Investigating the Interplay Between Adolescent Personality, Parental Control, and Externalizing Problem Behavior Across Adolescence

Martijn Van Heel¹, Patricia Bijttebier¹, Hilde Colpin¹, Luc Goossens¹, Wim Van Den

Noortgate¹, Karine Verschueren¹, & Karla Van Leeuwen¹

¹: KU Leuven, Belgium

Acknowledgement

This research was funded by a Concerted Research Action grant (GOA/12/009) from the KU Leuven Research Fund.

This research was not preregistered.

LG, HC, WVDN, KV, and KVL were involved in the conceptualization of the research project. MVH was responsible for data analysis and report writing. PB, LC, HC, WVDN, KV, and KVL provided feedback on the manuscript.

Correspondence should be addressed to Martijn Van Heel, Leopold Vanderkelenstraat 32

(box 3765), 3000 Leuven, Belgium (email: martijn.vanheel@kuleuven.be; telephone: +32 16 32 23 72)

DOI information: 10.1016/j.jrp.2019.06.005

Abstract

This study explored transactional associations among adolescent personality (i.e., conscientiousness, agreeableness), parental control (i.e., proactive, punitive, psychological control), and externalizing problem behavior (i.e., aggressive or rule-breaking behavior). A three-wave longitudinal study across a two-year time span provided questionnaire data from 1,116 adolescents (M_{age} Wave 1 = 13.79, 51% boys), 841 mothers, and 724 fathers that was used in random intercept cross-lagged panel models. At the between-person level, adolescent personality, parental control, and externalizing problem behavior were significantly associated. Concerning the within-person level, conscientiousness showed reciprocal associations with externalizing problem behavior (negative), with agreeableness (positive) and punitive control (negative). Our findings observed a reciprocity between adolescent personality and externalizing problem behavior, but also suggest a role for parental control in this interplay.

Keywords: externalizing problem behavior; parenting; personality; adolescence; longitudinal

1. Introduction

Externalizing problem behavior is highly prevalent in adolescence with more than 60% of adolescents getting involved in some kind of problem behavior (Reitz, Dekovic, & Meijer, 2005). Despite high co-occurrence of several types of externalizing problem behavior, such as rule-breaking and aggressive behavior (Bartels et al., 2003), they are considered to be separate concepts (Achenbach, 1991; Rothbaum & Weisz, 1994). Aggressive behavior refers to physical (e.g., assault) as well as verbal aggression (e.g., insulting), whereas rule-breaking behavior denotes behaviors such as missing curfew or truancy. Previous studies also showed a difference in etiological factors (Burt, 2013) and in correlations with personality features (Burt, Mikolajewski, & Larson, 2009). Besides this behavior being problematic for the environment of the adolescent, externalizing problem behavior is associated with numerous personal psychosocial outcomes such as academic underachievement (Ansary & Luthar, 2015) or work incapacity in adulthood (Narusyte, Ropponen, Alexanderson, & Svedberg, 2017). Therefore, the development of externalizing problem behavior has been extensively investigated (e.g., Laird et al., 2001; Roskam, 2018) guided by theoretical models, such as Lerner's developmental contextual model (Lerner, Rothbaum, Boulous, & Castellino, 2002) which emphasizes the transactional interplay between the person (e.g., temperament) and its environment (e.g., parenting) in behavioral development. The present study will use multiple temperament factors and parenting dimensions to investigate this interplay in detail using state-of-the-art statistical techniques.

Previous studies have suggested bidirectional relationships between parenting practices, such as parental control, and externalizing problem behavior in adolescence (Anderson, 1986; De Haan, et al., 2012; Huh, Tristan, Wade, & Stice, 2006; Keijsers, et al., 2012; Reitz et al., 2006). Parental control is an umbrella term encompassing different kinds of parenting behaviors to promote socialization, the process in which children and adolescents acquire norms, habits and behaviors to function in a way that is acceptable in their culture or society. In most studies two types of parental control are investigated, namely behavioral control and psychological control (Barber, Olsen, & Shagle, 1994; Kakiyama & Tilton-Weaver, 2009). A study by Janssens et al. (2015), however, suggests that parental behavioral control can be further split up into a reactive component, for example punishment, and a proactive

component, for example setting rules. Together with psychological control, there are three control dimensions. First, *proactive control* is a preventive parenting technique that anticipates undesirable adolescent behavior by providing a stable and regulated environment (Janssens et al., 2015). This parenting practice is generally effective in preventing externalizing problem behavior in adolescence (Galambos, Barker, & Almeida, 2003; Grolnick & Pomerantz, 2009). Second, *punitive control* refers to non-physical punishment, such as to lecture the adolescent after unwanted behavior, to give a time-out or to ground the adolescent (Janssens et al., 2015). Third, *psychological control* aims at obtaining compliance through manipulation and domination of the adolescent, for instance, through love withdrawal or guilt induction (Barber, 1996; Barber, Xia, Olsen, Mcneely, & Bose, 2012).

Research has primarily devoted attention to the association between adolescent problem behavior and each of these parental control dimensions separately, and has shown significant associations with externalizing behavior. Previous studies suggested that proactive control decreased externalizing problem behavior (e.g., Galambos, Barker, & Almeida, 2003; Gray & Steinberg, 1999; Pettit et al., 2001). Concerning punitive control, a meta-analysis by Larzelere and Kuhn (2005) showed the effectiveness of non-physical punishment in reducing problem behavior in the short term. However, Brenner and Fox (1998) and Stormshak et al. (2000) showed that punitive control is associated with an increase in externalizing problem behavior in the long term. In the context of punitive control, Larzelere and Kuhn also emphasized the role of the context in which the punishment occurs. For example, non-physical punishment is found to be more effective when the punishment is consistent and when the reason is explained to the child. Psychological control is associated with suboptimal adolescent development, primarily with internalizing problem behavior, but also with externalizing problem behavior (Barber, Olsen, & Shagle, 1994; Laird, Pettit, Bates, & Dodge, 2003). Studies have stressed the importance of distinguishing different parental control dimensions in the context of child development (Bates, Schermerhorn, & Petersen, 2012; Kiff, Lengua, & Zalewski, 2011) given their differential links to problem behavior. Concerning the association between parenting and externalizing problem behavior, it is important to acknowledge the role of heritability. A meta-analysis by Burt (2013) suggested a large genetic influence in the etiology of externalizing problem behavior, which means that parents are associated with adolescent problem behavior through genetics (i.e.,

individual characteristics) as well as parenting practices (i.e., environmental characteristics). It should be noted that it is likely that this genetic and environmental factor are associated (i.e., rGE; Scarr & McCartney, 1983). There is also evidence for bio-ecological interactions. Specifically, previous studies found that externalizing problem behavior was more heritable when mothers were more affectionate (Burt, Klarh, Neale, & Klump, 2013; Button et al., 2008). These findings urge to draw conclusions cautiously, since there are multiple factors to take into account when the associations between parenting and externalizing problem behavior are considered.

