, which makes sense given that these individuals want to earn status via admiration, respect, and displaying their positive qualities (Cheng et al., 2010; Maner, 2017). This is a novel insight given that most of the research on the links between dominance and prestige status-striving with aggressive behaviour has involved assessments of direct, but not indirect aggression

(Cabral & de Almeida, 2019; Cheng et al., 2013; Cheng et al., 2010; Henrich & Gil-White, 2001; Johnson et al., 2007; Monge-López & Álvarez-Solas, 2017). This is particularly important because, in comparison to direct aggression, indirect aggression is more normative in adulthood and tends to be viewed as more socially acceptable (Coyne & Archer, 2004; Vaillancourt & Farrell, 2021).

In partial support of Hypothesis 4, indirect aggression was found to mediate the positive relation between psychopathy with dominance status-striving. Furthermore, despite not directly predicting dominance, the indirect effect from sadism to dominance status-striving through indirect aggression was significant. In contrast, indirect aggression did not serve a mediating role for either narcissism or Machiavellianism in predicting dominance status-striving. Thus, when controlling for the shared overlap among the Dark Tetrad, evidence suggested that indirect aggression facilitated the pursuit of dominance status-striving among adults with higher levels of psychopathy and sadism. This is unsurprising given that several researchers have shown how indirect aggression can be an effective strategy through which to compete for salient reproductive resources, such as mates and status among adults and adolescents (Arnocky & Vaillancourt, 2012; Björkqvist et al., 2001; Lee et al., 2018; Salmivalli et al., 2000).

Limitations

Regarding limitations, it is important to emphasize that mediation with cross-sectional data cannot be used to argue for causal relations between variables. Longitudinal data provide a better test of causal mechanisms; however, experimental data are needed to ascertain "true" casual associations (discussed in Farrell & Vaillancourt, 2019). Therefore, to gather further clarity into potential causal relations, future researchers could employ longitudinal analytic techniques, perhaps cross-lagged panel modeling (Masten & Cicchetti, 2010), to assess the temporal priority of constructs (i.e., the sequential ordering of variables over time) featured in our path model. Nevertheless, establishing the cross-sectional relations among variables is an important first step prior to conducting more advanced and rigorous longitudinal or experimental work (Wang & Cheng, 2020).

The internal consistency of the measure used for indirect aggression in the current study, the IAS-A (Forrest et al., 2005), was also very high ($\alpha > .90$; Tavakol & Dennick, 2011). This might suggest problems with item redundancy. The IAS-A does tend to produce higher Cronbach's alpha values ($\alpha = .80–.95$; Arnocky et al., 2012; Forrest et al., 2005; Vaillancourt &

Farrell, 2021). The split-half reliability for the scale was very high (r = .92), as were the item-total correlations (r = .64–.85). We examined a 25-item short-form for the IAS-A (Forrest et al., 2005), but the internal consistency of this abridged version was just as high as the full 35-item scale. Furthermore, rerunning the analyses with the abridged scale did not influence the results. Nonetheless, it may be prudent for future researchers to examine the psychometrics of the scale to discern whether a smaller version of the measure can help to reduce item redundancy.

The Dark Tetrad dimensions are also multidimensional constructs that embody lower-order facets that were not examined in the current study (Buckels et al., 2013; Miller et al., 2019). It is possible that these facets share differential relations with indirect aggression and dominance and prestige status-striving orientations. For instance, primary psychopathy (callous-unemotionality) appears to share a stronger relation with indirect aggression in comparison to secondary psychopathy (impulsivity; Vaillancourt & Sunderani, 2010). Furthermore, narcissistic grandiosity, which is emphasized on the SD4 (Paulhus et al., 2020), relates to prestige (Cheng et al., 2010), but vulnerable narcissism may not (Dickinson & Pincus, 2003). Therefore, in future work it would be prudent to examine the lower-order facets of each Dark Tetrad trait in relation to indirect aggression, as well as dominance and prestige status-striving.

There was also evident overlap in item content on the instruments used in the current study to assess the Dark Tetrad traits (SD4; Paulhus et al., 2020) and the two status-striving orientations (Dominance-Prestige Scale; Cheng et al., 2010). Exploratory analyses indicated that multicollinearity was not an issue; however, there could still be problems with cross-contamination in item content. Therefore, it would be advantageous to assess dominance and prestige status acquisition strategies using third party ratings of social rank (dominance) and perceived admiration (prestige). This would also help to circumvent issues with self-reporting bias to ensure a more objective assessment of how adults strive for, accrue, and maintain status.

Conclusions

When it comes to striving for, accruing, and maintaining status, there are “two ways to the top”— dominance and prestige (Cheng et al., 2013; Henrich & Gil-White, 2001). Dominance and prestige status-striving orientations, although sharing a small degree of overlap, seem to be relatively unique in their nomological networks among adults (Maner, 2017). In the current study, we add to this growing literature by supporting nuanced predictive relations between the Dark Tetrad dimensions with dominance and prestige status-striving. Adults higher in

psychopathy intimidate and coerce others to succeed in social competition when vying for status (Jonason et al., 2012; Semenyna & Honey, 2015). The use of indirect aggression, such as malicious gossip, social exclusion, and guilt induction, likely helps to explain how these adults succeed in ascending organizational hierarchies. Those higher in sadism may similarly use indirectly aggressive tactics when pursuing dominance status-striving strategies. Social standing is paramount to those higher in narcissism, and the evidence suggests that narcissists embody both dominance and prestige status-striving orientations. However, those who endeavour to be respected by their peers and to gain admiration through self-promoting positive qualities (i.e., prestige) seem unwilling to use even more low-cost, covert forms of aggression to achieve their status goals. Instead, they may favour prosocial and cooperative tactics to augment their social rank (Cheng et al., 2010; Maner, 2017; Semenyna & Honey, 2015). This research is needed to gather further insight into the evolutionary processes that have helped to shape human status competition. These findings may also have practical relevance in organizational contexts, particularly those involving collaboration where employers may be searching for ways to encourage more cooperative ways of striving for status. Our results indicate that dominance status-striving carries significant interpersonal harm, which likely hampers productivity and teamwork in these contexts.

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Table 1

Descriptive Statistics and Bivariate Correlations

	1.	2.	3.	4.	5.	6.	8.
1. Narcissism	----						
2. Machiavellianism	.44**	----					
3. Psychopathy	.65**	.41**	----				
4. Sadism	.54**	.50**	.74**	----			
5. Dominance	.73**	.50**	.70**	.60**	----		
6. Prestige	.43**	.02	-.04	-.04	.19**	----	
8. Indirect Aggression	.51**	.43**	.78**	.71**	.61**	-.14**	----
Sex	.04	.04	.03	.23**	.06	.03	-.02
Age	-.17**	-.25**	-.28**	-.33**	-.19**	.08	-.24**
N	516	516	516	516	516	515	516
Minimum	1.00	1.00	1.00	1.00	1.00	1.00	27.00
Maximum	5.00	5.00	4.86	4.86	6.63	7.00	170.00
M	2.88	3.39	2.17	2.54	3.15	4.83	70.39
SD	0.93	0.77	1.01	1.00	1.36	1.07	28.66
Skewness	-0.04	-0.65	0.84	0.35	0.25	-0.71	1.21
Kurtosis	-0.73	0.53	-0.34	-0.82	-0.92	0.96	0.94

Note. Bivariate correlations significant at $^{**}p < .001$ (two-tailed).

