Correlates of Aggressive and Delinquent Conduct Problems in Adolescence

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The primary purpose of the study was to test a hypothetical model for aggressive and delinquent conduct problems in adolescence. A total of 168 adolescents from 121 families were studied using several questionnaires and a semi-structured interview. The following factors were considered: obstetric complications, temperament (novelty-seeking), self-esteem, family influences (perceived parenting, alcohol abuse/dependence of parents, antisocial personality disorder of the father) and peer-group characteristics (peer rejection and membership in a deviant peer group). The evaluation methods applied included correlation analyses and testing of two hypothetical models using structural equation modeling. The correlation analyses revealed significant relationships between adolescent aggressive and delinquent behavioral problems and parental antisocial behavior; perceived parental rejection and low emotional warmth; adolescent novelty-seeking, self-esteem, peer rejection and peer deviance. The two empirical models, separately for aggressive and delinquent behavior problems, revealed direct relationships between paternal antisocial behavior, parental rejection, adolescent novelty seeking, peer deviance, peer rejection, and offspring aggression and delinquency. There were, however, two differences with respect to the relationships between peer rejection, peer deviance, aggression and delinquency. First, peer rejection was more strongly associated with aggressive behavior and only moderately linked to delinquency. Second, deviance in the peer-group was found to be closely related with delinquency but only moderately with aggression. Our findings suggest that several pathways for aggressive and delinquent conduct problems are comparable while others were not. Regarding the findings of the empirical models, we conclude that only intervention measures that include parents, peers and individual adolescents may help decrease the incidence of aggressive and delinquent conduct problems. Aggr. Behav. 31:24–39, 2005. © 2005 Wiley-Liss, Inc.

Keywords: aggression; delinquency; adolescence; SEM; behavioral problems; parenting; peers; ASPD

INTRODUCTION

Externalizing symptoms are of great interest to mental health professionals because they are predictive of criminality, substance misuse and personality disorders in adulthood, and can cause disruptions in the family, school, and peer relations [Coie et al., 1982; Elliott, 1994]. Research has identified two general types of externalizing symptoms: overtly aggressive...
behavior (e.g., fighting, temper tantrums, and cruelty) and more covert delinquent behavior (e.g., lying, stealing, and substance abuse) [Fergusson et al., 1994; Lahey and Loeber, 1994]. Together, these behaviors comprise a higher order externalizing factor [Achenbach, 1991]. Although aggressive and delinquent behavioral problems are highly associated with each other, findings of many studies suggest that these conduct problems represent two distinct clinical entities, and should not be considered unidimensional [Achenbach et al., 1995; Stanger et al., 1996, 1997]. Thus, we use aggressive and delinquent conduct problems as two separate dependent variables in our hypothesized models.

Factors that contribute to delinquent and/or aggressive behavior are likely to be heterogeneous. They include biological characteristics [Cloninger, 1994] and shared or unshared environmental conditions affecting the individual [Garnefski and Diekstra, 1996]. In light of these complexities, an optimal understanding of the process through which normal behavior develops into aggressive or delinquent behavior requires one to consider multiple domains of influence. The purpose of this study was to test a hypothetical model for aggressive (model 1) and delinquent behavioral problems (model 2) in adolescence using structural equation modeling (SEM), taking into account multiple risk domains.

Obstetric complications (OCs) are among the earliest factors that can influence behavioral development. Recent reports from two large scale general population studies have revealed that obstetric complications were associated with the risk of externalizing disorders [Allen et al., 1998; Raine et al., 1997]. Moffitt [1993] theorizes that OCs can produce neuropsychological deficits in the infant’s nervous system that may lead to cognitive deficits. These deficits have been found to be correlated with difficult temperament and subsequent behavioral problems [Moffitt, 1990].

A second domain of interest relates to parenting characteristics. Several studies have emphasized the potential importance of negative parenting characteristics on the development of externalizing symptoms in children [Barnow et al., 2002b; Barnow and Freyberger, 2003; Dodge et al., 1994; Loeber and Farrington, 1998; Patterson et al., 1998]. Harsh, rejecting parenting and antisocial traits in parents are described as especially influential on adolescents’ behavioral problems [Bank et al., 1993; Barnow, 2001; Barnow et al., 2001; Henry et al., 1993; Patterson, 1999]. For example, subjects who perceived their parents as rejecting and low in emotional support had more behavioral problems such as aggression and delinquency than those who viewed their parents as supportive [Asher et al., 1990; Kumpfer and Turner, 1990].

Another domain of interest is parental drinking behavior [Barnow et al., 2002a,b]. Many studies have reported that adolescents who were raised in alcoholic households had higher scores on measures of aggression and delinquency [Alterman et al., 1998; Giancola et al., 1996; Greenfield et al., 1993]. The high incidence of co-morbidity of antisocial personality disorders (ASPD) in alcoholic fathers, however, appears to be one variable that might mediate parental problem drinking and the development of behavioral problems among children of alcoholics (COAs). It is likely that the association between childhood behavioral problems and parental ASPD is at least partially mediated through negative parenting styles (e.g., rejection, harsh punishment, and coercive parenting) of the antisocial parents [Rutter et al., 1998].