A second factor that has been investigated in the context of adolescent externalizing problem behavior is adolescent personality. A number of models have been proposed to frame this association between personality and problem behavior, or more general psychopathology (Durbin & Hicks, 2014). For instance, the predisposition model states that an individual's personality increases the risk for psychopathology, whereas the scar or complication model states that it is the psychopathology that changes the personality. Furthermore, the pathoplasty or exacerbation model entails that the individual's personality does not directly cause the psychopathology, but does influence how this psychopathology presents itself (Durbin & Hicks, 2014). The spectrum hypothesis states that personality and psychopathology are on opposite sides of one continuum, which implies (some) common etiological factors. Finally, the continuity hypothesis (De Bolle et al. (2012) contends that personality and problem behavior covary within and across time without pronouncing on the causality of this covariation. De Bolle et al. (2012) found support for the continuity hypothesis and suggested that particular combinations of personality and psychopathology are conceptually closer. For instance, earlier studies have indicated that conscientiousness (i.e., to being well-organized and showing self-discipline; Prinzie et al., 2010; Tackett, 2006) and agreeableness (i.e., being empathetic and supportive towards others; Prinzie et al., 2010; Tackett, 2006), which are part of the Five Factor Model of personality (Caspi, Roberts, & Shiner, 2005), are consistently negatively associated with externalizing problem behavior. Furthermore, De Bolle et al. (2012) also put forward the possibility of a 'third variable' playing a role in the association between adolescent personality and externalizing problem behavior. In this context, the present study explores parental control as a potential 'third variable' and more specifically as a mediator.

Literature suggests that parenting and personality are also associated with each other (Caspi et al., 2005). Studies focusing on parental control confirmed the reciprocal relationship between different forms of parental control (i.e., behavioral control and psychological control separately) and temperament in childhood (Bates, Schermerhorn, & Petersen, 2012; Kiff, Lengua, & Zalewski, 2011), which is closely related to personality (Shiner & DeYoung, 2013). The contribution of the present study is twofold, namely that three parental control dimensions (i.e., proactive, punitive, and psychological control) are investigated simultaneously and the focus is on adolescence rather than childhood (cfr. Kiff, Lengua, & Zalewski (2011)).

Furthermore, studies exploring the interplay between externalizing problem behavior, parenting, and child personality observed significant associations among all three variables (Prinz et al., 2003, 2010; Van Leeuwen et al., 2004, 2007). Specifically, the study by Prinz et al. (2003) included both mother and father reports and suggested that the associations between child personality (e.g., conscientiousness or agreeableness) and externalizing problem behavior were partially mediated by negative parenting practices. In other words, when parents rated their child as conscientious or agreeable, they were less inclined to use negative parenting practices, which in turn predicted less adolescent externalizing problem behavior. These previous studies assumed a certain direction in the relationship between variables (parenting and personality predicting problem behavior), and did not take into account possible bidirectional associations over time, despite the fact that other studies suggested this reciprocity (De Haan et al., 2012; Huh et al., 2006; Keijsers et al., 2012; Reitz et al., 2006).

1.1 The Present Study

The present study used Random Intercept Cross-Lagged Path Models (RI-CLPM; Hamaker, Kuiper, & Grasman, 2015) to examine transactional and indirect associations among parental control, personality, and two subtypes of externalizing problem behavior, namely, rule-breaking behavior and aggressive behavior, using a three-wave longitudinal design across adolescence. Based on previous research (Achenbach, 1991; Burt, 2013; Burt, Mikolajewski, & Larson, 2009), we decided to investigate the two types (i.e., rule-breaking and aggressive behavior) of externalizing problem behavior separately. Adolescents reported on their own aggressive and rule-breaking behavior, whereas we computed composite scores (combining mother and father reports) of proactive, punitive, and psychological

control, which are dimensions in the five-factor parenting model identified by Janssens et al. (2015). Similar composite scores were used for parent-reported adolescent Big Five personality dimensions.

Based on the literature (Mervielde et al., 2005; Prinzie et al., 2010; Tackett, 2006; Van Leeuwen et al., 2004, 2007), we hypothesized that higher levels of conscientiousness or agreeableness were associated with lower levels of both rule-breaking behavior and aggressive behavior and also lower levels of parental control. It was also assessed whether there was an indirect association between adolescent personality and externalizing problem behavior via parental control. Concerning parental control, we hypothesized that both punitive and psychological control were associated with more aggressive and rule-breaking behavior (Barber, 1996; Brenner & Fox, 1992; Janssens et al., 2015; Laird et al., 2003; Stormshak et al., 2000). Proactive control was expected to be negatively associated with aggressive and rule-breaking behavior (Galambos et al., 2003; Grolnick & Pomerantz, 2009). It was also assessed whether there was an indirect association between parenting practices and externalizing problem behavior via adolescent personality. Because the literature indicated that the relationship between parenting and externalizing problem behavior is bidirectional (De Haan et al., 2012; Huh et al., 2006; Keijsers et al., 2012; Reitz et al., 2006), the present study assessed both the predictive value of the parental control dimensions for subsequent problem behavior, and the predictive value of problem behavior for subsequent parenting. More specifically, we expected that more rule-breaking and aggressive behavior was associated with more negative parenting practices (e.g., psychological control and punitive control) (Huh et al., 2006). The effect of adolescent sex was also assessed. Consistent with the literature (Pettit et al., 2001), we expected that the associations between the parental control dimensions and externalizing problem behavior would be stronger for girls.

The present study adds to the literature by examining transactional associations between different parental control dimensions, adolescent personality and adolescent externalizing problem behavior across adolescence. The use of a RI-CLPM allows us to investigate these associations at both the between- and within-person level and without assuming a certain direction in the associations.

2. Method

2.1 Participants and Procedure

Data were collected within [name study masked for review]. This longitudinal study annually questioned adolescents and their parents in Flanders, the Dutch-speaking part of Belgium. Specifically, there were three waves of data collection with a one-year time interval. Participants were selected through a randomized multistage sampling approach. In a first stage, Flemish secondary schools were invited to take part in the study. Stratification was used to include students from general, technical, and vocational tracks. In the second stage 121 classes in the seventh, eighth, and ninth grade were selected from the nine schools who agreed to participate in the study. Within these classes, 2,254 students and their parents were invited to participate. The sample at Wave 1 comprised 1,116 adolescents ($M_{\text{age}} = 13.79$, $SD = 0.94$, 51% boys), 841 mothers ($M_{\text{age}} = 43.54$, $SD = 4.54$), and 724 fathers ($M_{\text{age}} = 45.45$, $SD = 4.76$). The retention rate in Wave 2 was 89% for adolescents, 75% for mothers, and 72% for father. In Wave 3, the retention rate decreased to 79% for adolescents, 66% for mothers and 63% for fathers. Family characteristics were representative for the general population $\chi^2(2) = 2.78$, $p = .25$, with 82% two-parent families, 7% single-parent families, and 11% blended families (Janssens et al., 2017; King Baudouin Foundation, 2008). The educational level (EDU) and employment activity level (ACT) of parents differed for both mothers (EDU: $\chi^2(3) = 30.34$, $p < .001$; ACT: $\chi^2(1) = 15.87$, $p < .001$) and fathers (EDU: $\chi^2(3) = 34.19$, $p < .001$; ACT: $\chi^2(1) = 15.13$, $p < .001$) with bachelor degrees and active employees being slightly overrepresented (Janssens et al., 2017; Research Department of the Flemish Government, 2010, 2011). Despite this small deviation, it can be concluded that participants represent all categories for socioeconomic status. The [name study masked for review] project used an accelerated longitudinal design, which implies that in each wave an age range is covered that overlaps with the age range of the next wave. Specifically, at Wave 1, adolescents are between 11.38 and 17.40 years old ($M_{\text{age}} = 13.79$, $SD = 0.94$), whereas at Wave 2, adolescents are between 12.56 and 18.22 years old ($M_{\text{age}} = 14.84$, $SD = 0.92$). At Wave 3, adolescents are between 13.44 and 19.09 years old ($M_{\text{age}} = 15.74$, $SD = 0.92$). This overlap leads to structural missing data, which is handled (cfr. regular missing data) through Full Information Maximum Likelihood (FIML). Across the three waves, adolescents' age ranged from 11 to 19 years.

