

Directions of Effects between Adolescent Psychopathic Traits and Parental Behavior

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Published online: 18 March 2012
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Abstract The present study examined the directions of effects between adolescent psychopathic traits and parental behaviors. The data are from a community-based cohort-sequential study. Data were collected annually over 4 years. Participants were 875 adolescents, aged 13–15 at Time 1, and we analyzed their reports of negative and positive parental behavior, delinquency, and psychopathic traits. In results from cross-lagged models, adolescent psychopathic traits predicted changes over time in all of the parental behaviors at nearly all of the time intervals, whereas the prediction from parental behaviors to psychopathic traits was inconsistent across parenting measures and time intervals. These findings suggest that parental behavior is more a reaction than a predictor of psychopathic traits in adolescence.

Keywords Psychopathic traits · Delinquency · Parental behavior · Directions of effects

Adolescents with psychopathic traits can be callous, unemotional, impulsive, manipulative, and remorseless. It is easy to imagine how these traits might produce anger and frustration for parents. Conversely, it is easy to imagine how being

exposed to frequent parental anger and frustration might cause adolescents to shield themselves emotionally, which could exaggerate such psychopathy-like traits as callousness, unemotionality, and remorselessness. The question, then, is what role parents play. Do they mainly react to adolescents' psychopathic traits or do their behaviors contribute to the development of psychopathic traits in adolescence?

Theoretical and empirical work suggests that parents do play a role in the early development of psychopathic traits. Theoretically, most recent models propose that psychopathic traits result from a complex interplay between biology and the social environment (see Saltaris 2002). In these models, biologically based temperament is an early precursor of the affective and interpersonal deficits shown by youths with psychopathic traits (see Frick 1998; Lykken 1995; Lynam 1996). The temperament style, which is characterized by lack of fear, impulsivity, and low behavioral inhibition, is thought to place a child at risk for developing a dysfunctional interpersonal style and resistance to emotional ties with other people (Kochanska 1993). Thus, temperament dispositions in early childhood are thought to form the foundation for the development of psychopathic traits, but the social environment, of which parents are an essential part, is considered critical in their development.

The role of parental behaviors is spelled out in several theories (Lykken 1995; Quay 1977; Salekin 2002). In these theories, negative parental behaviors, such as inconsistency, punishment and rejection, are thought to bring about emotional detachment in children who are temperamentally fearless and impulsive, partly because parents with these behaviors fail to promote self-control and secure parent-child bonds. Positive behaviors, such as consistency and competence, on the other hand, are thought to work against the development of psychopathic traits by promoting the internalization of prosocial behavior (Lykken 1995). Thus,

The Swedish Research Council provided funding for the longitudinal project used in this study.

We thank Håkan Stattin, Lauree Tilton-Weaver, and Maarten Van Zalk for critique on an earlier version.

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these theories suggest that although some children are temperamentally vulnerable to developing psychopathy, it is the rearing environment (i.e., parental behavior) that will determine the outcome.

Although a number of theorists agree on the role of parental behavior in the development of psychopathic traits, some go further, suggesting that the link between parental behavior and psychopathic traits might be bidirectional. Quay (1977), for example, has proposed that impulsive, fearless children are insensitive to the corrections that parents frequently use in response to bad behavior. Because of this, parents might try different strategies, thus making their parenting inconsistent. According to Quay, parental inconsistency creates a negative cycle that may exacerbate the development of a psychopathy-like personality style. In this theory, then, psychopathic traits and parental behavior affect each other over time.

Despite these well-developed ideas, there is little research on bidirectional influences between parenting and psychopathic traits in children or adolescents. There are several longitudinal studies that have examined half of the bidirectional equation by linking parenting behavior to stability or change over time in the development of psychopathic traits. In these studies, which were done mostly on adolescent samples, parents' negative practices, such as inconsistent discipline, poor communication, and physical punishment were related to the stability of psychopathic traits from childhood to adolescence and from adolescence to adulthood for youths with elevated levels of psychopathic traits (Frick et al. 2003; Lynam et al. 2008; Pardini and Loeber 2008). These studies have provided evidence that parental behavior may contribute to the maintenance of psychopathic traits; however, they have not ruled out the possibility that parents' negative behavior was, in part, a reaction to the adolescents' psychopathic traits. Specifically, youths with stably high levels of psychopathic traits might have elicited the negative parental behavior that contributed to the stability of their psychopathic traits. If so, the abovementioned results might represent one part of a reciprocal, or bidirectional, relationship. To test this possibility, longitudinal data with measures of psychopathic traits and parental behavior at multiple time points are needed. With such a design, both directions of effects can be examined.

We know of only three studies in the literature that offer clues about the possible bidirectional links between parenting behavior and psychopathic traits (Hawes et al. 2011; Larsson et al. 2008; Muñoz et al. 2011). In one of these studies (Larsson et al. 2008), the authors divided a sample of 7-year-olds into four groups, defined by high and low levels of antisocial behavior and callous, unemotional traits. The group that was high on both had experienced more negative parental behavior at ages three and four, and this was taken as confirmation of the parent-to-child effect. However, that

link disappeared after controlling for the children's conduct problems and hyperactivity at ages three and four, and this was taken as evidence of a child-to-parent effect. Although these results are provocative and the study was strengthened by the use of longitudinal data, a limitation was that callous, unemotional traits and negative parental behavior were each assessed at only one point in time. Consequently, it was not possible to predict changes over time in these characteristics. In another study (Hawes et al. 2011), measures of callous, unemotional traits and parenting behavior in childhood were both assessed at two time points, with 1 year between the measurements. The authors showed that parenting behavior predicted change in callous, unemotional traits and there was also some support that callous, unemotional traits predicted changes in parenting behavior. Although these results went beyond the previous study by including measures of callous, unemotional traits and parenting behavior at two time points, a limitation was that the effects of parental behavior and callous, unemotional traits were not examined simultaneously, so the findings do not reveal whether the links from parenting to callous traits hold even when the links from callous traits to parenting are controlled for, and vice versa. This precludes inferences concerning the *direction* of effects. In another recent study (Muñoz et al. 2011), links between youth psychopathic traits and parenting were not examined directly, but results showed that the higher the levels of youths' problem behaviors the more parents reduced their behavioral control over time and this link was stronger for youths who were high on callous, unemotional traits. Because callous, unemotional traits were included as a moderator rather than a predictor, however, the question remains open concerning the direction of effects between psychopathic traits and parenting. To examine bidirectionality, additional studies are needed in which parental behavior and psychopathic traits have been assessed at multiple time points and analyzed simultaneously in cross-lagged models.