Several longitudinal studies have supported the role of temperamental factors, especially early child impulsivity, in the development of externalizing problems [Bates et al., 1998; Caspi et al., 1995]. Cloninger [1987] discussed the fact that factors of personality-related temperament such as marked “sensation-seeking,” can predispose one to delinquency, and
rejection by parents and peers, as well as behavioral problems (e.g., substance abuse). Raine and colleagues [1998] have reported an association between stimulation-seeking at age three and aggression at age eleven. Predictive associations have been modest, and most studies have been based solely on maternal reports of infant/toddler temperament.

A fourth characteristic refers to how a child perceives his or her self-worth. The level of perceived social support and rejection by parents and peers has been reported to relate to a teenager’s self-esteem [Brutseart, 1990; Sandler et al., 1989]. Prospective studies that examined the associations between rejection by peers and parents, self-esteem, and behavioral problems reported that rejection by peers and parents appeared to be an antecedent of aggressive and delinquent conduct problems, while low self-esteem was indirectly related, through a higher probability of rejection by others, to childhood behavioral problems [Sandler et al., 1989].

Finally, the quality of relationships with peers is often cited as a correlate of problematic behavior of children. Specifically, instability in peer relationships has been implicated in the etiology of aggressive behavior [Hymel et al., 1990; Coie and Cillessen, 1993]. Children who are unable to form peer relationships are not only at risk for later delinquency and substance use, but are also more likely to associate with other deviant peers [Dishion, 2000].

In this study, we examined the interrelationships of individual risk factors (children’s temperament and self-esteem), family environment (parenting styles, parents’ mental disorders) and peer relationships (peer rejection and membership in a deviant peer group) with aggressive and delinquent behavior problems among 168 adolescent in Germany. The model is based upon the theoretical supposition that a positive family history of alcoholism (FH+) is related to an additional psychiatric diagnosis of antisocial personality disorder (ASPD) in the father and vice-versa. Furthermore, we hypothesized a potential direct influence of parental alcoholism and/or presence of ASPD of the father on both child’s temperament, as indexed by the extent of novelty-seeking, and the parenting styles of rejection and emotional warmth. Furthermore, paternal ASPD is thought to be directly associated with aggression, as well as delinquency, in offspring. Obstetric complications are hypothesized to be related to the child’s rating on the subscale of novelty seeking (NS), while NS is assumed to be associated with perceived parenting styles, peer rejection and with aggression or delinquency. Parental characteristics such as perceived rejection and emotional warmth are viewed as associated with both self-esteem and aggressive/delinquent behavior. Perceived self-worth is considered to be related to a higher probability of peer rejection, while rejection by peers is hypothesized as likely to increase the probability of association with deviant peers, and to heighten the risk of adolescent aggression/delinquency. Finally, we assume that membership in a deviant peer group is related to aggressive, as well as, delinquent behavior. The hypothetical model is shown in Figure 1. The model was then tested separately for aggressive and delinquent conduct problems.

METHODS

Subjects

The data were derived from the population-based Study of Health in Pomerania, Germany [SHIP; John et al., 2001]. In the SHIP, 3748 subjects aged 20 to 79 were drawn at random between March 1997 and May 2000, proportional to the population size of each community, and stratified by age and gender. From this population, 527 participants were chosen
reflecting the presence of one or more biological offspring between 12 and 18 years. Among these, 141 persons could not be located or did not respond to at least four phone calls and two letters, and at least one member of 75 families refused to participate, resulting in 311 (69%) family groups who gave informed consent. By October, 31, 2001, 122 of these families had been investigated. Because of missing data on at least two measures, 21 cases were excluded from the current study, leaving 104 families with 145 adolescents. There were no statistically significant differences between the 104 families included in the current study and the 423 nonparticipants in terms of the parents’ education (p = 0.64), monthly income (p = 0.32), and the number of children in the household (p = 0.27). Regarding marital status, a greater proportion of the parents in the investigated sample were married (87.5% vs. 75.3%, \( \chi^2 = 13.65, \text{df} = 3, p < 0.05 \)).

In an effort to increase the number of FH+ adolescents, seventeen additional families with 23 adolescents were recruited from outpatient addiction facilities in Pomerania. For this subset of the sample, several outpatient facilities in Pomerania were invited to refer families in which there was at least one biological parent with a clinical diagnosis of an AUD, where at least one biological offspring between the ages of 12 and 18 lived in the household, and who gave informed consent to take part in the study. A comparison of these 23 adolescents with the 145 who were recruited from the SHIP revealed no differences in terms of age (14.4 vs. 14.8, t = −0.74, df = 166, p = 0.46), while there was a trend for a higher proportion of those 23 adolescents to be a female (males: 51.0% vs. 30.4%, \( \chi^2 = 3.37, \text{df} = 1, p = 0.066 \)). The average age of the entire sample (N = 168 adolescents who came from 121 families) was 14.5 (SD = 2.10) years, with similar proportions of males (48.2%) and females. All participants were Caucasians who lived in Pomerania (Germany).