Figure 1

Theoretical Path Model of the Dark Tetrad, Indirect Aggression, and Status-Striving

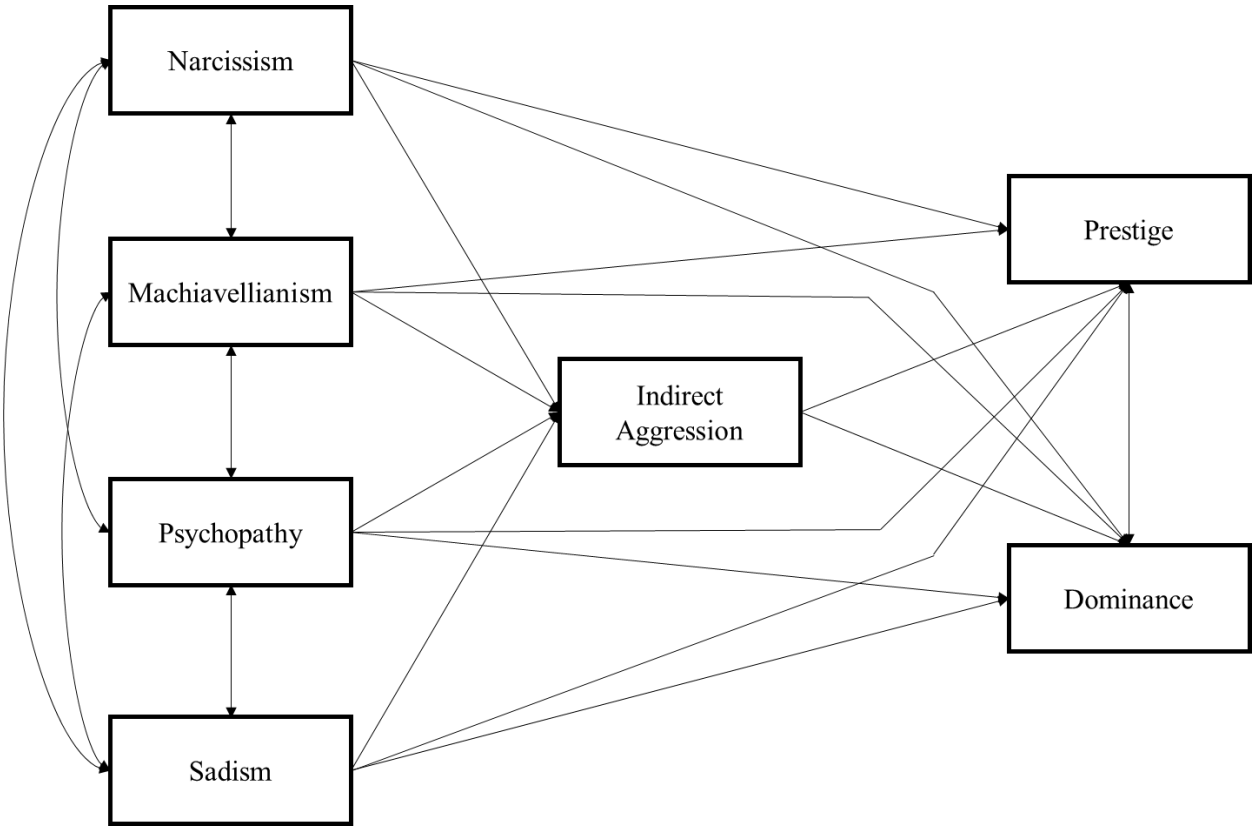
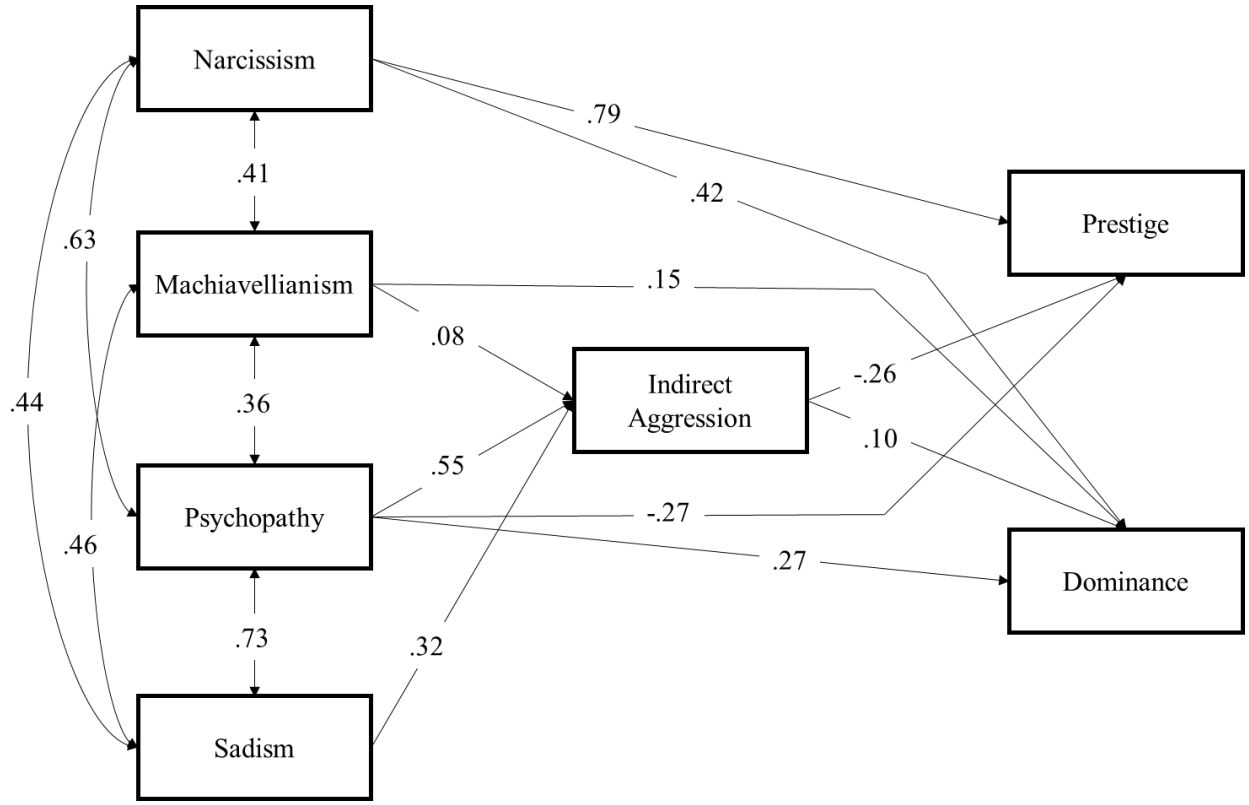


Figure 2

Path Analytic Model of the Dark Tetrad, Indirect Aggression, and Status-Striving



Note. Only significant paths ($p < .05$) are displayed in the above path model. Values represent standardized correlations (r) and beta coefficients (β). Age and sex were statistically controlled for in this model.

Chapter 6 – General Discussion

From an evolutionary perspective, the patterned expression of "dark" (i.e., malevolent) personality traits across time and cultures may seem anomalous. After all, among primates, humans demonstrate an exceptional capacity for cooperation, reciprocity, and altruistic behaviour, suggesting that these processes are core features of our evolutionary heritage (Brañas-Garza et al., 2017; Melis & Semmann, 2010; Tomasello, 2014; Trivers, 1971). However, this may be a key reason why those with a greater expression of dark personality characteristics can effectively manipulate, exploit, and take advantage of the kindness, generosity, and humility of others (discussed in Wissing & Reinhard, 2017). Moreover, human beings have and continue to develop, reside, and persist in a diverse array of social-ecological circumstances, and the personality traits that contribute to success in one context or period of development may be less effective in others (de Vries et al., 2016). Therefore, studying the adaptive benefits afforded to individuals higher in dark personality characteristics has been a salient area of empirical inquiry for evolutionary researchers. If the goal from a counselling, clinical, educational, or criminological perspective is to stymie problematic and deleterious behaviour, a better understanding of which factors contribute to, facilitate, and maintain the expression of antisocial tendencies is needed. Socio-cultural factors strongly influence but do not create antisocial characteristics in isolation, no more than these factors create cooperative and socially harmonious tendencies alone. Humans are biocultural beings with a rich evolutionary history. The interactionist perspective espoused by evolutionary scientists can be particularly powerful in helping to make sense of the complex interplay between phylogeny, ontogeny, genetics, hormones, attitudes, beliefs, and values, as well as cultural and historical processes (Buss et al., 1999; Confer et al., 2010; Davis, 2020). The three quantitative studies that comprise the current dissertation make use of this interactionist framework to glean further insight into interpersonal malevolence at different points in development.

Summary of Research Findings

Study 1

In Study 1, the longitudinal relations between the Dark Triad and bullying perpetration among a randomly selected sample of Canadian adolescents were examined. Specifically, the between-person and within-person relations between narcissism, Machiavellianism, psychopathy, and bullying were assessed via random intercept cross-lagged panel modeling (RI-

CLPM; Hamaker et al., 2015). Most of the research on the Dark Triad is focused on between-person associations (i.e., a person's level of the Dark Triad traits relative to other people), which gives only partial insight into what is occurring within an individual. By and large, we found quite similar relations at both the between- and within-person level. In line with previous research, controlling for sex and parental education, psychopathy was evidently the strongest correlate and predictor of adolescent bullying perpetration, whereas narcissism was not significantly related to bullying at the between-person level (i.e., the random intercept for narcissism did not correlate with the intercept for bullying) and inconsistently related to bullying at the within-person level (i.e., the within-time correlations). This tracks with previous meta-analytic findings suggesting a small to moderate positive correlation between narcissism and bullying (Kjærvik & Bushman, 2021; van Geel et al., 2017), which may fall out of significance when controlling for the shared overlap among the Dark Triad. There also tends to be an assumption in the literature that dark personality characteristic lead to later antisocial behaviour (i.e., disposition-driven pathways; discussed by Sijtsema et al., 2019). Novel evidence for perpetration-driven pathways from dark personality characteristics (e.g., Machiavellianism) to later bullying behaviour was found.