In this study, we used a cross-lagged panel design to look at the directions of effects between parental behaviors and adolescent psychopathic traits, both assessed annually over 4 years. We considered two aspects of parental behavior, positive behavior, operationalized as warmth and attempted understanding, and negative behavior, operationalized as angry outbursts, coldness, and negative reactions to disclosure. Negative parental behavior has been linked to the stability of psychopathic traits in adolescence (Frick et al. 2003; Lynam et al. 2008; Pardini and Loeber 2008), but there is also some evidence that parents' positive behavior may lead to decreases in callous, unemotional traits (Frick et al. 2003) and increases in feeling connected to parents (Tilton-Weaver et al. 2010). In addition to testing the directions of effects between parental behavior and psychopathic traits, we included delinquency in all models. Delinquency

and psychopathic traits are strongly correlated (Andershed et al. 2002; Christian et al. 1997; Declercq et al. 2009), and this raises the possibility that parents might react to delinquency more than to psychopathic traits, per se. Hence, including delinquency allowed us to look at the unique effects of psychopathic personality traits. We also considered the potential moderating role of adolescents' gender. Research on gender differences in the links between parental behavior and psychopathic traits is scarce, and there are no studies that have examined how parents react to psychopathic traits in boys and girls, separately. Thus, we included moderation by gender as an exploratory question. In short, the questions for the study were: (a) does parental behavior predict changes in adolescent psychopathic traits, (b) do adolescent psychopathic traits predict changes in parental behavior, and (c) are the effects moderated by gender?

Method

Participants

The data were from a 5-wave, cohort-sequential study that took place in one community in Sweden. The community had a total population of about 26,000 when the study began in 2001. The unemployment rate was similar to that in the country as a whole (6 %), however, the average income was slightly lower (4 %). Twelve percent of the inhabitants in the community had a foreign background. For the current study, we used Waves 2 through 5 (hereafter referred to as Times 1 through 4), because the measures of interest were comparable across these waves.

The current analyses involved participants who were in 7th through 9th grades (ages 13–15) at Time 1. Eight hundred seventy-five adolescents (90 % of the target sample), 464 boys (53 %) and 411 girls (47 %) participated at Time 1. Of these, 804 (92 %) were natives of Sweden and 66 (7.5 %) had a different ethnic background. At Time 1, 32 % of the parents were divorced or separated. Sixty-six percent of the participants lived with both their mother and father; 16 % lived with their mother only; 10 % lived with their father only; 11 % lived with their mother and a stepfather; 6 % with their father and a stepmother; 1.4 % lived with other relatives or someone else. The demographic characteristics at later waves were very similar. At least 83 % of the initial sample participated in each consecutive wave, and all participants had information for at least two time points on all variables used in the study. To determine whether those who participated at all four times differed from those who did not, we compared participants with complete data and participants with data missing for at least one of the waves. These groups differed significantly on all the variables used in this study, except parents' attempted understanding at

Time 2 and Time 4 and parental warmth at Time 2. Thus, adolescents who did not participate in the study at all the time points were younger, reported having more psychopathic traits and problem behavior, and reported experiencing less positive parental behavior and more negative parental behavior than others. Nonparticipation was unrelated to gender at all waves.

Adolescents were recruited in their classrooms during school hours. They were given a description of the study and informed that participation was voluntary. Parents were informed about the study ahead of time in meetings held in the community and by mail. They could send in a postage-paid postcard if they did not want their youth to participate (1 % did so). Adolescents filled out the questionnaires during regular school hours in sessions administered by trained research assistants. Teachers were not present. Adolescents were not paid for their participation. The study, including all measures and procedures, was approved by the University's Ethics Review Board.

Measures

Parental Behaviors The measures of parental behaviors included positive and negative behaviors. Most of the measures were developed within this project and have been used in prior publications. The factor structure of these measures and evidence of concurrent and predictive validity have been reported elsewhere (Tilton-Weaver et al. 2010). For some of the parenting scales, adolescents reported on mothers and fathers separately. Due to the high correlations between them (r_s from 0.61 to 0.64, $p_s < 0.001$), the scores were aggregated if reports on both parents were available.

Positive Parental Behaviors Parents' positive behaviors were measured with two scales—*attempted understanding* and *warmth*.

Attempted Understanding Parents' attempted understanding was measured with five items (Tilton-Weaver et al. 2010). The stem question was: "What happens if you have done something your parent really dislikes?" Adolescents rated five statements about their parents' typical behaviors. There were three response options, ranging from "never" to "most often." Examples of the five items were: "Talks to you at once," "Are clear about what they think, but are open for discussions," "Honestly wants to understand why you did what you did." The alpha reliabilities for this scale were 0.82 at Time 1 and 0.84 at Times 2, 3, and 4.

Warmth Adolescents responded to six statements about their mothers' and fathers' typical behaviors (Kerr and Stattin 2003). There were three response options, ranging from "never" to "most often." Examples were: "Praises you

for no special reason,” “Shows he or she cares for you with words and gestures,” “Does small things that make you feel special (e.g., wink, smile).” The alpha reliabilities for this scale were 0.88 at Time 1, 0.90 at Time 2, and 0.91 at Times 3 and 4.

Negative Parental Behaviors Parents’ negative behaviors were assessed with three scales—*angry outbursts*, *coldness-rejection*, and *negative reactions to disclosure*.

Angry Outbursts and Coldness-Rejection To measure two aspects of negative parenting practices, angry outbursts and coldness-rejection, we used youths’ responses to 11 statements about how their parents typically responded to behaviors they did not like. The stem question for all these items was: “What happens if you do something your parent really dislikes?” There were three response options, ranging from “never” to “most often.” Five items assessed *angry outbursts* (Tilton-Weaver et al. 2010). Some examples were: “Becomes very angry and has an outburst,” “Has a hard time controlling his or her irritation,” “Screams and yells at you.” The alpha reliabilities for this scale were 0.89 at Time 1, 0.90 at Time 2, 0.90 at Time 3, and 0.90 at Time 4. There were six items for *coldness-rejection* (Persson et al. 2004). Some examples were: “Is silent and cold towards you,” “Makes you feel guilty for a long time,” “Avoids you.” The alpha reliabilities for this scale were 0.84 at Time 1, 0.88 at Time 2, 0.86 at Time 3, and 0.86 at Time 4.

Negative Reactions to Disclosure Parents’ negative reactions to disclosure were measured with six items (Kerr et al. 1999). Examples were: “Have you ever told your parents things and later regretted that you did?” and “Have you been punished for something that you spontaneously told your parents?” There were five response options, ranging from “has never happened” to “very often.” The alpha reliabilities for this scale were 0.82 at Time 1, 0.90 at Time 2, 0.89 at Time 3, and 0.90 at Time 4.