2.2 Measures

All measures for both adolescents and parents were in Dutch, the native language of the participants. Most scales were adaptations of well-known American instruments.

2.2.1 Parenting behavior.

Parenting was rated by mothers and fathers on a selection of subscales from multiple questionnaires, which were included based on their availability in Dutch, theoretical relevance, adequate psychometric properties, and prior use in parenting research. A confirmatory factor analysis (CFA) on these questionnaires resulted in the five-factor parenting model mentioned in the Introduction (Janssens et al., 2015). Measurement invariance of this five-factor model was established across adolescence as well as across informants (i.e., mother and father) by Van Heel et al. (2017), which makes this model suitable to address the research questions.

The dimension *Proactive Control* (Mother Cronbach's α at W1 = .86, W2 = .83, W3 = .85; Father Cronbach's α at W1 = .86, W2 = .86, W3 = .87) comprised two subscales, that is Setting Parental Expectations for Behavior (6 items, e.g., "I expect my son or daughter to behave in a certain manner") and Parental Monitoring of Behavior (6 items, e.g., "I remind my son or daughter of the rules I made"). These subscales were selected from the Parental Regulation Scale (PRS-YSR; Barber, 2002), which was translated into Dutch by Soenens, Vansteenkiste, Luyckx, and Goossens (2006). The dimension *Punitive control* (Mother α at W1 = .88, W2 = .89, W3 = .89; Father α at W1 = .88, W2 = .88, W3 = .88) comprised the Punishment subscale (4 items, e.g. "If my son or daughter does something he/she was not supposed to, I punish him/her") from the Parental Behavior Scale – Short Form (PBS-S; Van Leeuwen et al., 2013). The dimension *Psychological Control* (Mother α at W1 = .84, W2 = .84, W3 = .89; Father α at W1 = .83, W2 = .84, W3 = .86) comprised two subscales. The subscale Psychological Control (8 items, e.g., "I do not talk to my son or daughter when he/she disappointed me until he/she pleases me again") was taken from the Dutch version of Barber's Psychological Control Scale (Barber, 1996; Soenens et al., 2006). One additional item from this subscale was based on a study by Soenens, Sierens, Vansteenkiste, Dochy, and Goossens (2012). The subscale Hostility (6 items, e.g., "I yell at my son or daughter when he/she misbehaves") was based on the Verbal Hostility Scale (Nelson & Crick, 2002). All items were rated by mothers on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*). For all three dimensions, scores were averaged across items.

2.2.2 Adolescent personality.

Mothers and fathers rated their adolescent's personality by filling out the Quick Big Five (QBF; Vermulst & Gerris, 2005). The QBF comprised 30 items with each factor of the Big Five personality factors being represented by six items. The present study only included conscientiousness and agreeableness. Examples of items are "systematic" (conscientiousness: mother α at $W1 = .91$, $W2 = .92$, $W3 = .92$; father α at $W1 = .91$, $W2 = .92$, $W3 = .92$) and "friendly" (agreeableness: mother α at $W1 = .87$, $W2 = .87$, $W3 = .88$; father α at $W1 = .88$, $W2 = .86$, $W3 = .89$). Each item was rated on a 7-point Likert scale, ranging from 1 (*completely incorrect*) to 7 (*completely correct*). For both personality variables, scores were averaged across items. The Differential Item Functioning (DIF) of this questionnaire was assessed in order to investigate whether the included personality items showed difference in response probabilities across parents per wave and across waves per parent. For this purpose, the procedure suggested by Raykov, Marcoulides, Lee, and Chang (2013) was used. There was no more than one item per DIF test that showed differential functioning (i.e., a significant association with wave number or informant). Given the fact that subscales contained an already limited number of items and none of the items consistently exhibited DIF, it was decided to use the original subscales for the personality dimensions, agreeableness and conscientiousness. The results concerning DIF tests are presented in Table S1 and Table S2 in the supplementary materials.

2.2.3 Composite score.

The present study used composite scores for both parental control and adolescent personality. All three parenting practices and both personality dimensions were represented by a separate composite score, which was an average of the ratings from mother and father. When the report from one parent was missing, the report from the other parent was used. Composite scores are thought to counteract the common method bias (i.e., the use of a single informant) and to be more nuanced, since they use multiple sources of information (Podsakoff, Scott, Mackenzie, & Podsakoff, 2003).

2.2.4 Adolescent problem behavior.

Adolescents rated their own externalizing problem behavior by filling out the Youth Self Report (YSR; Achenbach 1991). The broad-band scale Externalizing Behavior (YSR: 31 items, α at $W1 = .82$, $W2 = .84$, $W3 = .82$) can be further divided into two subscales that target aggressive behavior (YSR: 17

items, α at W1 = .78, W2 = .80, W3 = .78) and rule-breaking behavior (YSR: 14 items, α at W1 = .58, W2 = .66, W3 = .63), respectively. Example items are: “I destroy my own belongings” and “I skip classes or I play truant”, respectively. A 3-point rating scale was used, ranging from 0 (*not true*) to 2 (*very true or often true*). For both subscales, scores were averaged across items. Higher scores indicated more externalizing problem behaviors. Measurement invariance of the YSR across adolescence was established by Fonseca-Pedrero et al. (2012).

2.3 Analysis Strategy

Descriptive statistics of the included variables across the waves as well as the bivariate zero-order correlations per wave were provided. In order to assess systematic dropout, independent samples *t* tests were conducted to check whether there was a significant difference in the included variables at Wave *k* between adolescents that dropped out at Wave *k*+1 versus adolescents that still participated in Wave *k* +1.

Two RI-CLPM's were fitted for aggressive behavior and rule-breaking behavior separately to examine transactional and indirect associations with parenting (i.e., proactive control, punitive control, psychological control) and personality (i.e., conscientiousness and agreeableness), while accounting for within-time correlations and stability coefficients. In other words, two models were fitted, one for aggressive behavior and one for rule-breaking behavior, in which the parenting and personality variables were identical. The use of RI-CLPM was suggested by Hamaker, Kuiper, and Grasman (2015) in order to adequately represent both the within-person associations and between-person associations. All the analyses were conducted in MPlus version 7 (Muthén & Muthén, 2012). The robust Maximum Likelihood Estimator (MLR) was used to account for non-normality and Full Information Maximum Likelihood estimator (FIML) was used to handle missing data. Three indices were used to examine overall model fit. First, the lower the Satorra-Bentler chi square ($S-B\chi^2$) value was, the better the overall fit. Second, a high Comparative Fit Index (CFI), more specifically above .90, indicated acceptable model fit. Third, a low Mean Square Error of Approximation (RMSEA), more specifically below .08, indicated acceptable fit. In order to compare nested models, the Satorra-Bentler scaled chi-square difference test ($\Delta S-B\chi^2$) was used with an α of .05 (Hu & Bentler, 1999).