Study 2

One limitation associated with Study 1 is that the Dark Triad dimensions are multidimensional constructs that each embody several lower-order factors (Miller et al., 2019). In Study 2, the longitudinal associations between two core factors of psychopathy—callous-unemotionality (i.e., primary psychopathy) and impulsivity (i.e., secondary psychopathy)—alongside delinquency, and current dating status were examined in the same sample as Study 1 (i.e., a randomly selected sample of Canadian adolescents) via cross-lagged panel modeling (CLPM; Masten & Cicchetti, 2010). Delinquent behaviour has long been associated with psychopathy (see Geerlings et al., 2020 for meta-analysis), as well as dating, romantic, and sexual behaviour in youth and adults (Haynie et al., 2005; Miller & Simon, 1974; Rosenbaum & Kandel, 1990). However, few have examined the longitudinal relations between factors of psychopathy and indices of mating behaviour across time (Anderson et al., 2017; Thornton et al., 2019; Wymbs et al., 2013), particularly among adolescents. Moreover, sexual behaviour has received most of the empirical attention in this literature, with much less research devoted to more normative forms of mating behaviour in adolescence, such as dating (Rebellon & Manasse,

2004). Controlling for sex and parental education, secondary psychopathy shared a significant within-time association with being in a current dating relationship at Grade 10, but this effect did not replicate at Grades 11 and 12. Significant cross-lagged relations emerged from delinquency at Grade 10 to current dating status at Grade 11, which replicated from Grade 11 to 12. Furthermore, evidence for an indirect effect was found, whereby delinquency at Grade 11 mediated the relation between secondary psychopathy at Grade 10 to being in a current dating relationship at Grade 12. This finding indicates that youth higher in a specific factor of psychopathy (impulsivity) manage to outcompete peers for a dating partner and raises interesting questions regarding why delinquency might facilitate the mating success of youth. A caveat is that parameters were moderated by sex, such that delinquency only predicted dating across time in boys and not in girls.

Study 3

Focusing on the lower-order factors of psychopathy permitted a more refined examination of the construct that honours its multidimensional structure. Nonetheless, doing so also resulted in not being able to collectively assess the dark traits that often co-occur with psychopathy, including narcissism and Machiavellianism as part of the Dark Triad. There have also been calls to expand the umbrella of dark personality characteristics from the tripartite model of the Dark Triad to the four-variable model of the Dark Tetrad, with the inclusion of sadism (Book et al., 2016; Buckels et al., 2013; Paulhus et al., 2021). In Study 3, we examined the cross-sectional relations among the Dark Tetrad traits, dominance and prestige status-striving orientations, and indirect aggression among North American adults. Limited work has been conducted on the associations between dark personality characteristics and the two normative ways in which people tend to strive for status (dominance and prestige). Furthermore, if particular malevolent traits are linked to specific status-striving strategies, it is unclear what behavioural mechanism(s) might help to explain these relations. In line with previous research (Semenyna & Honey, 2015), in a path model, controlling for age and sex (i.e., assigned sex at birth), narcissism, Machiavellianism, and psychopathy, but not sadism predicted dominance status-striving, whereas only narcissism predicted prestige. Each Dark Tetrad trait was found to positively predict the perpetration of indirect aggression. Furthermore, indirect aggression was found to mediate the association between psychopathy and dominance status-striving. Moreover, despite sadism not sharing a direct relation with dominance, indirect aggression still served a

mediating role in the indirect relation between these constructs. These results are important from both theoretical and practical perspectives. Status is power (Vaillancourt et al., 2010) in both the domains of social and reproductive competition (Lee & Vaillancourt, 2018; Vaillancourt & Krems, 2018), and there is limited information regarding how dark personality traits relate to different status-striving orientations among adults (Semenyna & Honey, 2015).

Integration of Findings and Contributions to Knowledge

The three quantitative studies that constitute the current dissertation center on an examination of the links between dark personality traits, aggression, mating behaviour, and status-striving. From an evolutionary perspective, scholars propose that malevolent and sinister dispositions can confer adaptive benefits in the domains of social and mating competition in a context-specific manner given the demands of the developmental environment and local social-ecological landscape (da Silva & Salekin, 2015; Davis et al., 2019a; Gladden et al., 2009; Jonason et al., 2010; Jonason & Webster, 2010; Lalumière et al. 2001; Mishra & Lalumière, 2008). Those higher in dark personality characteristics, such as the Dark Triad of narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002), tend to compete for valued social (e.g., status) and reproductive resources (e.g., mates) via aggression, coercion, and manipulation. Evidence provided across the three studies lends further support to the above proposal. Adolescents aged 15 to 18 years expressing higher levels of the Dark Triad dimensions were more likely to perpetrate bullying (Study 1), which has been linked in previous work to social power (Vaillancourt et al., 2003; Vaillancourt et al., 2010) and indices of short-term mating success (e.g., number of sex partners; Provenzano et al., 2018). The same adolescents expressing heightened secondary (i.e., impulsivity), but not primary (i.e., callous-unemotionality), psychopathy were more likely to engage in delinquency which corresponded to being in a current dating relationship over time (Study 2). Moreover, narcissism, Machiavellianism, psychopathy, and sadism (i.e., the Dark Tetrad; Buckels et al., 2013; Paulhus et al., 2021) were all positively correlated with gaining status through fear and intimidation (i.e., dominance status-striving) among adults between 18–61 years of age.

At a general level, the three quantitative studies encompassed in the current dissertation help to demonstrate the utility of an evolutionary perspective for studying human trait covariation to gather greater insight into bullying (Volk et al., 2012), delinquency (Quinsey et al., 2004), dating (Arnocky & Vaillancourt, 2012), and status-striving (Semenyna & Honey,

2015). Despite an explosion of research on dark personality traits, particularly regarding the Dark Triad, many theoretical and empirical questions remain either unexplored or understudied. A key limitation that continues to hinder the progress of the literature on the Dark Triad is the reliance on convenience samples of young adult participants with cross-sectional data (Miller et al., 2019; Muris et al., 2017; Vize et al., 2018). Consequently, there is little research wherein the Dark Triad dimensions have been collectively studied among community samples of youth with longitudinal data, which precludes an assessment of how dark personality characteristics develop and causally influence each other over time alongside various forms of aggressive and antisocial behaviour. Furthermore, in this longitudinal work researchers have not used analytic techniques that separate between-person from within-person relations among the Dark Triad over time. Popular longitudinal analyses used to date conflate inter-personal and intra-personal processes, which biases parameter estimates and heightens the likelihood of committing Type I errors (Mulder & Hamaker, 2021).

Study 1 involves the first examination of the Dark Triad and bullying using random-intercept cross-lagged panel modeling (RI-CLPM; Hamaker et al., 2015), which helps to disentangle these different sources of variability. Many assume that the Dark Triad co-occur within individuals to a significant extent; however, there is surprisingly little work actually addressing the question (Chabrol et al., 2015; Dinić et al., 2019). These results add to this literature and demonstrate how, at the within-person level, Machiavellianism and psychopathy tend to co-occur within adolescents along with bullying perpetration. In contrast, at the intra-personal level, narcissism is less consistently related to the other dimensions of the triad and bullying perpetration. These patterns resonate with those noted by many researchers studying the Dark Triad at the between-person level with cross-sectional data. Although characterized by a common underlying "core" (Book et al., 2015; Book et al., 2016), the Dark Triad traits are differentially linked to antagonism, antisociality, and violence (Muris et al., 2017; Paulhus et al., 2018). This is why psychopathy is considered a "darker" trait than the other dimensions of the triad because it is more often linked with interpersonally damaging behaviour (Furnham et al., 2013). Moreover, although not the principal objective of the current dissertation, the findings from Study 1 that bullying can both predict and be an outcome of malevolent dispositions is relevant from counselling and clinical perspectives. This finding suggests that dark personality traits and externalizing behaviour (e.g., bullying) "feed off of" and potentiate one another at the

within-person level. It also provides an alternative approach to bullying prevention: curbing dark dispositions.