Adolescent Behavior

Adolescent Psychopathic Traits Adolescent psychopathic traits were measured with the Youth Psychopathic Traits Inventory (YPI; Andershed et al. 2002b), a self-report instrument designed to capture psychopathic traits in community samples of youths 12 years and older. Reliability and construct validity of this instrument has been reported elsewhere (Andershed et al. 2002a; Declercq et al. 2009; Poythress et al. 2006). Participants responded to 50 items, organized into 10 internally consistent subscales, using a four-point scale ranging from 1 (*Does not apply at all*) to 4 (*Applies very well*). Together, these subscales constitute three coherent

factors reflecting the interpersonal, emotional, and behavioral dimensions of psychopathy (Cooke and Michie 2001). Consistent with previous studies using the YPI and other instruments (e.g., CPS; Lynam 1997; YPI; Andershed et al. 2007), we used a total psychopathic traits score, which was calculated as a mean value of the scores from the three dimensions. The *grandiose, manipulative* dimension comprised 20 items, equally divided among four subscales: Dishonest Charm, Grandiosity, Lying, and Manipulation. Examples of the items were: “I have the ability to con people by using my charm and my smile,” “I am better than everyone else,” “Sometimes I find myself lying without any particular reason.” The alpha reliabilities were 0.83 at Time 1, 0.89 at Time 2, 0.87 at Time 3, and 0.87 at Time 4. The *callous, unemotional* dimension comprised 15 items from three subscales: Unemotionality, Remorselessness, and Callousness. Some examples of items were: “I think that crying is a sign of weakness, even if no one sees you,” “I usually feel calm when other people are scared,” and “I have the ability not to feel guilt and regret about things that other people would feel guilty about.” The alpha reliabilities for this dimension were 0.76 at Time 1, 0.88 at Time 2, 0.86 at Time 3, and 0.86 at Time 4. The *impulsive, irresponsible* dimension included 15 items for Impulsiveness, Thrill-Seeking, and Irresponsibility. Examples of the items were: “I prefer to spend my money right away rather than save it,” “I like to be where exciting things happen.” The alpha reliabilities were 0.77 at Time 1, 0.79 at Time 2, 0.77 at Time 3, and 0.75 at Time 4. These three dimensions were significantly and substantially correlated with each other at Times 1 through 4 (r s from 0.44 to 0.71, p s < 0.001).

Delinquency Adolescent-reported delinquency was measured with 19 questions about delinquent activities that are commonly included in self-report measures (see, e.g., Haynie 2001). This scale has been validated in a Swedish sample in a comparison with official records (Magnusson et al. 1975), and similar scales have been validated in North American samples (Hindelang et al. 1980). The behaviors included shoplifting; being caught by the police; vandalizing public or private property; taking money from home; creating graffiti; breaking into a building; stealing from someone’s pocket or bag; buying or selling stolen goods; being in a physical fight in public; carrying a weapon; stealing a car; stealing a moped or motorcycle. The alpha reliabilities were 0.92 at Time 1, 0.89 at Time 2, 0.93 at Time 3, and 0.95 at Time 4.

Plan of Analyses

We examined the directions of effects by comparing alternative cross-lagged models, following a model comparison approach (Kline 2010) using Mplus 6 (Muthén and Muthén

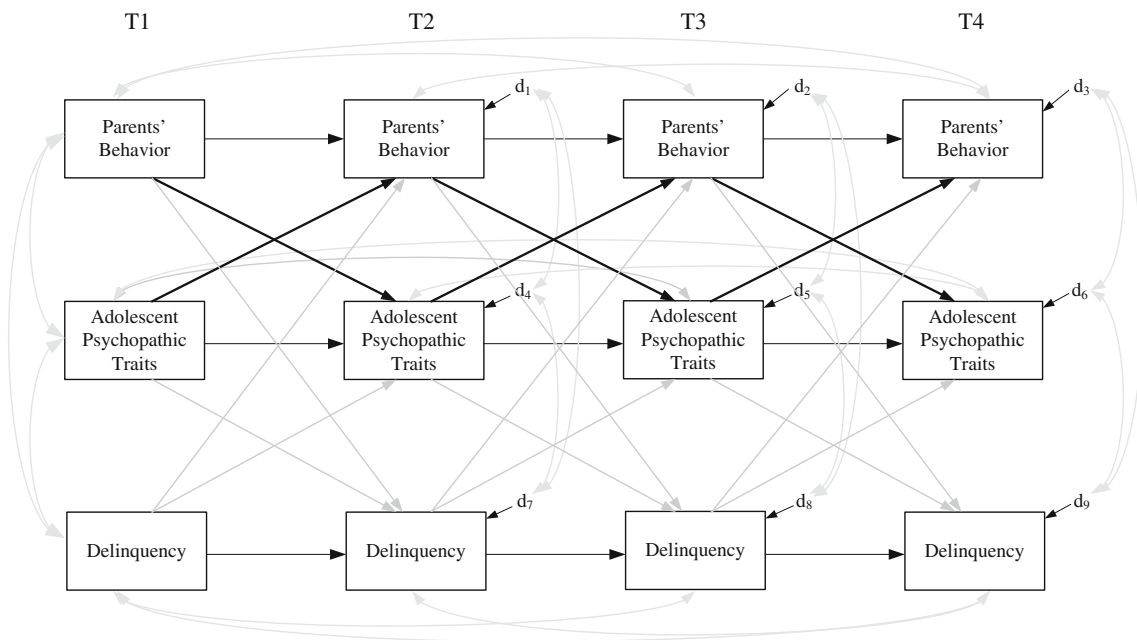


Fig. 1 Conceptual model of parental behavior, adolescent psychopathic traits and delinquency, with all estimated paths

1998–2006). Figure 1 displays the conceptual model. The model comparison proceeded in three steps, and three alternative models were compared. First, in the *baseline model*, we specified the stability paths between subsequent measures of adolescent psychopathic traits, parental behaviors and delinquency, the correlations between the measurements of psychopathic traits, parental behaviors and delinquency at non-subsequent time points and correlations measured at the same time point. The directional paths between psychopathic traits and parental behavior were not specified in this step. Then, in the first alternative model, the *parent-effects model*, we added the directional paths from parental behaviors to subsequent adolescent psychopathic traits and delinquency. Finally, in the second alternative model, the *bidirectional-effects model*, we added directional paths from adolescent psychopathic traits to parental behaviors and delinquency. Each alternative model was compared with the previous model using chi-square difference statistics (Kline 2010). We estimated all three models for each of the five parental behavior variables. In addition, to examine the possible moderating effects of adolescent gender, multiple-group analyses were performed comparing results for boys and girls.

The models were evaluated using chi-square statistics, the Bentler comparative fit index (CFI; Bentler 1990), the root-mean-square error of approximation (RMSEA; Browne and Cudeck 1993), and the standardized root-mean-square residual (SRMR; Hu and Bentler 1998). A CFI value of 0.95 or higher suggests good model fit (Hu and Bentler 1998); and RMSEA and SRMR values 0.08 or lower are considered adequate model fits (Browne and Cudeck 1993; Hu and

Bentler 1998). All models were estimated using Full Information Maximum Likelihood (FIML). FIML performs better than listwise or pairwise deletion techniques, and is appropriate even when data are not missing at random or completely at random (Little and Rubin 2002). The proportion of missing values was examined by a covariance “coverage” matrix, which provides an estimate of available observations for each pair of variables. The minimum recommended coverage is 0.10 (Muthén and Muthén 2006). In this study, coverage ranged from 0.66 to 0.99.