The within-person portion of the models was built using a 2-step modelling strategy (Janssens

et al., 2017). In a first phase, models were tested without constraining any parameters. In a second phase, parameters were constrained across waves to assess a model that showed good overall fit, but also was more parsimonious. A first unconstrained model (Model 1) included all stability paths between time points as well as within-time correlations. A second unconstrained model (Model 2) included the cross-lagged paths involving aggressive behavior/rule-breaking behavior. A third unconstrained model (Model 3) included the cross-lagged paths that originate in conscientiousness and agreeableness and end in the parental control dimensions. The cross-lagged paths between the two personality types were also included in order to control the model for this association. A fourth and last unconstrained model (Model 4) included the cross-lagged paths that originate in proactive control, punitive control, and psychological control and end in the personality factors. The cross-lagged paths between the three parenting dimensions were also included in order to control the model for these associations. A significant $\Delta S-B\chi^2$ ($\alpha = .05$) indicates that the extended model showed a significantly better fit. This model was then compared with the next, extended model (e.g., if Model 2 showed a significantly better fit than Model 1 then Model 2 was compared to Model 3). A second phase, in which the model was simplified, began with constraining the stability path (Model 5) to be equal across waves. A second constraint (Model 6) additionally held the within-time correlations equal across waves. These constrained models were tested against the best fitting unconstrained model. A non-significant $\Delta S-B\chi^2$ test indicated that the constrained model did not show a significantly worse model fit, and thus that the parameters could be considered equal across waves.

When the best fitting model was established, it was assessed whether the model significantly differed between boys and girls. The Satorra-Bentler chi-square difference test was used to compare a multi-group SEM model which constrained the parameters across adolescent sex with a model that allowed the parameters to vary across adolescent sex. Depending on the results of this test, the final model was discussed for boys and girls separately or as one general model. For the sake of illustration we assessed whether the Random-Intercept Cross Lagged Panel Model (RI-CLPM) fitted better than the regular Cross Lagged Panel Model (CLPM). Hamaker, Kuiper and Grasman (2015) suggest to use a chi-square difference test, but they indicate that the regular chi-square difference test is a valid alternative, since the latter is more conservative. We opted to use the regular chi-square difference test,

because its stringency makes for more robust conclusions and in order to be consistent with other model comparison tests in this manuscript.

Within the RI-CLPM models, we tested whether there were indirect effects on externalizing problem behavior at Wave 3. Specifically, we tested whether parenting (personality) at Wave 1 was associated with externalizing problem behavior at Wave 3 through personality (parenting) at Wave 2. It is important to note that we tested every combination of parental control dimensions (punitive, proactive, and psychological control), personality dimensions (agreeableness and conscientiousness), and type of externalizing problem behavior (rule-breaking and aggressive behavior).

3. Results

3.1 Descriptive Statistics

Means and standard deviations of the included variables per wave are presented in Table S3. Zero-order correlations per wave are presented in Table S4a through S4c.

3.2 Attrition Analysis

Results from the attrition analysis showed that drop-out, and thus, missing data were not completely at random (MCAR). However according to Sterne et al. (2009) the missing at random (MAR) assumption is plausible when a wide array of covariates that predict the attrition is available. The present study used a longitudinal dataset containing numerous demographic variables (e.g., ethnicity, gender, family situation, SES) and as such the assumption of MAR is deemed plausible. When missing data are assumed to be MAR, FIML, used in the present study, is shown to be the optimal approach to handle missing data (Enders & Bandalos, 2001). More detailed results of the attrition analysis are presented in Table S5.

3.3 Rule-Breaking Behavior

Detailed results on the model selection procedure concerning rule-breaking behavior are presented in Table S6. Model 5 was the best fitting model for the interplay including rule-breaking behavior ($S-B\chi^2(27) = 69.908$; CFI= .992; RMSEA= .020) and did not significantly differ across adolescent gender ($\Delta S-B\chi^2 = 19.484$, $\Delta df = 28$, $p = .883$). This finding indicated that there was no need for separate models for boys and girls. Furthermore, the RI-CLPM showed significant better model fit ($\Delta S-B\chi^2 = 196.514$, $\Delta df = 14$, $p < .001$) in comparison to regular CLPM ($S-B\chi^2(42) = 294.456$; CFI=

.951; RMSEA= .074). Thus, the final model was Model 5, which included the within-time correlations, cross-lagged paths, and stability paths that were constrained across waves.

Correlations between random intercepts are presented in Table 1. In the rule-breaking model at the between-person level, the random intercepts of the parental control dimensions showed weak negative associations with the random intercepts of the two other parental control dimensions and weak to moderate positive associations with the random intercepts of agreeableness, conscientiousness, and rule-breaking behavior. The correlations with rule-breaking behavior were significant, but weak. The random intercepts of agreeableness and conscientiousness were strongly negatively correlated with each other and weakly positively associated with the random intercept of rule-breaking behavior.

Within-person correlations are presented in Table 2. The within-person stability paths, or carry-over effects, were all significant ($p < .01$), except for the stability paths of psychological control. The standardized regression coefficients ranged from 0.14 (psychological control W1 (W2) to W2 (W3)) to 0.47 (conscientiousness W2 to W3). Concerning within-person cross-lagged paths, or spill-over effects, a negative reciprocal relation between conscientiousness and punitive control was observed, whereas conscientiousness showed a positive reciprocal association with agreeableness. Punitive control and rule-breaking behavior also showed a positive reciprocal association, but only between Wave 2 and Wave 3. Furthermore, conscientiousness at Wave 1 was negatively associated with rule-breaking behavior at W2, which, in turn, was negatively associated with conscientiousness at Wave 3. Agreeableness at Wave 1 was negatively associated with proactive control, which, in turn, was negatively associated with agreeableness at Wave 3. Proactive control predicted a relative increase in psychological control at the next wave, although this association was not observed from psychological control to proactive control. All the estimates of all the cross-lagged paths are presented in Table 3 and Figure 1 provides a visual representation of the significant cross-lagged and stability paths.

Finally, there were no indirect associations between personality traits (i.e., conscientiousness or agreeableness) at Wave 1 and rule-breaking behavior at Wave 3 via parental control (i.e., proactive control, punitive control, or psychological control) or between parental control (i.e., proactive control, punitive control, or psychological control) at Wave 1 and rule-breaking behavior at Wave 3 via

adolescent personality (i.e., conscientiousness or agreeableness). Detailed results concerning the indirect associations are presented in Table S7.

3.4 Aggressive Behavior

Detailed results on the model selection procedure concerning aggressive behavior are presented in Table S8. Model 5 was the best fitting model for the interplay including aggressive behavior ($S-B\chi^2(27) = 64.727$; CFI= .993; RMSEA= .020) and did not significantly differ across adolescent gender ($\Delta S-B\chi^2 = 19.484$, $\Delta df = 28$, $p = .883$). This finding indicated that there was no need for separate models for boys and girls. Furthermore, the RI-CLPM showed significant better model fit ($\Delta S-B\chi^2 = 190.016$, $\Delta df = 14$, $p < .001$) in comparison to regular CLPM ($S-B\chi^2(42) = 291.329$; CFI= .953; RMSEA= .073). The final model included the within-time correlations, cross-lagged paths, and the stability paths that were constrained across waves.

Correlations among random intercepts are presented in Table 1. At the between-person level, the random intercepts in the model concerning aggressive behavior showed a similar pattern as in the model concerning rule-breaking behavior. There was one difference, namely that the random intercept of proactive control was weakly negatively associated with the random intercept of aggressive behavior.