Miller et al. (2019) recently argued that an issue with research on the Dark Triad is that these traits are higher-order dimensions of personality that embody lower-level factors, which investigators tend not to examine. An important caveat here, however, is that in comparison to cross-sectional analyses (e.g., multiple regression), complex longitudinal analytic procedures become increasingly difficult to conduct and interpret with each additional variable included in the model. Study 2 addresses Miller et al's (2019) call for more research at the lower-order factor level for psychopathy, specifically concerning primary (callous-unemotionality) and secondary psychopathy (impulsivity). Evolutionary scholars continue to debate how those higher in psychopathy, both at the dimensional and lower-order factor level, manage to succeed in courting, appealing to, and obtaining desirable mates (Blanchard et al., 2016; Carter et al., 2014; Jonason et al., 2015; Rauthmann & Kolar, 2013). Evidence on the topic to date is quite mixed and centers on young adult participants with cross-sectional data. The results from Study 2 help to advance this literature and attend to these gaps. Delinquency was found to indirectly explain how adolescents higher in secondary psychopathy were at an increased likelihood of being in a current dating relationship across time. Previous scholars have suggested that psychopaths may only be attractive as short-term partners (i.e., brief sexual and romantic relationships), because of opportunistic mating, deceptively signalling desirable attributes, and coercion (Blanchard et al., 2016). The results from Study 2 accord with this idea and suggest that delinquent behaviour among those higher in impulsivity may encourage opportunism and signal the possession of desirable attributes in mates. Perhaps this occurs in a sex-specific manner in a heterosexual context. Delinquent adolescent girls may signal sexual availability, which boys are particularly attentive to when pursuing mates (Hattori et al., 2013). In contrast, delinquent adolescent boys may signal bravery and physical formidability, which adolescent girls appear to prioritize.

In previous work, the avarice and drive for power among adults higher in dark personality traits has been documented (Davis et al., 2019a; Lee et al., 2013). Yet there is surprisingly little research on how adults higher in malevolent dispositions actually pursue their status-related goals and what kinds of status-striving orientation they possess (Jonason et al., 2012; Semenyna & Honey, 2015). The dual hierarchy model of status (Henrich & Gil-White's, 2001) in a salient lens through which researchers have studied the two principal ways in which

humans strive for status: dominance and prestige. Building on the work of others (e.g., Cheng et al., 2010; Semenyna & Honey, 2015), in Study 3 for the first time the cross-sectional relations between the Dark Tetrad (narcissism, Machiavellianism, psychopathy, and sadism; Paulhus et al., 2021) and these two kinds of status-striving orientations were assessed in a community sample of adults. In accordance with previous findings, those higher in narcissism demonstrated an unparalleled motivation to strive for and to accrue status. It is likely that narcissists believe that they principally accrue status through the admiration and respect of others (i.e., prestige), while the results from Study 3 indicate that they are more likely to gain status through intimidating and coercing others. Evidence suggests that narcissists have a greater need for control, which makes them less likely to take the perspective of others (Lee & Kang, 2020). This could help to account for why those higher in narcissism try to dominate and subjugate others on their path to augmenting and maintaining social rank. Although, the results from Study 3 also indicate that adults higher in prestige status-striving are less likely to espouse particularly malevolent dispositions (e.g., psychopathy) and to perpetrate indirect aggression. Thus, discouraging the expression of these "darker" personality characteristics may help to mitigate both the perpetration of indirect aggression against peers and colleagues, as well as striving for status in a way that involves coercion and fear.

Overall Limitations and Future Directions

Despite several advantages of the current dissertation research, such as the use of relatively large community samples of youth and adults, novel analytic approaches, and validity checks, there are several important limitations that need to be addressed. Perhaps paradoxically, the use of the McMaster Teen Study dataset is both a strength as well as a limitation of the research in Study 1 and Study 2. Because it is an ongoing longitudinal cohort dataset involving annual assessments that extends over a decade, it provides the unique and rare opportunity to examine dynamic developmental life course patterns. However, with each subsequent year of data collection there is attrition, and the missing data analyses from Studies 1 and 2 indicate that it is non-random concerning particular covariates, such as sex and parental education. Therefore, the representativeness and generalizability of the data diminishes with each year. Consequently, it is important for future researchers to compare and contrast the longitudinal findings from Studies 1 and 2 with a similar cohort of North American adolescents.

A further limitation is that self-reports were used for each study in the current dissertation. There are a number of important biases that can confound results when relying exclusively on self-report instruments. For instance, common method variance could have produced spurious associations between constructs (Siemsen et al., 2010). Response sets could have influenced the validity of scores provided by participants, perhaps via acquiescence (i.e., the tendency to agree with statements), extremeness (i.e., the tendency to select extreme response options), and social desirability (i.e., falsely presenting oneself in a socially desirable fashion; Kreitchmann et al., 2020). For these reasons, it is beneficial, when possible, to use third-party observer ratings to triangulate and replicate research findings (McDonald, 2008).

Another key limitation concerns when particular constructs were first assessed and when the transition from youth to adult psychometric instruments occurred in the McMaster Teen Study. For instance, Machiavellianism was first measured with the Kiddie-Mach Scale (Christie & Geis, 1970) at Time 6 when participants were 15 years old, precluding an examination of this dark personality dimension prior to this point in development. Similarly, the Antisocial Personality Screening Device–Self-Report (APSD-SR; Frick & Hare, 2001) was employed from Time 5 to Time 8 (Ages 14–17), and then the Self-Report Psychopathy Scale (SRP-III; Paulhus 2009) was used starting at Time 10 (19 years of age). Measurement equivalence (i.e., measurement invariance) between different psychometric instruments would need to be established in any model using scores from both measures to ensure that they are assessing psychopathy in a similarly valid manner. Therefore, in future work it would be advantageous to begin assessing dark personality characteristics earlier on in youth so that a larger period of adolescent development can be examined.

One more salient limitation is that only North American participants who live in a Western, educated, industrialized, rich, and democratic (WEIRD) context were included in the current dissertation research, which characterizes most research in psychology (Henrich, 2020). It is therefore difficult to extrapolate findings from the current research to other cultural circumstances that vary in terms of cultural syndrome (e.g., individualism versus collectivism), degree of economic development, inequality, and political affairs. This is particularly salient when assuming an evolutionary perspective, because putative adaptations that may be taken to be human universals likely vary in culturally specific ways. There is a significant amount of research on dark personality traits in non-WEIRD contexts (e.g., Sehar & Fatima, 2016; Safaria

et al., 2020; Wright et al., 2020). For example, Wright et al. (2020) found that country of origin significantly moderated the associations between the Dark Triad and cyberbullying in adolescents. In Chinese and Indian adolescents, narcissism and callous-unemotional traits (i.e., primary psychopathy) significantly predicted cyberbullying perpetration, whereas the Dark Triad did not significantly predict cyberbullying at the multivariate level for Japanese youth. Importantly, however, these cross-cultural studies are often characterized by the same limitations that hinder the progress of the literature on malevolent dispositions at large: the reliance on convenience samples with cross-sectional data. Therefore, there is an evident need to collect longitudinal data on adolescents from non-WEIRD cultural circumstances using probability sampling techniques.

Chapter 7 – General Conclusion

The expression of socially harmonious personality characteristics, such as honesty-humility (i.e., being humble and avoiding exploiting others; Ashton & Lee, 2016), are as much a part of our evolutionary histories as the existence of malevolent personality traits, including those embodied in the Dark Triad (Paulhus & Williams, 2002) and Dark Tetrad (Buckels et al., 2013; Paulhus et al., 2021). Only a handful of studies have included a longitudinal examination of the Dark Triad and bullying among adolescents (e.g., Sijtsema et al., 2019), and none had previously involved the use of analytic techniques that allow for the separation of between-person from within-person variability (e.g., RI-CLPM; Hamaker et al., 2015). In Study 1 of this dissertation, the first evidence is provided that, when controlling for the between-person variability in the Dark Triad, Machiavellianism and psychopathy shared significant and consistent within-person associations with bullying among adolescents across time. Novel evidence in favour of both disposition- (i.e., dark personality traits → bullying) and perpetration-driven pathways (i.e., bullying → dark personality traits) at the within-person level in youth was also supported. In Study 2, digging into the lower-order factors of psychopathy, adolescents higher in impulsivity were more likely to be in a current dating relationship relative to peers, and they accomplished this goal via delinquent behaviour across time. Delinquency may signal the possession of desirable qualities, such as bravery in boys and a willingness to engage in sexual behaviour in girls, which helps to explain the heightened mating success of youth higher in psychopathy. Few researchers have collectively modeled the factors of psychopathy alongside delinquency and mating behaviour using longitudinal data in adolescents, and there has been a preoccupation with sexual behaviour at the neglect of more normative forms of mating behaviour in youth, such as dating (Rebellon & Manasse, 2004). Power is salient to adults higher in dark personality traits (Lee et al., 2013), but there is limited information regarding how those higher in dispositional malevolence actually strive for and accrue status (Semenyna & Honey, 2015). In Study 3, only narcissism was found to predict prestige status-striving among the Dark Tetrad, and indirect aggression facilitated the pursuit of a dominance status-striving strategy among adults higher in psychopathy and sadism. Collectively, these findings point to the utility of an evolutionary perspective in gathering further insight into the longitudinal and cross-sectional associations between dark personality characteristics and antisocial behaviour that can carry

significant individual, interpersonal, and societal-level harm, including bullying, delinquency, and indirect aggression.