Results

Descriptive Statistics

Table 1 shows correlations among all variables used in the analyses. All variables showed moderate stability over time, $r_s=0.52$ to 0.76 , $p_s<0.001$, $r_s=0.24$ to 0.63 , $p_s<0.001$, and $r_s=0.25$ to 0.64 , $p_s<0.001$ for psychopathic traits, parental behavior, and delinquency, respectively. Furthermore, the average levels of psychopathic traits in the sample from T1 to T4 ranged from $M=2.03$ ($SD=0.41$) to $M=1.84$ ($SD=0.45$), and delinquency ranged from $M=1.17$ ($SD=0.37$) to $M=1.14$ ($SD=0.38$).

In a first set of analyses, we estimated baseline models with only autoregressive paths and within-time correlations between adolescent psychopathic traits, delinquency and the five indexes of parental behavior. As can be seen in Table 1, the baseline models did not yield acceptable fit for any of the parenting variables. The questions, then, were whether

Table 1 Correlations between model variables and adolescent psychopathic traits

| Model variables | Adolescent psychopathic traits | | | |
|---|--------------------------------|----------|----------|----------|
| | T 1 | T 2 | T 3 | T 4 |
| Angry outbursts | | | | |
| T 1 | 0.24*** | 0.13*** | 0.18*** | 0.10** |
| T 2 | 0.20*** | 0.28*** | 0.23*** | 0.19*** |
| T 3 | 0.21*** | 0.19*** | 0.28*** | 0.18*** |
| T 4 | 0.16*** | 0.18*** | 0.24*** | 0.23*** |
| Coldness rejection | | | | |
| T 1 | 0.33*** | 0.19*** | 0.23*** | 0.23*** |
| T 2 | 0.24*** | 0.38*** | 0.28*** | 0.22*** |
| T 3 | 0.24*** | 0.21*** | 0.29*** | 0.20*** |
| T 4 | 0.23*** | 0.24*** | 0.17*** | 0.30*** |
| Negative reactions to disclosure | | | | |
| T 1 | 0.34*** | 0.22*** | 0.21*** | 0.20*** |
| T 2 | 0.22*** | 0.32*** | 0.24*** | 0.20*** |
| T 3 | 0.29*** | 0.32*** | 0.45*** | 0.28*** |
| T 4 | 0.27*** | 0.28*** | 0.26*** | 0.40*** |
| Attempted understanding | | | | |
| T 1 | -0.22*** | -0.15*** | -0.16*** | -0.11*** |
| T 2 | -0.20*** | -0.14*** | -0.19*** | -0.15*** |
| T 3 | -0.17*** | -0.16*** | -0.23*** | -0.18*** |
| T 4 | -0.21*** | -0.19*** | -0.24*** | -0.24*** |
| Warmth | | | | |
| T 1 | -0.17*** | -0.09*** | -0.11*** | -0.06* |
| T 2 | -0.19*** | -0.10*** | -0.15*** | -0.06* |
| T 3 | -0.21*** | -0.17*** | -0.23*** | -0.16*** |
| T 4 | -0.15*** | -0.12*** | -0.13*** | -0.17*** |
| Delinquency | | | | |
| T 1 | 0.36*** | 0.27*** | 0.26*** | 0.17*** |
| T 2 | 0.32*** | 0.39*** | 0.33*** | 0.37*** |
| T 3 | 0.29*** | 0.25*** | 0.39*** | 0.24*** |
| T 4 | 0.17*** | 0.20*** | 0.24*** | 0.36*** |

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

adding the directional paths would significantly improve the model fit and what those paths would reveal about the directional effects between parenting and adolescents' psychopathic traits.

Does Parental Behavior Predict Changes in Adolescent Psychopathic Traits and Delinquency?

We asked, first, whether parental behaviors were related to changes in adolescent psychopathic traits in these data as they have been in several studies reported in the literature (Frick et al. 2003; Lynam et al. 2008; Pardini and Loeber 2008). Starting with the baseline model, we added directional paths from parental behaviors to subsequent

psychopathic traits and delinquency. As can be seen in Table 2, the addition of directional paths from parents' negative and positive behaviors to psychopathic traits significantly improved the model fits for parents' negative reactions to disclosure and attempted understanding, but not for the other models. There were significant links for parents' negative reactions to disclosure at T2 ($\beta = 0.08$, $p = 0.008$) and T3 ($\beta = 0.13$, $p = 0.036$), in which these negative parental behaviors predicted increases in psychopathic traits over time. For positive parental behavior, there was one significant cross-path; parents' attempted understanding predicted change in psychopathic traits from T2 to T3 ($\beta = -0.08$, $p = 0.007$). Furthermore, considering the directional paths from parental behavior to delinquency, there was only one significant improvement in model fit and it was for parents' angry outbursts. Thus, there is some support that parental behavior is related to changes in psychopathic traits; however, the effects are not robust across time points and the addition of the parent-to-adolescent paths did not significantly improve model fit for two of the five measures of parental behavior.

Do Adolescent Psychopathic Traits and Delinquency Predict Changes in Parental Behavior?

To examine whether the directional paths from psychopathic traits to parental behaviors added to the model fit over and above the paths from parental behaviors to psychopathic traits, in a final set of models we added cross-lagged paths from adolescent psychopathic traits and delinquency to parental behavior. As can be seen in the lower section of Table 2, these models showed significant improvements in fit over the parent-effects models. The significant cross-paths from these bidirectional models are plotted in Figs. 2 and 3, and all cross-paths are shown in Table 3. To begin, the figures reveal robust bidirectional relations between psychopathic traits and delinquency in all parenting models. The most robust evidence was for the links from psychopathic traits to delinquency. Initial (T1) levels of psychopathic traits predicted increases in delinquency across all time points in all three negative-parenting models (Fig. 2) and both positive-parenting models (Fig. 3), indicating that changes over time in psychopathic traits lead to changes over time in delinquency. The evidence for delinquency leading to increases in psychopathic traits is less robust; however, in all models, T1 delinquency predicted changes in psychopathic traits from T1 to T2 and from T2 to T3. In short, there is much evidence that psychopathic traits lead to increases over time in delinquency, and there is some evidence that delinquency leads to increases in psychopathic traits.