Within-person correlations per wave are presented in Table 2. The within-person stability paths were all significant at $p < .01$, except for the stability paths of psychological control. The standardized regression coefficients ranged from 0.13 (psychological control W2 to W3) to 0.44 (conscientiousness W2 to W3). The stability paths of aggressive behavior were significant, but weaker than the stability paths of rule-breaking behavior. Concerning within-person cross-lagged paths, the positive reciprocal association between conscientiousness and agreeableness across waves was replicated. Also similar to the model concerning rule-breaking behavior was the positive association from proactive control with psychological control at the next wave and the observation that agreeableness at Wave 1 predicted a relative decrease in proactive control at Wave 2, which, in turn, predicted a relative decrease in agreeableness at Wave 3. Punitive control and aggressive behavior showed a positive reciprocal association, but only between Wave 2 and Wave 3. Conscientiousness at Wave 1 predicted a relative decrease of aggressive behavior at Wave 2, which, in turn, predicted a relative decrease in conscientiousness at Wave 3. A similar pattern was found for conscientiousness and punitive control.

All the estimates of all the cross-lagged paths are presented in Table 4 and Figure 2 provides a visual representation of the significant cross-lagged and stability paths.

Finally, there were no indirect associations between personality traits (i.e., conscientiousness or agreeableness) at Wave 1 and aggressive behavior at Wave 3 via parental control (i.e., proactive control, punitive control, or psychological control) or between parental control (i.e., proactive control, punitive control, or psychological control) at Wave 1 and aggressive behavior at Wave 3 via adolescent personality (i.e., conscientiousness or agreeableness). Detailed results concerning the indirect associations are presented in Table S9.

4. Discussion

The present study investigated the transactional associations between different aspects of adolescent personality, parental control, and externalizing problem behavior across three waves with a one-year interval in adolescence. Thus, the results below hold for this specific time interval and choosing a different interval may lead to different results. A Random intercept cross-lagged panel model was used because it distinguishes the time-invariant between-person effects and the time-specific within-person effects, which allows to accurately investigate transactional associations across adolescence. At the between-level, the strongest associations were observed involving the personality dimensions. Specifically, high levels of parent-reported conscientiousness or agreeableness were associated with high levels of parent-reported proactive and punitive control. Furthermore, the two personality dimensions were negatively associated with each other. Concerning within-person transactional associations, the hypothesis that high levels of conscientiousness or agreeableness would be associated with a relative decrease in externalizing problem behavior was supported for conscientiousness, which showed reciprocal negative links with both rule-breaking and aggressive behavior. Furthermore, our findings indicated that there were no indirect associations between parental control and externalizing problem behavior (via adolescent personality) or between adolescent personality and externalizing problem behavior (via parental control). Concerning parenting behaviors, we expected that high levels of punitive or psychological control would be associated with a relative increase of externalizing problem behavior, whereas proactive control was expected to be associated with a relative decrease. This hypothesis was only and inconsistently confirmed for punitive control. In contrast to our

hypothesis, models for rule-breaking and aggressive behavior were not found to be significantly different for boys as compared to girls.

4.1 Links Among Rule-Breaking Behavior, Personality, and Parental Control

In contrast to a previous study by Pettit et al. (2001), sex did not appear to play a significant role in the interplay between rule-breaking behavior and parental control. It is possible that sex effects become more apparent when specific associations are considered rather than an extensive model on parenting, personality and problem behavior. Furthermore, another difference with the study by Pettit et al. (2001) is that they investigated delinquent behavior, which can be considered more severe since it implies breaking the law. Sex may become more important when problem behavior grows more severe, but more research is needed to explore its role in more detail.

At the between-person level, high levels of punitive control were associated with low levels of proactive and psychological control and high levels of proactive control were associated with low levels of psychological control. This may indicate that when parents often use one parenting practice, other practices may be used less. However, this does not mean parents use only one parenting practice. High levels of the parental control dimensions were associated with higher levels of the two personality dimensions, agreeableness and conscientiousness, which may be interpreted as parents perceiving their parenting as effective. When parents obtain compliance from their adolescent through the use of these parenting practices, they rate the adolescents as more agreeable and more conscientious. A somewhat counterintuitive finding is the observation that high levels of conscientiousness were associated with low levels of agreeableness. This finding can be interpreted in light of every dimension of the Big Five having positive and negative aspects. High levels of conscientiousness can be reflected in a perfectionistic attitude and lack of spontaneity. It is possible that these characteristics lead to individuals being perceived as uncooperative and less agreeable. It has to be noted that this association was observed at the population level, but not at the intra-individual level. Finally, high levels of rule-breaking behavior were weakly associated with high levels of proactive control, agreeableness, and conscientiousness, but low levels of punitive and psychological control. The findings concerning punitive (Brenner & Fox, 1998; Stormshak, Bierman, McMahon, & Lengua, 2000) and psychological control (Ahmad, Vansteenkiste, & Soenens, 2013; Mabbe et al., 2016) as well as concerning agreeableness and

conscientiousness (Asendorpf, Caspi, & Hofstee, 2002) were consistent with the literature. The finding that rule-breaking behavior was positively associated with proactive control is not in line with the literature (Galambos, Barker, & Almeida, 2003; Gray & Steinberg, 1999). One possible explanation is that parents assume that because of risky behaviors inherent in adolescence, an adolescent needs more proactive control (increasing rules and supervision), but that these parenting practices are counterproductive, eliciting more rule-breaking. More research is needed to investigate how proactive control is experienced by adolescents and how they respond to it.

At the within-person level, the cross-lagged paths indicated a negative reciprocal association between rule-breaking behavior and conscientiousness. In other words, when parents described their adolescent as more conscientious, the adolescent reported less rule-breaking behavior one year later, and vice versa, which is consistent with our hypotheses. If an adolescent is conscientious, it is less likely that the adolescent will exhibit problem behavior. This reciprocity, in line with De Bolle et al. (2012) and Shiner (2000) can be framed within the continuity hypothesis which states that personality and externalizing problem behavior covary within and across time, but could also be interpreted within the scar/complication hypothesis, stating that psychopathology predicts personality, or the predisposition hypothesis, stating that personality predicts psychopathology. Based on the present findings, it is impossible to distinguish between these three hypotheses. More research is needed to explicitly test the different hypotheses. Prinzie et al. (2003) suggested that parental control may play a role in the association between personality and problem behavior. However, there was no support for indirect associations between adolescent personality and externalizing problem behavior via parental control. We also observed that conscientiousness predicted agreeableness, and vice versa. Consistent with the literature (Ones, Viswesvaran, & Reis, 1996), this finding seems to indicate that when a parent thinks of the adolescent as being more cooperative and agreeable, he/she will see him/her as more conscientious. However, being conscientious does not necessarily implies being agreeable, which is reflected in the two personality types showing different observations with parenting practices. Conscientiousness consistently predicted a reduction in punitive control, and vice versa, whereas agreeableness was reciprocally negatively associated with proactive control. The finding concerning conscientiousness and punitive control is consistent with the findings of Schofield et al. (2012) and

seems intuitive. If an adolescent is more conscientious, it is less likely that he or she will show unwanted behavior. Therefore, there is no need for punitive control to obtain compliance. Furthermore, we also found that high levels of proactive control consistently predicted higher levels of psychological control, whereas psychological control did not predict proactive control. This association is somewhat surprising since proactive control is considered a positive and psychological control a negative parenting practice. One possible explanation is that parents who posit rules (proactive control) use psychological control to make sure the adolescents abide them. In this case, the intention of providing a well-structured environment for the adolescent can escalate into limiting their autonomy by using psychological control. The parental control dimensions seem to play a more limited role in the interplay with adolescent personality and rule-breaking behavior. This finding, however, does not minimize the importance of parenting, and more specific parental control. It may indicate a more general role for parenting, socializing the adolescent and shaping its personality to adequately function in a social environment (Grusec & Davidov, 2010). This is in line with suggestions for designing parent-based interventions for externalizing problem behavior by Jaccard and Levitz (2013). They propose a strategy that focuses not only on the problem behavior itself, but also on a more general positive development of the adolescent. Focusing on more general constructs such as social, emotional, or moral development could also lead to lower levels of problem behavior.