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Appendix A

Supplemental Materials File – Study 1 (Chapter 3): Mplus Syntax for all Models

Model 1 – Base Model

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL (Model 1);

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
```

```
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;

cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu; !Allow covariates to correlate;

cNPQ7 ON cNPQ6; !Autoregressions among within-person centered vars;
cNPQ8 ON cNPQ7;

cKMS7 ON cKMS6;
cKMS8 ON cKMS7;

cAPSD7 ON cAPSD6;
cAPSD8 ON cAPSD7;

cBULL7 ON cBULL6;
cBULL8 ON cBULL7;

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;
```

```
cNPQ7 ON cBULL6;
cNPQ8 ON cBULL7;

cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6;
cKMS8 ON cBULL7;

cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;

cAPSD7 ON cBULL6;
cAPSD8 ON cBULL7;

cBULL7 ON cNPQ6;
cBULL8 ON cNPQ7;

cBULL7 ON cKMS6;
cBULL8 ON cKMS7;

cBULL7 ON cAPSD6;
cBULL8 ON cAPSD7;

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7; !Allow residuals (dynamic errors);
cNPQ8 with cKMS8; !To correlate;

cNPQ6 with cAPSD6;
cNPQ7 with cAPSD7;
cNPQ8 with cAPSD8;

cKMS6 with cAPSD6;
```

```
cKMS7 with cAPSD7;
cKMS8 with cAPSD8;

cBULL6 with cNPQ6;
cBULL7 with cNPQ7;
cBULL8 with cNPQ8;

cBULL6 with cKMS6;
cBULL7 with cKMS7;
cBULL8 with cKMS8;

cBULL6 with cAPSD6;
cBULL7 with cAPSD7;
cBULL8 with cAPSD8;

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Model 2 – Autoregressions Constrained to be Equal

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL (Model 2);

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
```

```
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;
```

```
Sex with PMKedu; !Allow covariates to correlate;

cNPQ7 ON cNPQ6(a); !Autoregressions among within-person centered vars;
cNPQ8 ON cNPQ7(a); !Equality constraints applied;

cKMS7 ON cKMS6(b);
cKMS8 ON cKMS7(b);

cAPSD7 ON cAPSD6(c);
cAPSD8 ON cAPSD7(c);

cBULL7 ON cBULL6(d);
cBULL8 ON cBULL7(d);

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;

cNPQ7 ON cBULL6;
cNPQ8 ON cBULL7;
cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6;
cKMS8 ON cBULL7;

cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;

cAPSD7 ON cBULL6;
cAPSD8 ON cBULL7;

cBULL7 ON cNPQ6;
cBULL8 ON cNPQ7;

cBULL7 ON cKMS6;
cBULL8 ON cKMS7;
```

```
cBULL7 ON cAPSD6;
cBULL8 ON cAPSD7;

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7; !Allow residuals (dynamic errors);
cNPQ8 with cKMS8; !To correlate;

cNPQ6 with cAPSD6;
cNPQ7 with cAPSD7;
cNPQ8 with cAPSD8;

cKMS6 with cAPSD6;
cKMS7 with cAPSD7;
cKMS8 with cAPSD8;
cBULL6 with cNPQ6;
cBULL7 with cNPQ7;
cBULL8 with cNPQ8;

cBULL6 with cKMS6;
cBULL7 with cKMS7;
cBULL8 with cKMS8;

cBULL6 with cAPSD6;
cBULL7 with cAPSD7;
cBULL8 with cAPSD8;

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Model 3 – Within-Time Correlations Constrained to be Equal

```
TITLE: Study 1 - RI-CLPM T6-T8 NPQ, KMS, APSD, BULL (Model 3);
DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;
```

```
VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;
cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;
```

```
cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu; !Allow covariates to correlate;

cNPQ7 ON cNPQ6; !Autoregressions among within-person centered vars;
cNPQ8 ON cNPQ7;

cKMS7 ON cKMS6;
cKMS8 ON cKMS7;

cAPSD7 ON cAPSD6;
cAPSD8 ON cAPSD7;

cBULL7 ON cBULL6;
cBULL8 ON cBULL7;

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;

cNPQ7 ON cBULL6;
cNPQ8 ON cBULL7;

cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6;
cKMS8 ON cBULL7;
```

```
cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;

cAPSD7 ON cBULL6;
cAPSD8 ON cBULL7;

cBULL7 ON cNPQ6;
cBULL8 ON cNPQ7;

cBULL7 ON cKMS6;
cBULL8 ON cKMS7;

cBULL7 ON cAPSD6;
cBULL8 ON cAPSD7;

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7(c); !Allow residuals (dynamic errors);
cNPQ8 with cKMS8(c); !To correlate;

cNPQ6 with cAPSD6; !Equality constraints applied;
cNPQ7 with cAPSD7(c1);
cNPQ8 with cAPSD8(c1);

cKMS6 with cAPSD6;
cKMS7 with cAPSD7(c2);
cKMS8 with cAPSD8(c2);

cBULL6 with cNPQ6;
cBULL7 with cNPQ7(c3);
cBULL8 with cNPQ8(c3);
cBULL6 with cKMS6;
cBULL7 with cKMS7(c4);
cBULL8 with cKMS8(c4);

cBULL6 with cAPSD6;
cBULL7 with cAPSD7(c5);
```

```
cBULL8 with cAPSD8(c5);

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;  and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Model 4 – Cross-Lagged Relations Constrained to be Equal

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL, (Model 4);

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;
```

```
ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu; !Allow covariates to correlate;

cNPQ7 ON cNPQ6; !Autoregressions among within-person centered vars;
cNPQ8 ON cNPQ7;

cKMS7 ON cKMS6;
cKMS8 ON cKMS7;

cAPSD7 ON cAPSD6;
cAPSD8 ON cAPSD7;

cBULL7 ON cBULL6;
cBULL8 ON cBULL7;
```

```
cNPQ7 ON cKMS6(a); !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7(a); !Equality constraints applied;

cNPQ7 ON cAPSD6(b);
cNPQ8 ON cAPSD7(b);

cNPQ7 ON cBULL6(c);
cNPQ8 ON cBULL7(c);

cKMS7 ON cNPQ6(d);
cKMS8 ON cNPQ7(d);

cKMS7 ON cAPSD6(e);
cKMS8 ON cAPSD7(e);

cKMS7 ON cBULL6(f);
cKMS8 ON cBULL7(f);

cAPSD7 ON cNPQ6(g);
cAPSD8 ON cNPQ7(g);

cAPSD7 ON cKMS6(h);
cAPSD8 ON cKMS7(h);

cAPSD7 ON cBULL6(i);
cAPSD8 ON cBULL7(i);

cBULL7 ON cNPQ6(j);
cBULL8 ON cNPQ7(j);

cBULL7 ON cKMS6(k);
cBULL8 ON cKMS7(k);

cBULL7 ON cAPSD6(l);
cBULL8 ON cAPSD7(l);

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7; !Allow residuals (dynamic errors);
cNPQ8 with cKMS8; !To correlate;
```

```
cNPQ6 with cAPSD6;
cNPQ7 with cAPSD7;
cNPQ8 with cAPSD8;

cKMS6 with cAPSD6;
cKMS7 with cAPSD7;
cKMS8 with cAPSD8;

cBULL6 with cNPQ6;
cBULL7 with cNPQ7;
cBULL8 with cNPQ8;

cBULL6 with cKMS6;
cBULL7 with cKMS7;
cBULL8 with cKMS8;

cBULL6 with cAPSD6;
cBULL7 with cAPSD7;
cBULL8 with cAPSD8;

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Model 5 – Autoregressions and Within-Time Correlations Constrained to be Equal

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL Model 5;

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
```

```
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
```

```
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu;

cNPQ7 ON cNPQ6(a); !Autoregressions among within-person centered vars;
cNPQ8 ON cNPQ7(a); !Equality constraints applied;

cKMS7 ON cKMS6(a1);
cKMS8 ON cKMS7(a1);

cAPSD7 ON cAPSD6(a2);
cAPSD8 ON cAPSD7(a2);

cBULL7 ON cBULL6(a3);
cBULL8 ON cBULL7(a3);

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;

cNPQ7 ON cBULL6;
cNPQ8 ON cBULL7;

cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6;
cKMS8 ON cBULL7;

cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;

cAPSD7 ON cBULL6;
cAPSD8 ON cBULL7;
```

```
cBULL7 ON cNPQ6;
cBULL8 ON cNPQ7;

cBULL7 ON cKMS6;
cBULL8 ON cKMS7;

cBULL7 ON cAPSD6;
cBULL8 ON cAPSD7;

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7(c); !Allow residuals (dynamic errors);
cNPQ8 with cKMS8(c); !To correlate;

cNPQ6 with cAPSD6; !Equality constraints applied;
cNPQ7 with cAPSD7(c1);
cNPQ8 with cAPSD8(c1);

cKMS6 with cAPSD6;
cKMS7 with cAPSD7(c2);
cKMS8 with cAPSD8(c2);

cBULL6 with cNPQ6;
cBULL7 with cNPQ7(c3);
cBULL8 with cNPQ8(c3);

cBULL6 with cKMS6;
cBULL7 with cKMS7(c4);
cBULL8 with cKMS8(c4);
cBULL6 with cAPSD6;
cBULL7 with cAPSD7(c5);
cBULL8 with cAPSD8(c5);

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; ! Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; ! and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;
```

```
OUTPUT: CINTERVAL stdyx;
```