Concerning the over-time associations between psychopathic traits and parenting, as evidenced in the Figures,

Table 2 Fit indices for all cross-lagged models

| Models | χ^2 (df) | CFI | RMSEA (90 % CI) | SRMR | $\Delta\chi^2$ (df) | <i>p</i> |
|-------------------------------------|---------------|-------|----------------------|-------|---------------------|----------|
| Baseline models | | | | | | |
| Angry outbursts | 190.010 (37) | 0.955 | 0.069 (0.059, 0.079) | 0.102 | – | |
| Coldness-rejection | 262.733 (37) | 0.923 | 0.084 (0.074, 0.093) | 0.120 | – | |
| Negative reactions to disclosure | 300.222 (37) | 0.914 | 0.090 (0.081, 0.100) | 0.130 | – | |
| Attempted understanding | 209.536 (37) | 0.942 | 0.073 (0.064, 0.083) | 0.109 | – | |
| Warmth | 210.813 (37) | 0.946 | 0.073 (0.064, 0.083) | 0.105 | – | |
| Parent-effects models | | | | | | |
| Parental behavior → YPI | | | | | | |
| Angry outbursts | 186.205 (34) | 0.955 | 0.072 (0.062, 0.082) | 0.098 | 3.805 (3) | 0.283 |
| Coldness-rejection | 256.685 (34) | 0.924 | 0.087 (0.077, 0.097) | 0.114 | 6.048 (3) | 0.109 |
| Negative reactions to disclosure | 286.366 (34) | 0.918 | 0.092 (0.082, 0.102) | 0.121 | 13.856 (3) | 0.003 |
| Attempted understanding | 200.609 (34) | 0.944 | 0.075 (0.065, 0.085) | 0.103 | 8.927 (3) | 0.030 |
| Warmth | 206.184 (34) | 0.947 | 0.076 (0.066, 0.086) | 0.103 | 4.629 (3) | 0.201 |
| Parental behavior → Delinquency | | | | | | |
| Angry outbursts | 181.702 (31) | 0.956 | 0.075 (0.064, 0.085) | 0.095 | 4.503 (3) | 0.212 |
| Coldness-rejection | 233.871 (31) | 0.931 | 0.086 (0.076, 0.097) | 0.104 | 22.814 (3) | <0.001 |
| Negative reactions to disclosure | 280.720 (31) | 0.919 | 0.096 (0.086, 0.106) | 0.115 | 5.646 (3) | 0.130 |
| Attempted understanding | 197.650 (31) | 0.944 | 0.078 (0.068, 0.089) | 0.099 | 2.956 (3) | 0.398 |
| Warmth | 202.835 (31) | 0.947 | 0.080 (0.069, 0.090) | 0.100 | 3.349 (3) | 0.341 |
| Bidirectional-effects models | | | | | | |
| YPI → Parental behavior | | | | | | |
| Angry outbursts | 164.552 (28) | 0.960 | 0.075 (0.064, 0.086) | 0.085 | 17.150 (3) | <0.001 |
| Coldness-rejection | 197.294 (28) | 0.942 | 0.083 (0.072, 0.094) | 0.084 | 36.577 (3) | <0.001 |
| Negative reactions to disclosure | 223.969 (28) | 0.936 | 0.089 (0.079, 0.100) | 0.089 | 56.751 (3) | <0.001 |
| Attempted understanding | 171.788 (28) | 0.952 | 0.077 (0.066, 0.088) | 0.085 | 25.862 (3) | <0.001 |
| Warmth | 176.637 (28) | 0.954 | 0.078 (0.067, 0.089) | 0.088 | 26.198 (3) | <0.001 |
| Delinquency → Parental Behavior | | | | | | |
| Angry outbursts | 160.267 (25) | 0.960 | 0.079 (0.067, 0.090) | 0.084 | 4.285 (3) | 0.232 |
| Coldness-rejection | 186.448 (25) | 0.945 | 0.086 (0.075, 0.098) | 0.083 | 10.846 (3) | 0.013 |
| Negative reactions to disclosure | 212.776 (25) | 0.939 | 0.093 (0.081, 0.104) | 0.085 | 11.193 (3) | 0.011 |
| Attempted understanding | 163.713 (25) | 0.953 | 0.080 (0.068, 0.091) | 0.084 | 8.075 (3) | 0.044 |
| Warmth | 173.260 (25) | 0.954 | 0.082 (0.071, 0.094) | 0.087 | 3.377 (3) | 0.337 |
| Delinquency → YPI | | | | | | |
| Angry outbursts | 139.756 (22) | 0.965 | 0.078 (0.066, 0.091) | 0.063 | 20.511 (3) | <0.001 |
| Coldness-rejection | 165.914 (22) | 0.951 | 0.086 (0.074, 0.099) | 0.064 | 20.534 (3) | <0.001 |
| Negative reactions to disclosure | 197.613 (22) | 0.943 | 0.096 (0.084, 0.108) | 0.069 | 15.163 (3) | 0.002 |
| Attempted understanding | 154.244 (22) | 0.957 | 0.083 (0.067, 0.092) | 0.045 | 9.469 (3) | 0.024 |
| Warmth | 151.548 (22) | 0.960 | 0.082 (0.070, 0.095) | 0.066 | 21.712 (3) | <0.001 |
| YPI → Delinquency | | | | | | |
| Angry outbursts | 82.790 (19) | 0.981 | 0.062 (0.049, 0.076) | 0.028 | 56.966 (3) | <0.001 |
| Coldness-rejection | 115.375 (19) | 0.967 | 0.076 (0.063, 0.090) | 0.038 | 50.539 (3) | <0.001 |
| Negative reactions to disclosure | 143.729 (19) | 0.959 | 0.087 (0.074, 0.100) | 0.040 | 53.889 (3) | <0.001 |
| Attempted understanding | 87.040 (19) | 0.977 | 0.064 (0.051, 0.078) | 0.030 | 67.204 (3) | <0.001 |
| Warmth | 94.025 (19) | 0.977 | 0.067 (0.054, 0.081) | 0.031 | 57.523 (3) | <0.001 |

CFI Comparative fit index; RMSEA Root mean square error of approximation; SRMR Standardized root mean square residual

psychopathic traits at T1, T2, and T3 predicted increases in all three measures of negative parental behavior and decreases in both measures of positive parental behavior across all time points, except for parental warmth, which

failed to reach significance at the final time point. In other words, the higher the adolescents' psychopathic traits at one time point, the more parents' angry outbursts, coldness-rejection, and bad reactions to disclosure increased and the