4.2 Links Among Aggressive Behavior, Personality, and Parental Control

Similar to the interplay including rule-breaking, the modelling strategy indicated that the interplay did not significantly differ for boys and girls. At the between-person level, the findings in the interplay including aggressive behavior were similar to the findings in the model including rule-breaking behavior. One difference is the finding that high levels of proactive control were associated with lower levels of aggressive behavior. This finding is in line with research that proactive control reduces externalizing problem behavior (Galambos, Barker, & Almeida, 2003; Gray & Steinberg, 1999). It would be interesting to further investigate this difference between the two types of externalizing problem behavior, since it could provide information on which parenting practices are effective in reducing different types of externalizing problem behavior.

At the within-person level, the cross-lagged paths in the model for aggressive behavior, were similar to the findings for the rule-breaking behavior model. This similar pattern of associations can be explained by the co-occurrence of rule-breaking and aggressive behavior, which is estimated to be 50-60% (Bartels et al., 2003). However, we also found some differences, but they concern the strength and not the direction of the association. The positive association between punitive control and aggressive behavior was smaller than between punitive control and rule-breaking behavior. This finding is in line with previous research suggesting differences in interpersonal correlates (e.g., association with negative affect; Burt, Mikolajewski, & Larson, 2009). Furthermore, literature suggests differences in etiological, genetic as well as environmental, factors (Burt, 2013). It is likely that the importance of genetic characteristics is not limited to the etiology of both types of externalizing problem behavior or the heritability of personality traits linked to problem behavior (De Fruyt et al., 2006), but that they also differentially interact with environmental influences (Burt, Klarh, Neale, & Klump, 2013; Button et al., (2008).

5. Limitations

A number of limitations can be noted concerning the present study. First, the data that were derived from adolescent- and parent-reports. Especially on sensitive topics such as externalizing problem behavior, punitive, and psychological control, it is possible that there is an effect of social desirability. This could have led to an underreporting of externalizing problem behavior by the adolescent and of psychological and punitive control by parents. Second, the Cronbach's alpha of the rule-breaking behavior subscale is rather low, but improves over time. Nonetheless, this urges us to be cautious in our conclusions concerning rule-breaking behavior. Third, in order to limit model complexity, the present study made a selection of the personality characteristics that are included. It is possible that other aspects of adolescent personality, or more broadly, other personal characteristics, also play a role in the interplay with externalizing problem behavior. Fourth, given the limited number of waves (i.e., three waves spanning a two-year period) and the wide range of ages included per wave, conclusions pertaining to developmental trends should be drawn with caution. Adolescence is a period with major changes for both the adolescent and the parents, and, as such, it is likely that a sample that is more heterogeneous in terms of age and that covers a larger part of the adolescence provides better

opportunities to investigate specific developmental trends in the interaction between adolescents and parents.

6. Conclusion

At the population level, the findings indicate that externalizing problem behavior, parental control, conscientiousness, and agreeableness are significantly associated across adolescence. At the individual level, our findings suggest that conscientiousness plays an important role. Specifically, conscientiousness predicts changes in externalizing problem behavior (i.e., rule-breaking and aggressive behavior) and shows reciprocal associations with agreeableness (positive) and punitive control (negative). Furthermore, proactive control predicts a relative increase in psychological control as well as in agreeableness. There were no indirect effects of parental control (via adolescent personality) or of adolescent personality (via parental control) on externalizing problem behavior. The present study shows that externalizing problem behavior is the result of and acts in a complex interaction between the individual and its environment. Specifically, we found a reciprocity between personality and problem behavior, but we also observed an important role for parental control. Our findings also showed the added value of including multiple dimensions of personality (i.e., conscientiousness and agreeableness) or parental control (i.e. proactive, punitive, and psychological control), since these appear to play distinct role in the interplay with externalizing problem behavior.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Figure 1. Significant cross-lagged and stability paths of the final model concerning rule-breaking behavior.

Note. Pro = Proactive Control; Pun = Punitive Control; Psy = Psychological Control; Con = Conscientiousness; Agree = Agreeableness; Rul = Rule-breaking behavior; * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 2. Significant cross-lagged and stability paths of the final model concerning aggressive behavior.

Note. Pro = Proactive Control; Pun = Punitive Control; Psy = Psychological Control; Con = Conscientiousness; Agree = Agreeableness; Agg = Aggressive Behavior; * $p < .05$. ** $p < .01$. *** $p < .001$

Table 1

Pearson Correlations Among Random Intercepts of the Best Fitting Model Concerning Rule-Breaking Behavior and Aggressive Behavior Respectively

Rule-breaking model	1	2	3	4	5	6
1.Proactive control	1					
2.Punitive control	-.13 ***	1				
3.Psychological control	-.11 ***	-.16 ***	1			
4.Agreeableness	.27 ***	.36 ***	.14 ***	1		
5.Conscientiousness	.38 ***	.56 ***	.24 ***	-.45 ***	1	
6.Rule-breaking behavior	.04 ***	-.06 ***	-.03 ***	.06 ***	.09 ***	1
Aggressive behavior model	1	2	3	4	5	6
1.Proactive control	1					
2.Punitive control	-.12 ***	1				
3.Psychological control	-.11 ***	-.16 ***	1			
4.Agreeableness	.27 ***	.37 ***	.14 ***	1		
5.Conscientiousness	.33 ***	.56 ***	.25 ***	-.46 ***	1	
6.Aggressive behavior	-.06 ***	-.09 ***	-.04 ***	.07 ***	.13 ***	1

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Within-Person Pearson Correlations Among Variables of the Best Fitting Model Concerning Rule-Breaking Behavior

	<i>Wave 1</i>						<i>Wave 2</i>						<i>Wave 3</i>					
Rule-breaking behavior model	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
1.Proactive control	1						1						1					
2.Punitive control	.56***	1					.23**	1					.38***	1				
3.Psychological control	.60***	.67***	1				.30***	.24*	1				.13*	.24**	1			
4.Agreeableness	-.56***	-.67***	-.72***	1			-.10	-.02	-.31***	1			-.08	-.15*	-.25**	1		
5.Conscientiousness	-.64***	-.72***	-.72***	.81***	1		-.03	-.15	-.14	.43***	1		-.13*	-.20**	-.20**	.32***	1	
6.Rule-breaking behavior	.50***	.58***	.61***	-.69***	-.65***	1	.04	.05	-.01	-.12	-.12	1	.02	.08	.01	-.11	-.19**	1
Aggressive behavior model	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
1.Proactive control	1						1						1					
2.Punitive control	.56***	1					.24**	1					.38***	1				
3.Psychological control	.60***	.68***	1				.30***	.23*	1				.13	.22**	1			
4.Agreeableness	-.56***	-.68***	-.72***	1			-.09	-.01	-.31***	1			-.07	-.13*	-.25**	1		
5.Conscientiousness	-.62***	-.72***	-.73***	.82***	1		-.02	-.15	-.15*	.46***	1		-.13	-.18**	-.19**	.31***	1	
6.Aggressive behavior	.47***	.59***	.63***	-.70***	-.69***	1	.11**	.18*	.12	-.21*	-.20*	1	.04	.16*	.01	-.17	-.22**	1