Model 6 – Perpetration-Driven Paths Constrained to Zero

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL (Model 6);

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;

   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
```

```
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; ! Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu; !Allow covariates to correlate;

cNPQ7 ON cNPQ6(a); !Autoregression among within-person centered vars;
cNPQ8 ON cNPQ7(a); !Equality constraints applied;

cKMS7 ON cKMS6(a1);
cKMS8 ON cKMS7(a1);

cAPSD7 ON cAPSD6(a2);
cAPSD8 ON cAPSD7(a2);
cBULL7 ON cBULL6(a3);
cBULL8 ON cBULL7(a3);

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;

cNPQ7 ON cBULL6@0; !Perpetration paths fixed to zero;
cNPQ8 ON cBULL7@0;
```

```
cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6@0;
cKMS8 ON cBULL7@0;

cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;

cAPSD7 ON cBULL6@0;
cAPSD8 ON cBULL7@0;

cBULL7 ON cNPQ6;
cBULL8 ON cNPQ7;

cBULL7 ON cKMS6;
cBULL8 ON cKMS7;

cBULL7 ON cAPSD6;
cBULL8 ON cAPSD7;

mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7(c); !Allow residuals (dynamic errors);
cNPQ8 with cKMS8(c); !To correlate;

cNPQ6 with cAPSD6; !Equality constraints applied;
cNPQ7 with cAPSD7(c1);
cNPQ8 with cAPSD8(c1);

cKMS6 with cAPSD6;
cKMS7 with cAPSD7(c2);
cKMS8 with cAPSD8(c2);
```

```
cBULL6 with cNPQ6;
cBULL7 with cNPQ7(c3);
cBULL8 with cNPQ8(c3);

cBULL6 with cKMS6;
cBULL7 with cKMS7(c4);
cBULL8 with cKMS8(c4);

cBULL6 with cAPSD6;
cBULL7 with cAPSD7(c5);
cBULL8 with cAPSD8(c5);

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Model 7 – Disposition-Driven Paths Constrained to Zero

```
TITLE: RI-CLPM T6-T8 NPQ, KMS, APSD, BULL (Model 7;

DATA: file = PhD_Study_1_DT_Bull_Cleaned.csv;

VARIABLE:
    names =
ID_N
PMKedu
Sex
NPQ6
NPQ7
NPQ8
KMS6
KMS7
KMS8
APSD6
APSD7
APSD8
BULL6
BULL7
BULL8
;
```

```
   missing = all(-99);

   usevariables =
   PMKedu
   Sex
   NPQ6-NPQ8
   KMS6-KMS8
   APSD6-APSD8
   BULL6-BULL8
   ;

ANALYSIS:
 estimator=mlr;
 MODEL=NOCOVARIANCES; !Supresses default estimation of certain covs in model;

MODEL: !Create two individual factors (random intercepts kappa and omega);

mu_NPQ BY NPQ6@1 NPQ7@1 NPQ8@1;
mu_KMS BY KMS6@1 KMS7@1 KMS8@1;
mu_APSD BY APSD6@1 APSD7@1 APSD8@1;
mu_BULL BY BULL6@1 BULL7@1 BULL8@1;
cNPQ6 BY NPQ6@1; !Create within-person centered variables;
cNPQ7 BY NPQ7@1;
cNPQ8 BY NPQ8@1;

cKMS6 BY KMS6@1;
cKMS7 BY KMS7@1;
cKMS8 BY KMS8@1;

cAPSD6 BY APSD6@1;
cAPSD7 BY APSD7@1;
cAPSD8 BY APSD8@1;

cBULL6 BY BULL6@1;
cBULL7 BY BULL7@1;
cBULL8 BY BULL8@1;

NPQ6-NPQ8@0; !Constrain the measurement error variances to zero;
KMS6-KMS8@0;
APSD6-APSD8@0;
BULL6-BULL8@0;

mu_NPQ mu_KMS mu_APSD mu_BULL ON PMKedu Sex; !Controlling for covariates;

Sex with PMKedu; !Allow covariates to correlate;
```

```
cNPQ7 ON cNPQ6(a); !Autoregression among within-person centered vars;
cNPQ8 ON cNPQ7(a); !Equality constraints applied;

cKMS7 ON cKMS6(a1);
cKMS8 ON cKMS7(a1);

cAPSD7 ON cAPSD6(a2);
cAPSD8 ON cAPSD7(a2);

cBULL7 ON cBULL6(a3);
cBULL8 ON cBULL7(a3);

cNPQ7 ON cKMS6; !Cross-lagged effects among within-person centered vars;
cNPQ8 ON cKMS7;

cNPQ7 ON cAPSD6;
cNPQ8 ON cAPSD7;

cNPQ7 ON cBULL6;
cNPQ8 ON cBULL7;

cKMS7 ON cNPQ6;
cKMS8 ON cNPQ7;

cKMS7 ON cAPSD6;
cKMS8 ON cAPSD7;

cKMS7 ON cBULL6;
cKMS8 ON cBULL7;

cAPSD7 ON cNPQ6;
cAPSD8 ON cNPQ7;

cAPSD7 ON cKMS6;
cAPSD8 ON cKMS7;
cAPSD7 ON cBULL6;
cAPSD8 ON cBULL7;

cBULL7 ON cNPQ6@0; !Disposition-driven paths constrained to zero;
cBULL8 ON cNPQ7@0;

cBULL7 ON cKMS6@0;
cBULL8 ON cKMS7@0;

cBULL7 ON cAPSD6@0;
cBULL8 ON cAPSD7@0;
```

```
mu_NPQ WITH mu_KMS; !Allow random intercepts to correlate
mu_NPQ WITH mu_APSD;
mu_KMS WITH mu_APSD;
mu_BULL WITH mu_NPQ;
mu_BULL WITH mu_KMS;
mu_BULL WITH mu_APSD;

cNPQ6 with cKMS6; !Within-person centered variables correlated;
cNPQ7 with cKMS7(c); !Allow residuals (dynamic errors);
cNPQ8 with cKMS8(c); !To correlate;

cNPQ6 with cAPSD6; !Equality constraints applied;
cNPQ7 with cAPSD7(c1);
cNPQ8 with cAPSD8(c1);

cKMS6 with cAPSD6;
cKMS7 with cAPSD7(c2);
cKMS8 with cAPSD8(c2);

cBULL6 with cNPQ6;
cBULL7 with cNPQ7(c3);
cBULL8 with cNPQ8(c3);

cBULL6 with cKMS6;
cBULL7 with cKMS7(c4);
cBULL8 with cKMS8(c4);

cBULL6 with cAPSD6;
cBULL7 with cAPSD7(c5);
cBULL8 with cAPSD8(c5);

mu_NPQ with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !Fix correlation for random
intercepts;
mu_KMS with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !and within-pers. cen.
variables;
mu_APSD with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0; !First wave to zero;
mu_BULL with cNPQ6@0 cKMS6@0 cAPSD6@0 cBULL6@0;

OUTPUT: stdyx;
```