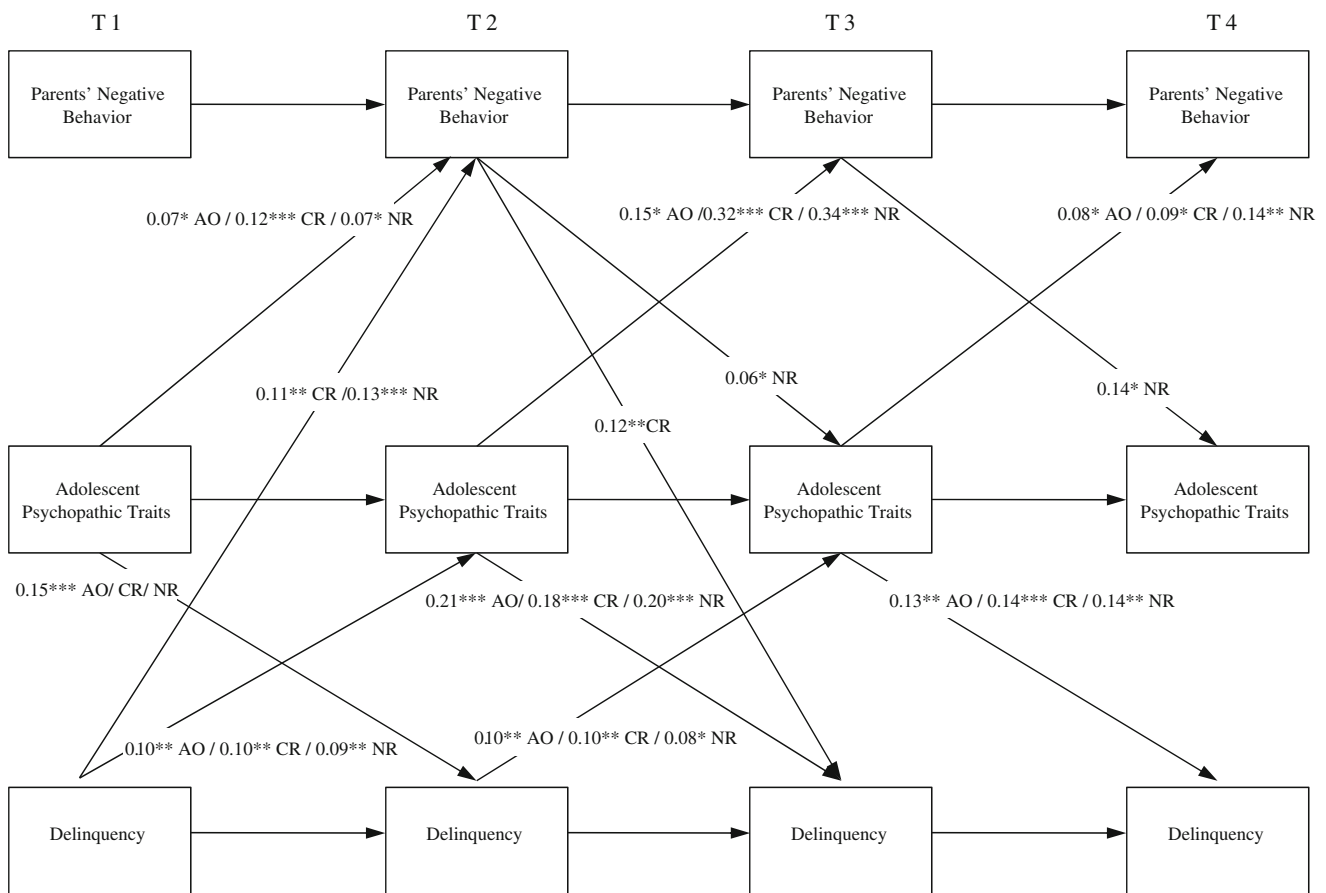


Fig. 2 All significant cross-lagged paths between adolescent psychopathic traits, parents' negative behaviors, and delinquency from the bidirectional models. Note. AO = Angry outbursts; CR = Coldness-

rejection; NR = Negative reactions to disclosure. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

more their attempted understanding and warmth decreased over time. As the Figures also reveal, however, the links from parental behaviors to psychopathic traits were almost the same as they were in the parent-effects model. Parents' bad reactions to disclosure predicted increases in psychopathic traits from T2 to T3 and from T3 to T4, and parental warmth and attempted understanding predicted decreases in psychopathic traits from T2 to T3.

Now considering the paths from delinquency to parental behavior, as shown in Fig. 2, there is some evidence for reciprocal relations between parents' coldness rejection and delinquency. The higher the initial (T1) levels of delinquency, the more cold and rejecting parents became from T1 to T2. Although less robust, there is also evidence that changes in coldness-rejection lead to changes in delinquency, as T2 coldness-rejection predicted T3 delinquency. There was one significant link for parents' bad reactions to disclosure, in which T1 delinquency predicted T2 bad reactions, indicating that the higher the initial (T1) levels of delinquency, the more parents' bad reactions increased over time. Concerning the two positive-parenting models, there was only one significant cross-path. As shown in Fig. 3, T1

delinquency predicted decreased attempted understanding from T1 to T2.

In short, there was some evidence that delinquency predicted changes over time in parental behavior, but psychopathic traits, unique of their associations with delinquency, showed consistent and robust prediction of changes over time in parental behaviors. Concerning bidirectional relations between parenting and psychopathic traits, there was some evidence for bidirectional relations when came to negative parental behavior, but the stronger, more consistent effects were from adolescent psychopathic traits to negative and positive parental behavior.

Adolescent Gender as a Moderator

To examine whether adolescent gender moderated the link between parental behavior and psychopathic traits, we repeated the same set of analyses with gender-based group comparisons on all cross-lagged paths between adolescent psychopathic traits and parental behavior, in both directions. We compared the constrained models with unconstrained models in which the structural paths were set free across