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Parameter Estimates for the Cross-Lagged Paths in the Rule-Breaking Behavior Model

Outco	Predict	β	p	Outco	Predict	β	p	Outco	Predict	β	p
Pro con	Cons	0.04	.76	Pun	Cons	-	.01	Psy con	Cons	-	.56
	Agree	-	.01		Agree	-	.20		Agree	-	.08
	Pun	0.12	.15		Pro con	-	.85		Pro con	0.23	.00
	Psy con	0.04	.67		Psy con	0.10	.24		Pun	0.09	.31
	Rul W1	0.12	.18		Rul W1	0.06	.45		Rul W1	0.08	.34
Agree	Cons	0.34	.00	Cons	Agree	0.22	.01	Rul W2	Cons	-	.00
	Pro con	-	.01		Pro con	-	.11		Agree	-	.55
	Pun	-	.93		Pun	-	.03		Pro con	0.03	.61
	Psy con	-	.18		Psy con	0.01	.84		Pun	0.03	.66
	Rul W1	-	.34		Rul W1	-	.55		Psy con	0.03	.67
Pro con	Cons	-	.50	Pun	Cons	-	.02	Psy con	Cons	-	.25
	Agree	-	.21		Agree	-	.32		Agree	-	.10
	Pun	0.14	.09		Pro con	0.15	.08		Pro con	0.18	.03
	Psy con	0.14	.11		Psy con	0.09	.30		Pun	0.28	.00
	Rul W2	0.11	.09		Rul W2	0.11	.04		Rul W2	0.04	.39
Agree	Cons	0.23	.01	Cons	Agree	0.19	.01	Rul W3	Cons	-	.06
	Pro con	-	.00		Pro con	-	.08		Agree	0.02	.82
	Pun	-	.66		Pun	-	.01		Pro con	0.16	.05
	Psy con	-	.38		Psy con	0.08	.28		Pun	0.17	.03
	Rul W2	-	.34		Rul W2	-	.00		Psy con	0.01	.83

Note. Pro con = Proactive control; Pun con = Punitive control; Psy con = Psychological control; Cons = Conscientiousness; Agree = Agreeableness; Rul = Rule-breaking behavior.

Table 4

Parameter Estimates for the Cross-Lagged Paths in the Aggressive Behavior Model

Outcome	Predictor	β	p	Outcome	Predictor	β	p	Outcome	Predictor	β	p
Pro con W2	Cons W1	0.069	.652	Pun con W2	Cons W1	-0.301	.026	Psy con W2	Cons W1	-0.104	.525
	Agree W1	-0.347	.018		Agree W1	-0.158	.201		Agree W1	-0.220	.121
	Pun con W1	0.119	.162		Pro con W1	0.007	.919		Pro con W1	0.246	.001
	Psy con W1	0.046	.659		Psy con W1	0.104	.251		Pun con W1	0.082	.374
	Agg W1	0.100	.306		Agg W1	0.061	.412		Agg W1	0.105	.218
Agree W2	Cons W1	0.369	<.001	Cons W2	Agree W1	0.237	.014	Agg W2	Cons W1	-0.266	.029
	Pro con W1	-0.160	.009		Pro con W1	-0.099	.110		Agree W1	-0.211	.061
	Pun con W1	-0.005	.945		Pun con W1	-0.130	.063		Pro con W1	0.035	.575
	Psy con W1	-0.101	.222		Psy con W1	0.014	.864		Pun con W1	0.053	.432
	Agg W1	-0.065	.341		Agg W1	-0.073	.205		Psy con W1	0.052	.454
Pro con W3	Cons W2	-0.051	.622	Pun con W3	Cons W2	-0.151	.094	Psy con W3	Cons W2	-0.110	.314
	Agree W2	-0.172	.173		Agree W2	-0.101	.305		Agree W2	-0.176	.120
	Pun con W2	0.149	.100		Pro con W2	0.147	.098		Pro con W2	0.169	.045
	Psy con W2	0.128	.164		Psy con W2	0.069	.432		Pun con W2	0.274	.001
	Agg W2	0.069	.473		Agg W2	0.195	.014		Agg W2	0.092	.204
Agree W3	Cons W2	0.222	.026	Cons W3	Agree W2	0.213	.008	Agg W3	Cons W2	-0.061	.589
	Pro con W2	-0.272	.004		Pro con W2	-0.131	.105		Agree W2	-0.175	.153
	Pun con W2	-0.018	.839		Pun con W2	-0.143	.039		Pro con W2	0.122	.228
	Psy con W2	-0.078	.413		Psy con W2	0.090	.245		Pun con W2	0.359	<.001
	Agg W2	-0.181	.051		Agg W2	-0.160	.014		Psy con W2	-0.018	.837

Note. Pro con = Proactive control; Pun con = Punitive control; Psy con = Psychological control; Cons = Conscientiousness; Agree = Agreeableness; Agg = Aggressive behavior.

Supplemental materials

Table S1

Differential Item Functioning Test Using MIMIC Model of Agreeableness and Conscientiousness Between Mothers and Fathers Per Wave.

Agreeableness						
item	Wave 1		Wave 2		Wave 3	
	β	p	β	p	β	p
QBF1	-0.108	.076	0.017	.414	-0.023	.096
QBF10	-0.001	.953	0.050	.017	0.069	.161
QBF15	-0.035	.231	0.007	.719	-0.016	.720
QBF19	0.006	.731	0.051	.009	0.076	.004
QBF22	-0.005	.754	-0.015	.429	-0.040	.300
QBF28	0.000	.984	-0.066	.001*	-0.478	<.001*
Adjusted α	<.001		.001		<.001	
Conscientiousness						
item	Wave 1		Wave 2		Wave 3	
	β	p	β	p	β	p
QBF4	-0.017	.272	0.000	.981	-0.017	.327
QBF8	-0.016	.261	-0.061	<.001*	-0.050	.005
QBF12	-0.020	.090	0.002	.906	-0.022	.163
QBF16	0.010	.486	0.006	.704	-0.047	.005
QBF25	0.032	.013	0.050	.001	0.012	.439
QBF27	0.016	.336	-0.033	.115	0.548	<.001*
Adjusted α	<.001		<.001		<.001	

Note. QBF= Quick Big Five Questionnaire followed by the item number in the original questionnaire.

*: Significant results compared to the adjusted α level. The α level was adjusted using the Benjamin-Hochberg procedure (nominal $\alpha = .05$) as suggested by Raykov et al. (2013).

Table S2

Differential Item Functioning Test Using MIMIC Model of Agreeableness and Conscientiousness Between Waves Per Parent.

Agreeableness				
item	Mother		Father	
	β	p	β	p
QBF1	-0.019	.232	-0.026	.131
QBF10	-0.025	.195	0.021	.219
QBF15	0.001	.942	0.056	.001
QBF19	0.005	.731	0.052	.001
QBF22	0.017	.277	0.056	.001
QBF28	0.008	.602	-0.368	<.001*
Adjusted α	<.001		<.001	
Conscientiousness				
item	Mother		Father	
	β	p	β	p
QBF4	-0.028	.303	0.030	.115
QBF8	0.000	.997	-0.036	.016
QBF12	-0.021	.059	-0.031	.011
QBF16	0.065	.012	-0.008	.584
QBF25	0.004	.871	-0.014	.261
QBF27	0.042	.007	0.443	<.001*
Adjusted α	<.001		<.001	

Note. QBF= Quick Big Five Questionnaire followed by the item number in the original questionnaire.