Table S1

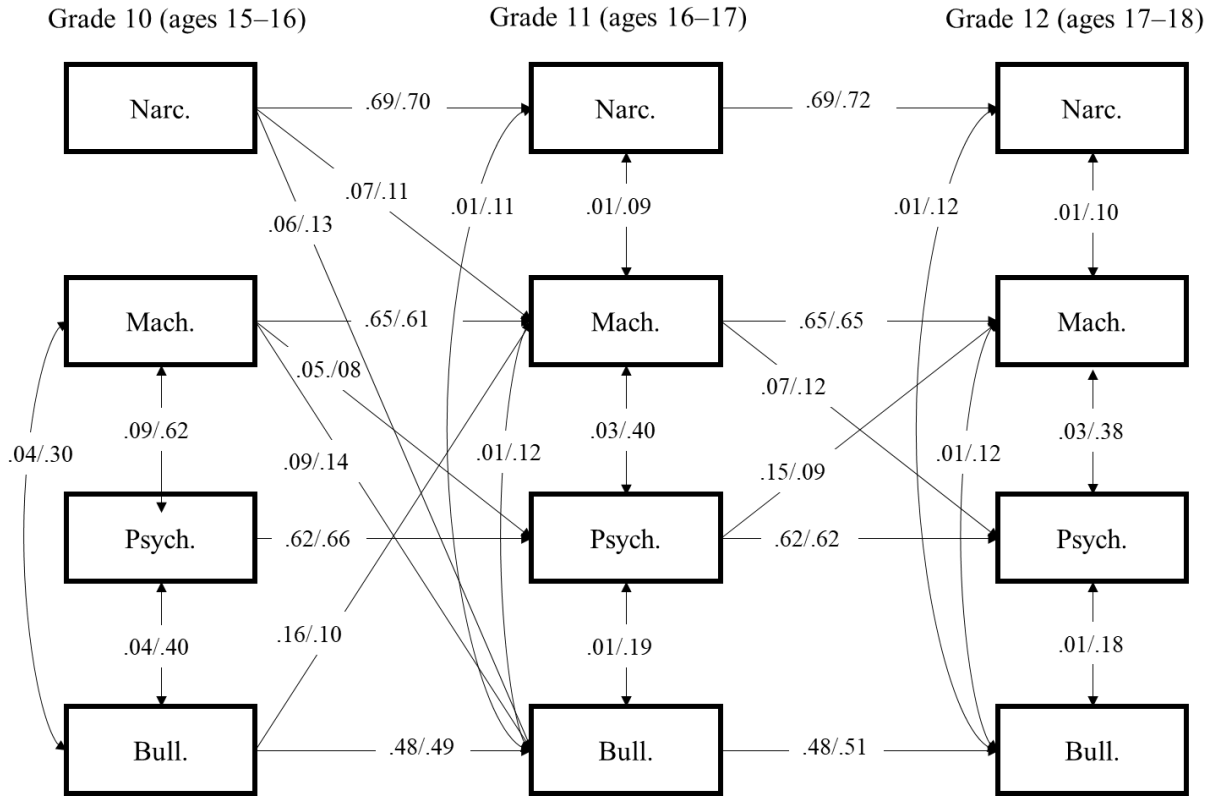
Summary of Model Fit Statistics for the Exploratory Traditional CLPM Analyses

Mod.	$\chi^2(df)$	*p*	CFI	TLI	RMSEA (90% CI)	SRMR	Comp.	$\Delta\chi^2_{SB}(\Delta df)$	*p*
1.	126.82(16)	<.001	0.952	0.728	0.116 (0.098-0.135)	0.031	----	**----**	**----**
2.	116.71(19)	<.001	0.957	0.798	0.100 (0.083-0.118)	0.031	M2 vs. M1	0.679(3)	.878
3.	129.58(22)	<.001	0.953	0.808	0.098 (0.082-0.114)	0.031	M3 vs. M1	2.655(6)	.851
4.	155.68(28)	<.001	0.944	0.821	0.094 (0.080-0.109)	0.037	M4 vs. M1	28.233(12)	.005
5.	**122.54(26)**	**<.001**	**0.958**	**0.854**	**0.085 (0.070-0.100)**	**0.032**	**M5 vs. M1**	**3.285(10)**	**.974**

Note. Mod. = model; χ^2 = Chi-square; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Comp. = model comparison; $\Delta\chi^2_{SB}$ = Satorra-Bentler scaled Chi-square difference test. Model 1 = base model; Model 2 = autoregressive paths constrained; Model 3 = within-time correlations at Grade 11 and 12 constrained; Model 4 = cross-lagged paths constrained; Model 5 = Final model (autoregressions across time points and within-time correlations at Grade 11 and 12 constrained to be equal).

Figure S1

Traditional CLPM for Dark Triad and Bullying from Grades 10 to 12 (Model 5)



Note. Final CLPM (Model 5) includes autoregressions (constrained to be equal), cross-lagged effects, within-time correlations (constrained to be equal at Grade 11 and 12), and the covariates sex and parental education. Only statistically significant ($p < .05$) paths are shown. Values before the slash are unstandardized coefficients (*b*) or covariances, while values after the slash are correlations (*r*) and standardized coefficients (β).

Appendix B

Narcissistic Personality Questionnaire for Children – Revised (NPQC-R)

Instructions: Please read each statement and decide how well it describes you. Mark your answer by selecting the appropriate number (0–4) for each statement.

0	1	2	3	4	97
False – Not at all true of me	Mostly false	Neither true nor false	Mostly true	Very true of me	Skip

1. I always know what I am doing.
2. If I ruled the world it would be a better place.
3. I am going to be a great person,
4. I am good at getting people to do things my way.
5. It is easy for me to control other people.
6. I was born a good leader.
7. I am a really special person.
8. I can make people believe anything I want them to.
9. I think I am a great person.
10. When I am supposed to be punished, I can usually talk my way out of it.

- **Superiority** items: 1, 3, 6, 7, 9
- **Exploitativeness** items, 2, 4, 5, 8, 10
    - Items omitted from the original NPQC-R (Ang & Raine, 2009):
        - "I think my body looks good."
        - "I would do almost anything if you dared me."

Appendix C

Kiddie-Mach Scale (KMS)

Instructions: Please read each statement and decide how well it describes you. Mark your answer by selecting the appropriate number (1-5) for each statement.

1	2	3	4	5	97
Strongly disagree				Strongly agree	Skip

1. Never tell anyone why you did something unless it will help you.
2. Most people are good and kind. (reverse-keyed)
3. The best way to get along with people is to tell them things that make them happy.
4. You should do something only when you are sure it is right. (reverse-keyed)
5. It is smartest to believe that all people will be mean if they have a chance.
6. You should always be honest, no matter what. (reverse-keyed)
7. Sometimes you have to hurt other people to get what you want.
8. Most people won't work hard unless you make them do it.
9. It is better to be ordinary and honest than famous and dishonest. (reverse-keyed)
10. It is better to tell someone why you want him/her to help you than to make up a good story to get him/her to do it. (reverse-keyed)
11. Successful people are mostly honest and good. (reverse-keyed)
12. Anyone who completely trusts anyone else is asking for trouble.
13. A criminal is just like other people except that he/she is stupid enough to get caught.
14. Most people are brave. (reverse-keyed)
15. It is smart to be nice to important people even if you don't really like them.
16. It is possible to be good in every way. (reverse-keyed)
17. Most people cannot be easily fooled. (reverse-keyed)
18. Sometimes you have to cheat a little to get what you want.
19. It is never right to tell a lie. (reverse-keyed)
20. It hurts more to lose money than to lose a friend.

Appendix D

Antisocial Process Screening Device – Self-Report (APSD-SR)

Instructions: Please read each statement and decide how well it describes you. Mark your answer by selecting the appropriate number (0-2) for each statement.