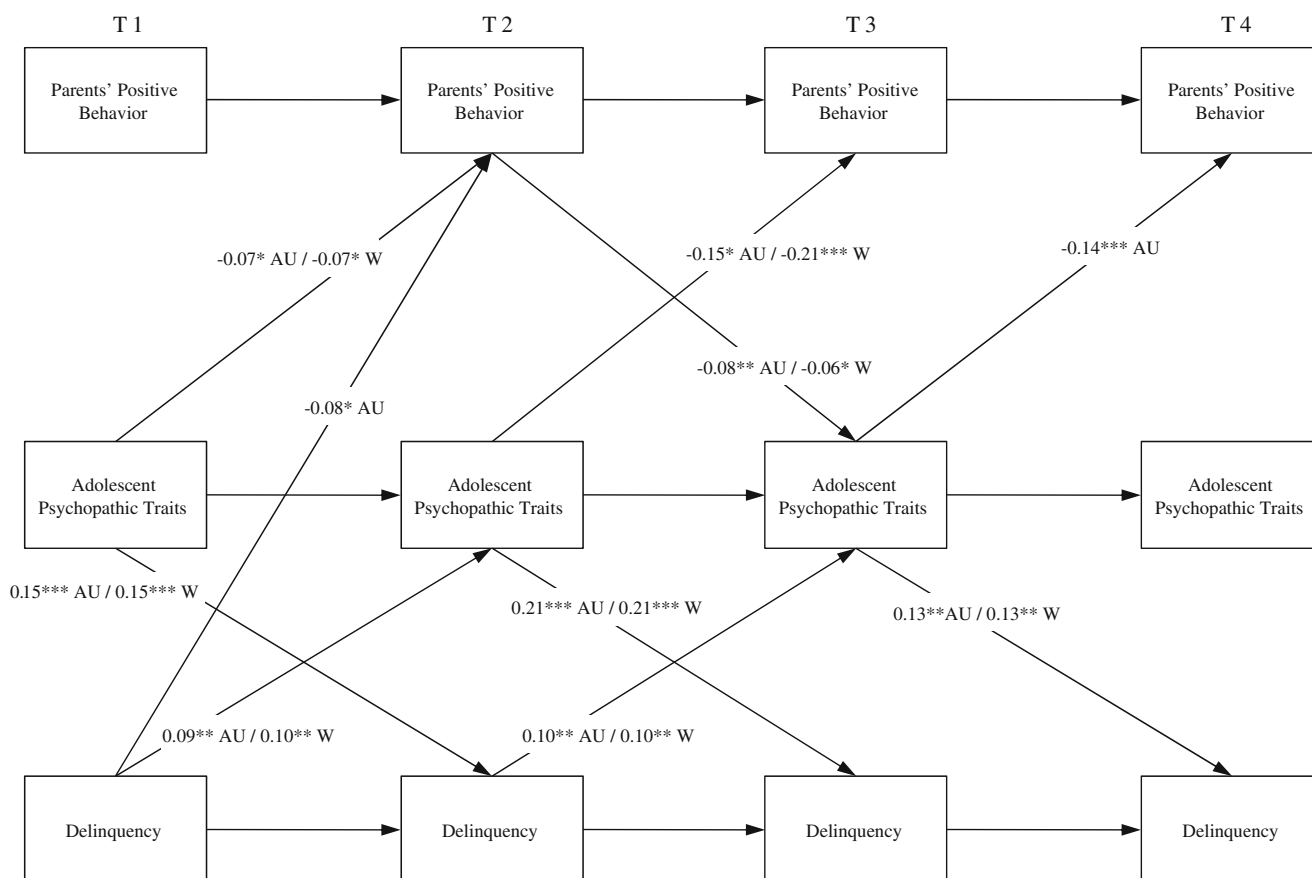


Fig. 3 All significant cross-lagged paths between adolescent psychopathic traits, parents' positive behaviors, and delinquency from the bidirectional models. *Note.* AU = Attempted understanding; W = Warmth. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

adolescent gender. Equality constraints in multiple group analyses were compared using χ^2 difference tests. There was one significant cross-path between adolescents' psychopathic traits at T2 and parental coldness-rejection at T3 which was significant for boys ($\beta = 0.22, p < 0.001$) but not for girls. No other significant differences were found.

Discussion

From the literature on the development of psychopathic personality traits in children and adolescents, one would expect bidirectional effects between parental behavior and psychopathic traits. Empirical research has shown some evidence that parental behavior is related to the development of psychopathic traits over time; however, the other part of the bidirectional process—the contribution of adolescents' psychopathic traits to the maintenance and change of parental behavior over time—has been far less understood. In this study, we showed that adolescent psychopathic traits seem to influence parents into increasing their use of negative behaviors and decreasing their use of positive behaviors, and these effects were systematic over 4 years. Although

we did find some evidence that parental behavior influences changes in adolescent psychopathic traits, these effects were much less consistent. Moreover, it seemed to be the personality features, specifically, to which parents were reacting rather than the antisocial behaviors that are associated with psychopathic traits. In essence, what our results show good support for is parents' reactions to adolescent psychopathic personality traits.

The present study advances the literature on adolescent psychopathic traits in several ways. One is by considering parental behaviors as both responses to and predictors of psychopathic traits in adolescence. Several studies have examined parent-to-child effects (Frick et al. 2003; Larsson et al. 2008; Lynam et al. 2008; Pardini and Loeber 2008) or child-to-parent effects (Hawes et al. 2011). A recent study also examined these effects indirectly by examining whether callous, unemotional traits moderated the link between parenting and youth problem behavior (Muñoz et al. 2011). They took the significant moderation effect as evidence that parents responded to callous, unemotional traits, a conclusion that converges with ours. Notably, the two studies used different measures of psychopathic traits and came to similar conclusions. Still, our study is

Table 3 Cross-path estimates between parents' negative behaviors, adolescent psychopathic traits, and delinquency

| | Parental behavior | | | | |
|---|-------------------|--------------------|--------------------|-------------------------|----------|
| | Negative | | | Positive | |
| | Angry outbursts | Coldness—rejection | Negative reactions | Attempted understanding | Warmth |
| Psychopathic traits → Parental behavior | | | | | |
| T1 → T2 | 0.07* | 0.12*** | 0.07* | -0.07* | -0.07* |
| T2 → T3 | 0.15* | 0.32*** | 0.34*** | -0.15* | -0.21*** |
| T3 → T4 | 0.08* | 0.09* | 0.14** | -0.14*** | -0.03 |
| Psychopathic traits → Delinquency | | | | | |
| T1 → T2 | 0.15*** | 0.15*** | 0.15*** | 0.15*** | 0.15*** |
| T2 → T3 | 0.21*** | 0.18*** | 0.20*** | 0.21*** | 0.21*** |
| T3 → T4 | 0.13** | 0.14*** | 0.14** | 0.13** | 0.13** |
| Parental behavior → Psychopathic traits | | | | | |
| T1 → T2 | -0.02 | 0.01 | -0.00 | -0.02 | 0.04 |
| T2 → T3 | 0.05 | 0.03 | 0.06* | -0.08** | -0.06* |
| T3 → T4 | 0.04 | 0.10 | 0.14* | -0.02 | 0.00 |
| Parental behavior → Delinquency | | | | | |
| T1 → T2 | -0.03 | -0.03 | -0.04 | 0.01 | 0.01 |
| T2 → T3 | 0.03 | 0.12** | 0.04 | -0.04 | -0.02 |
| T3 → T4 | -0.01 | -0.05 | -0.01 | 0.00 | -0.03 |
| Delinquency → Psychopathic traits | | | | | |
| T1 → T2 | 0.10** | 0.10** | 0.09** | 0.09** | 0.10** |
| T2 → T3 | 0.10** | 0.10** | 0.08* | 0.10** | 0.10** |
| T3 → T4 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Delinquency → Parental behavior | | | | | |
| T1 → T2 | 0.06 | 0.11** | 0.13*** | -0.08* | -0.01 |
| T2 → T3 | -0.02 | -0.07 | 0.00 | 0.04 | -0.02 |
| T3 → T4 | -0.04 | -0.07 | 0.01 | 0.05 | 0.05 |

* $p < 0.05$, ** $p < 0.01$,
*** $p < 0.001$

the first to directly and explicitly examine the reciprocal links between psychopathic traits and parental behavior in adolescence. As such, we were able to show that not only do adolescent psychopathic traits influence parental behavior to a greater extent than parental behavior affects psychopathic traits, but that parents react to these traits by becoming increasingly less supportive over time. Further, our findings extend previous literature by considering the possible moderating effect of gender. We did not find consistent gender differences in how parents react to psychopathic traits but according to some studies, gender differences seem to be more closely related to correlates of psychopathic traits, such as delinquency, rather than to the psychopathic traits themselves (Verona et al. 2010). Given that our measure of psychopathic traits does not contain items that address delinquent behavior, we should perhaps not expect to find moderating effects of gender. Finally, the distinction between psychopathic traits and delinquent behavior helps to advance this research area. With a few exceptions, our

findings suggest that parents are more influenced by psychopathic personality traits than by delinquent behavior, even though delinquency was reciprocally related to psychopathic traits. In sum, the present study advances previous literature by addressing these fundamental questions about parental contributions to the development of psychopathic traits in adolescence, and showing that changes in parental behaviors are better conceptualized as responses to than predictors of adolescent psychopathic traits.