*: Significant results compared to the adjusted α level. The α level was adjusted using the Benjamin-Hochberg procedure (nominal $\alpha = .05$) as suggested by Raykov et al. (2013).

Table S3

Means and Standard Deviations of Included Variables Per Wave.

	<i>M (SD)</i>		
	Wave 1	Wave 2	Wave 3
Proactive control	4.14 (0.47)	4.07 (0.43)	4.07 (0.45)
Punitive control	2.91 (0.82)	2.83 (0.78)	2.70 (0.82)
Psychological control	1.88 (0.45)	1.85 (0.43)	1.81 (0.44)
Agreeableness	5.84 (0.79)	5.82 (0.77)	5.88 (0.77)
Conscientiousness	4.21 (1.26)	4.09 (1.32)	4.22 (1.28)
Rule-breaking behavior	0.23 (0.17)	0.23 (0.19)	0.22 (0.18)
Aggressive behavior	0.30 (0.24)	0.28 (0.22)	0.26 (0.21)

Table S4

Correlations Between Included Variables at Wave 1 (a), Wave 2 (b), Wave 3 (c)

(a)	1	2	3	4	5	6	7
Proactive control (1)							
Psychological control (2)	.063						
Punitive control (3)	.225***	.246***					
Agreeableness (4)	.169***	.329***	-.121***				
Conscientiousness (5)	-.056	-.286***	-.183***	.351***			
Rule-breaking behavior (6)	-.038	.231***	.144***	-.265***	-.226***		
Aggressive behavior (7)	-.056	.267***	.132***	-.312***	-.253***	.664***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

(b)	1	2	3	4	5	6	7
Proactive control (1)							
Psychological control (2)	.113**						
Punitive control (3)	.264***	.185***					
Agreeableness (4)	.188***	-.305***	-.010				
Conscientiousness (5)	.012	-.245***	-.140***	.382***			
Rule-breaking behavior (6)	-.045	.122**	.109**	-.175***	-.245***		
Aggressive behavior (7)	-.024	.184***	.118**	-.220***	-.251***	.624***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

(c)	1	2	3	4	5	6	7
Proactive control (1)							
Psychological control (2)	.077						
Punitive control (3)	.360***	.236***					
Agreeableness (4)	.133**	-.339***	-.084*				
Conscientiousness (5)	-.078	-.296***	-.132**	.347***			
Rule-breaking behavior (6)	-.020	.167***	.118**	-.148**	-.236***		
Aggressive behavior (7)	-.058	.202***	.089*	-.213***	-.196***	.592***	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Table S5

Attrition Analysis Assessing Systematic Attrition

Variables at Wave <i>k</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>M</i> Δ	<i>SE</i> Δ	Δ at Wave <i>k</i> + 1	
						95% CI Lower	95% CI Upper
Rule-breaking W1	3.227	1093	.001	0.05	0.17	0.02	0.09
Aggressive behavior W1	1.501	1093	.134	0.03	0.02	-0.01	0.08
Proactive control W1	-1.238	74.596	.220	-0.09	0.08	-0.25	0.06
Punitive control W1	1.056	847	.291	0.11	0.10	-0.10	0.31
Psychological control W1	-0.353	843	.724	-0.02	0.06	-0.13	0.09
Conscientiousness W1	-1.823	840	.069	-0.29	0.16	-0.61	0.02
Agreeableness W1	-0.551	840	.582	-0.06	0.10	-0.25	0.14
Rule-breaking W2	3.151	166.540	.002	0.06	0.02	0.02	0.10
Aggressive behavior W2	2.880	986	.004	0.06	0.02	0.02	0.10
Proactive control W2	-0.109	649	.913	-0.01	0.06	-0.11	0.10
Punitive control W2	2.506	653	.012	0.25	0.10	0.05	0.44
Psychological control W2	1.384	647	.167	0.08	0.06	-0.03	0.19
Conscientiousness W2	-4.053	649	<.001	-0.68	0.17	-1.00	-0.35
Agreeableness W2	-1.68	649	.094	-0.16	0.10	-0.36	0.03

Table S6

Model Fit Indices for Rule-Breaking Behavior

Model	S-B χ^2	df	p	SCF	Δ S-B χ^2	Δ df	p	CFI	RMSEA
Phase 1: Unconstrained models									
Model 1	379.537	81	<.001	1.0968				.942	.058
Model 2	259.257	61	<.001	1.0679	117.655	20	<.001	.961	.039
Model 3	183.515	45	<.001	0.9742	73.665	16	<.001	.973	.036
Model 4	69.713	23	<.001	.9575	112.972	22	<.001	.991	.020
Phase 2: Simplifying Model 3									
Model 5	69.908	27	<.001	1.0484	4.163	4	.384	.992	.021
Model 6	360.138	57	<.001	1.1183	278.910	30	<.001	.941	.042

Note. The model in bold shows the best model fit.

Table S7

Indirect Associations Between Rule-Breaking Behavior and Personality Traits Mediated by Parental Control

Outcome	Predictor	mediator	β	p
Rule-breaking behavior W3	Conscientiousness W1	Proactive control W2	.007	.757
		Punitive control W2	-.054	.147
		Psychological control W2	-.002	.851
Rule-breaking behavior W3	Agreeableness W1	Proactive control W2	-.056	.084
		Punitive control W2	-.027	.240
		Psychological control W2	-.004	.829
Rule-breaking behavior W3	Proactive control W1	Conscientiousness W2	-.017	.212
		Agreeableness W2	-.004	.824
Rule-breaking behavior W3	Punitive control W1	Conscientiousness W2	.025	.139
		Agreeableness W2	.000	.942
Rule-breaking behavior W3	Psychological control W2	Conscientiousness W2	-.003	.847
		Agreeableness W2	-.002	.826

Table S8

Model Fit Indices for Aggressive Behavior

Model	S-B χ^2	df	p	SCF	Δ S-B χ^2	Δ df	p	CFI	RMSEA
Phase 1: Unconstrained models									
Model 1	374.612	81	<.001	1.1179				.945	.038
Model 2	224.423	61	<.001	1.0722	141.696	20	<.001	.969	.041
Model 3	133.910	45	<.001	1.0579	88.962	16	<.001	.983	.034
Model 4	63.977	23	<.001	0.9910	69.391	22	<.001	.992	.018
Phase 2: Simplifying Model 3									
Model 5	64.727	27	<.001	1.0437	3.085	4	.544	.993	.020
Model 6	368.881	57	<.001	1.1270	289.668	30	<.001	.942	.041

Note. The model in bold shows the best model fit.

Table S9

Indirect Associations Between Aggressive Behavior and Personality Traits Mediated by Parental Control

Outcome	Predictor	mediator	β	p
Aggressive behavior W3	Conscientiousness W1	Proactive control W2	.008	.661
		Punitive control W2	-.108	.063
		Psychological control W2	.002	.840
Aggressive behavior W3	Agreeableness W1	Proactive control W2	-.042	.277
		Punitive control W2	-.057	.226
		Psychological control W2	.004	.840
Aggressive behavior W3	Proactive control W1	Conscientiousness W2	.006	.602
		Agreeableness W2	.028	.182
Aggressive behavior W3	Punitive control W1	Conscientiousness W2	.005	.584
		Agreeableness W2	.001	.945
Aggressive behavior W3	Psychological control W2	Conscientiousness W2	-.001	.871
		Agreeableness W2	.018	.337