0	1	2	97
Not at	Sometimes true	Definitely true	Skip

1. You blame others for your mistakes.
2. You engage in illegal activities.
3. You care about how well you do at school or work. (reverse-keyed)
4. You act without thinking of the consequences.
5. Your emotions are shallow and fake.
6. You lie easily and skillfully.
7. You are good at keeping promises. (reverse-keyed)
8. You brag a lot about your abilities, accomplishments, or possessions
9. You get bored easily
10. You use or "con" other people to get what you want.
11. You tease or make fun of other people.
12. You feel bad or guilty when you do something wrong. (reverse-keyed)
13. You do risky or dangerous things.
14. You act charming and nice to get what you want.
15. You get angry when corrected or punished.
16. You think you are better or more important than other people.
17. You do not plan ahead or leave things until the "last minute."
18. You are concerned about the feelings of others. (reverse-keyed)
19. You hide your feelings or emotions from others.
20. You keep the same friends. (reverse-keyed)

- **Callous-Unemotional** items: 3(R), 7(R), 12(R), 18(R), 19, 20(R)
- **Impulsivity** items: 1, 4, 9, 13, 17
- **Narcissism** items: 5, 8, 10, 11, 14, 15, 16
    - Items that did not load onto any factor (Vitacco et al., 2003): 2, 6
    - Items removed from Callous-Unemotional subscale in Study 2 because of problematic internal consistencies: 19, 20(R)

Appendix E

Bullying Perpetration

Definition of bullying: There are lots of different ways to bully someone but a bully wants to hurt the other person (it's not an accident), and does so repeatedly and unfairly (the bully has some advantage over the victim). Sometimes a group of students will bully a student. It is not bullying when two students of the same strength quarrel or fight.

0	1	2	3	97
Not at all			Many times a week	Skip

1. Since the start of the school year [September], how often have you taken part in bullying another student?
2. How often have you taken part in physically bullying others by hitting, shoving, kicking, spitting or beating up others?
3. How often have you taken part in verbally bullying others by insults, put downs, or threats?
4. How often have you taken part in bullying others by exclusion, rumors, or getting others not to like someone?
5. How often have you taken part in bullying others using the computer, text messages, or email messages/pictures to threaten someone or make them look bad?

Appendix F

Rule Breaking Behavior Scale

Instructions: Please read each statement and decide how well it describes you. Mark your answer by selecting the appropriate number (0-2) for each statement.

0	1	2	97
Not true	Somewhat or sometimes true	Very true or often true	Skip

1. I drink alcohol without my parents' approval.
2. I don't feel guilty after doing something I shouldn't.
3. I break rules at home, school, or elsewhere.
4. I hang around with kids who get in trouble.
5. I lie or cheat.
6. I would rather be with older kids than kids my own age.
7. I run away from home.
8. I set fires.
9. I steal at home.
10. I steal from places other than home.
11. I swear or use dirty language.
12. I smoke, chew, or sniff tobacco.
13. I cut classes or skip school.
14. I use drugs for nonmedical purposes (don't include alcohol or tobacco)
15. I vandalize things that do not belong to me.

Appendix G

Short Dark Tetrad 4

Instructions: Please rate your agreement with each of the following statements using the scale provided:

1	2	3	4	5	0
Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Skip

1. It's not wise to let people know your secrets.
2. Whatever it takes, you must get the important people on your side.
3. Avoid direct conflict with others because they may be useful in the future.
4. Keep a low profile if you want to get your way.
5. Manipulating the situation takes planning.
6. Flattery is a good way to get people on your side.
7. I love it when a tricky plan succeeds.
8. People see me as a natural leader.
9. I have a unique talent for persuading people.
10. Group activities tend to be dull without me.
11. I know that I am special because people keep telling me so.
12. I have some exceptional qualities
13. I'm likely to become a future star in some area.
14. I like to show off every now and then.
15. People often say I'm out of control.
16. I tend to fight against authorities and their rules.
17. I've been in more fights than most people of my age and gender.
18. I tend to dive in, then ask questions later.
19. I've been in trouble with the law.
20. I sometimes get into dangerous situations.
21. People who mess with me always regret it.
22. Watching a fist-fight excites me.
23. I really enjoy violent films and video games.
24. It's funny when idiots fall flat on their face.
25. I enjoy watching violent sports.
26. Some people deserve to suffer.
27. Just for kicks, I've said mean things on social media.
28. I know how to hurt someone with words alone.

- **Machiavellianism** items: 1, 2, 3, 4, 5, 6, 7
- **Narcissism** items: 8, 9, 10, 11, 12, 13, 14
- **Psychopathy** items: 15, 16, 17, 18, 19, 20, 21
- **Sadism** items: 22, 23, 24, 25, 26, 27, 28

Appendix H

Dominance-Prestige Scales (Self-Report Version)

Instructions: Please indicate the extent to which each statement accurately describes ***you*** by selecting the appropriate number from the scale provided

1	2	3	4	5	6	7	0
Not at all			Somewhat			Very much	Skip

1. ____ Members of my peer group respect and admire me.
2. ____ Members of my peer group do NOT want to be like me.
3. ____ I enjoy having control over others.
4. ____ Others always expect me to be successful.
5. ____ I often try to get my own way regardless of what others may want.
6. ____ Others do NOT value my opinion.
7. ____ I am willing to use aggressive tactics to get my way.
8. ____ I am held in high esteem by those I know.
9. ____ I try to control others rather than permit them to control me.
10. ____ I do NOT have a forceful or dominant personality.
11. ____ Others know it is better to let me have my way.
12. ____ I do NOT enjoy having authority over other people.
13. ____ My unique talents and abilities are recognized by others.
14. ____ I am considered an expert on some matters by others.
15. ____ Others seek my advice on a variety of matters.
16. ____ Some people are afraid of me.
17. ____ Others do NOT enjoy hanging out with me.

- **Dominance** items: 3, 5, 7, 9, 10 (R), 11, 12 (R), 16.
- **Prestige** items: 1, 2 (R), 4, 6 (R), 8, 13, 14, 15, 17 (R).

Appendix I

Indirect Aggression Scale–Aggressor Version (IAS-A)

Instructions: Using the scale provided, please indicate how often you have done the following to people:

1	2	3	4	5	0
Never	Rarely	Sometimes	Often	Always	Skip

1. Used sarcasm to insult others.
2. Made fun of others in public.
3. Called others names.
4. Intentionally embarrassed others in public.
5. Been 'bitchy' towards others.
6. Made negative comments about others' physical appearance.
7. Imitated others in front of others.
8. Criticized others in public.
9. Gave others 'dirty' looks.
10. Accused others of something while making it appear to be said in fun.
11. Snubbed others in public.
12. Intentionally ignored another person/people.
13. Belittled others.
14. Done something to try and make others look stupid.
15. Talked about others behind their back.
16. Played a nasty practical joke on others.
17. Took or damaged something that belonged to others.
18. Excluded others from a group.
19. Purposefully left others out of activities.
20. Omitted others from conversations on purpose.
21. Used private in-jokes to exclude others.
22. Withheld information from others that the rest of the group is let in on.
23. Turned other people against others.
24. Made other people not talk to others.
25. Made others feel that they don't fit in.
26. Spread rumors about others.
27. Stopped talking to others.
28. Gained their confidence and then disclosed their secrets.
29. Used emotional blackmail on others.
30. Tried to influence others by making them feel guilty.
31. Used my relationship with others to try and get others to change a decision.
32. Put undue pressure on others.
33. Used their feelings to coerce others.
34. Made others feel inferior to me by my behaviour/words.
35. Pretended to be hurt and/or angry with others to make others feel bad about him/herself.

Contributions of Collaborators and/or Co-Authors

Chapter 3

Adam Davis conducted the analyses and wrote the manuscript draft and Ann H. Farrell helped with the syntax for the random-intercept cross-lagged panel model (RI-CLPM). Tracy Vaillancourt designed the larger study from which the current research is a part of (i.e., the McMaster Teen Study), and Heather Brittain, Amanda Krygsman, and Tracy Vaillancourt collected the survey data. Steven Arnocky helped with editing the manuscript, as did the other co-authors.

Chapter 4

Adam Davis conducted the analyses and wrote the manuscript draft. Tracy Vaillancourt designed the larger study from which the current research was a part of (i.e., the McMaster Teen Study). Heather Brittain and Tracy Vaillancourt collected the survey data Steven Arnocky helped with editing the manuscript, as did the other co-authors.

Chapter 5

Adam Davis wrote the research proposal for ethics, created the "HIT" on MTurk and took care of compensating workers, conducted the analyses, and wrote the manuscript draft. Tracy Vaillancourt helped with editing the research proposal and manuscript, as well as funding the larger research project from which the current study is a part of. Adam Davis and Tracy Vaillancourt designed the larger study from which the current research is a part of.