Why did parental behaviors not influence psychopathic traits to a greater extent? At least three lines of research provide possible explanations. First, there are both theoretical ideas and empirical findings suggesting that children and adolescents who are high on callous, unemotional traits are insensitive to punishment and, therefore, less influenced by parenting behavior than other children (Frick 1998). For example, in several cross-sectional studies looking at the link between parenting behavior and conduct problems, results have shown parenting behavior to be related to

conduct problems for youths who were low on callous traits but not for youths who were high (Oxford et al. 2003; Wootton et al. 1997). Although these studies were cross-sectional, the results are consistent with the idea that youths who are high on psychopathic traits might be resistant to the effects of parental behavior. It should be noted, however, that a recent study examined these moderation effects prospectively and found some evidence for the opposite direction of effects between parenting and youth problem behaviors (Muñoz et al. 2011). Another explanation comes from research on behavior-genetics, where some studies have shown that psychopathic traits are under strong genetic influence (Forsman et al. 2008; Larsson et al. 2008; Viding et al. 2005). As such, environmental influence such as parental behavior may be of limited importance for children and adolescents with psychopathic traits. In fact, additional support for this general idea can be inferred from studies showing psychopathic traits in children and adolescents to be moderately stable personality characteristics in adolescence (Frick et al. 2003; Loney et al. 2007; Lynam et al. 2008; Obradović et al. 2007; Pardini and Loeber 2008). In short, several lines of research suggest that adolescents' psychopathic traits might be little affected by parental behavior because they are generally not very malleable.

Although we found little evidence for extensive bidirectional influence in this study, we have not ruled out parents' roles in the development of psychopathic traits. The longitudinal nature of our study does permit us to draw conclusions concerning the directionality of effects, but we assessed *changes* in behavior over time; we did not assess *causes* of these behaviors. In this sense, we can only say that psychopathic characteristics influence changes in parental behavior rather than parental behavior contributes to maintenance and development of psychopathic traits. More important, the parent-adolescent relationship is a continuous process that changes as the child matures, and it is possible that we would have found other effects with younger children. It should be noted, however, that studies where bidirectional links between parental behavior and problem behavior in children have been investigated have shown that parents react to child problem behaviors (Anderson et al. 1986; Buss 1981) as well as callous, unemotional traits (Larsson et al. 2008; Hawes et al. 2011), and that they change their behavior in response. Thus, although our findings show that some adolescents appear not to be influenced by certain parental behaviors, the history of these interactions remains unknown. Therefore, it is important for future research to examine children younger than the present sample in order to estimate the role of parental behavior during a developmental period when psychopathic traits are the least stable, and consequently, examine whether parental behavior influences the change.

Our findings might have important clinical implications. Given the strong link between parenting and adolescent problem behaviors, it is often assumed that the direction of effects is from parents to child. Therefore, much intervention effort has been focused on altering parental behaviors in order to improve adolescent adjustment. Although there appear to be no studies examining adolescents with psychopathic traits specifically, findings on children high on callous, unemotional traits suggest that they might benefit less from parenting intervention programs than children with conduct problems who are low on callous, unemotional traits (Hawes and Dadds 2005). Drawing from the findings of the present study, we did find some support that adolescents who perceived their parents as warm and understanding exhibited decreases in psychopathic traits. Further, we also found that a negative pattern of communication between adolescents and their parents was linked to increases in psychopathic traits. This is consistent with previous studies showing that youths high on psychopathic traits are more sensitive to positive parental behaviors than youths who are low on these traits (Tilton-Weaver et al. 2010), and that negative communication between parents and youths is a strong predictor of elevated levels of callousness in adolescence (Pardini and Loeber 2008). Thus, although our findings generally favor the conclusion that psychopathic traits are related to increased levels of negative parental behavior over time and that parental behavior, as operationalized in this study, seems to be subordinate in the development of psychopathic traits across middle adolescence, there seems to be more to the story. For example, as suggested by Salekin and Lochman (2008), it could be that parental behavior has greater influence during childhood and that by adolescence the development of these traits might be difficult to reverse, regardless of parenting practices. Therefore, one important aim for applied research might be to consider the importance of taking adolescent personality traits into account when estimating the role of parental behavior in the development of serious behavior problems.

Some limitations of this study deserve mention. One is the reliance on adolescents' self-reports of their own behavior and their parents' behaviors, which introduces the likelihood of shared-method variance. However, there are studies showing that adolescents' perceptions of their families' behaviors are not necessarily less accurate than more objective measures (Chen et al. 1998), and parents tend to give socially desirable responses about their own behavior more often than adolescents do (Morsbach and Prinz 2006). For this reason, using adolescents' reports of parental behaviors should give less biased information than using parents' reports. Moreover, in previous work on problem behaviors, it has been shown that adolescents tend to report more externalizing problems for themselves than their

parents do (Verhulst and Van der Ende 1992). Therefore, it seems reasonable that the adolescents should report on their own and their parents' behaviors. Second, the present study examined the reciprocal effects between adolescent psychopathic traits and some common parental behaviors. However, the relationship between parents and adolescents is far more complex than the indices used in this study. It is, therefore, possible that we would have found other results using other measures. Hence, it might be worthwhile to examine a broader range of parental behaviors to see whether other parental behaviors would yield similar results.

Despite these limitations, this study has a number of strengths. First, we used data from a large, community-based sample. We included longitudinal data, which allowed us to systematically test for bidirectionality between parental behaviors and adolescent psychopathic traits. Our design provides unique insight into the developmental processes and directional effects that have previously only been speculated about (Wootton et al. 1997). In addition, having data from four time points allowed us to see which effects were robust over time points, which increases confidence in the conclusions drawn from the findings. Second, we were able to tease apart the effects between behaviors and the personality traits. There is a wealth of research documenting the association between psychopathic traits and delinquency (Andershed et al. 2002; Christian et al. 1997; Declercq et al. 2009), and up to now, it has been unknown whether and how parents are influenced by psychopathic traits per se. By looking into the unique effects of psychopathic traits and delinquency, our study shows that parents, indeed, react to specific personality features of their adolescents irrespective of the adolescents' delinquency status.

The implications of this study are both theoretical and clinical. Theoretically, there is some support for the reciprocal effects models described above (Quay 1977). Although it appears that, at least by adolescence, parents are reacting to their youths' psychopathic traits more than they are affecting them, there is still some evidence that parental behaviors can exacerbate or ameliorate psychopathic traits. Clinically, it is important to understand what behaviors to expect from parents of adolescents who are high on psychopathic traits. Changes in some of these behaviors might have positive effects on these adolescents' development, not only in terms of psychopathic traits, but more generally.

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