**Measurements**

The semi-structured interview, the SSAGA [Bucholz et al., 1994], was used to determine the adolescents’ family history status of alcoholism. Cross-center studies of the SSAGA indicate good reliability regarding alcohol-use disorders, with test-retest agreement (Kappas) for the DSM-III-R diagnoses of alcohol dependence between 0.87–0.89, and between 0.57–0.74 for abuse (the range reflects the results of different studies). Using the SSAGA, 64 adolescents (FH+ sample) with at least one parent with alcohol abuse or dependence were identified from the total of 168 offspring.

**Antisocial personality disorder** of parents and adolescents older than 15 years was assessed with the Structured Clinical Interview SCID-II [First et al., 1997]. A value of more than three in the self-rating section of the interview indicates a tendency toward antisocial personality disorder. Because no mother had a value higher/equal 3 in the self rating section, only paternal antisocial personality disorder was considered in this study. The SCID-II has Kappas between 0.51 and 0.68 for lifetime diagnoses [Williams et al., 1992]. For children age fifteen and younger, the Diagnostic Interview for Psychiatric Disorders [Children-DIPS; Unnewehr, 1995] was used to determine the ICD-10 [World Health Organization, WHO, 1991] diagnosis (F91.x) of oppositional defiant disorder (ODD) or conduct disorder (CD).

**Obstetric complications** (OCs) were assessed using three items gathered from an interview [Raine et al., 1997] with the mother: a gestational period of less than 37 weeks, placement of the infant in an incubator after birth, and low birth weight (<2500g). These items were selected due to their importance for later brain development [Cohen et al., 1989].
The OCs score was determined from the z score transformation of these three items ($\alpha = 0.76$).

Novelty-seeking was assessed with the 9th version of the Temperament and Character Inventory [TCI; Cloninger et al., 1998]. This inventory measures seven dimensions of personality: four temperament and three character dimensions. The temperament scale of novelty-seeking (NS; 40 items) includes 4 lower-order subscales (e.g., excitability, impulsiveness vs. thoughtfulness, extravangance vs. simplicity). The validity of the questionnaire was confirmed through various studies. In the analyses, the respective raw values of the entire scale of NS were used. In the age group of 12–15 years, a previously unpublished, abbreviated version of the TCI (jTCI) was used. Z-score transformation of the scales of NS in the jTCI and TCI were combined to obtain one value for the different age groups.

Self-esteem of adolescents was determined using the Rosenberg Self Worth Scale [Rosenberg, 1985]. This scale contains 10 true/false items for evaluating global self-esteem. Test-retest reliability and internal consistency of the scale have been reported as satisfactory, with $r = 0.85$ and $\alpha = 0.88$ (in our study $\alpha = 0.79$).

Parenting styles were examined with the short EMBU [Swedish acronym for “own memories concerning upbringing”; Arrindell et al., 2001], which was completed by all offspring. All questions were evaluated separately regarding the father and mother using a four-point Likert-type scale (0 = does not apply, 3 = very often). For the purpose of this study, rejection (7 items) and emotional warmth (6 items) were used in the analysis as reflecting abusing and neglectful parental rearing patterns. The Cronbachs alphas are 0.70 for rejection and 0.84 for emotional warmth.

The Youth Self Report [YSR; Achenbach, 1994], is a 119-item checklist in which adolescents use a three-point scale to rate how well a series of behavioral problems describe their own behavior. Second-order principal factor analyses have revealed two broadband groupings of the syndromes, labeled emotional problems and behavioral problems. To determine the extent of behavioral problems, we used the subscales of aggression, which consists of 19 items (e.g., destroys things, temper tantrums, physically attacks people) (alpha = 0.82 and 0.84 for boys and girls, respectively); and delinquency, which consist of 11 items (e.g., lying or cheating, running away from home, stealing at home or outside, using alcohol or drugs) (alpha = 0.70 and 0.77). Additionally, the similar Child Behavior Checklist [CBCL; Achenbach, 1991] was filled out by the mother. The correlations between mothers’ (CBCL) and children’s (YSR) ratings in the subscales of aggression and delinquency were only moderate, with a Pearson correlation coefficient (Pearson) of $r = 0.293$ ($p < 0.001$) for aggressive conduct problem and $r = 0.399$ ($p < 0.001$) for delinquency.

Peer deviance was assessed by a questionnaire developed by our research group. To determine the degree of deviant behaviors within the peer group, adolescents were asked three questions in true/false format: 1) the use of alcohol/drug at least once per week among friends; 2) the use of violence (fighting) to solve problems in the group; and 3) the presence of members who committed crime and/or had contact with the police because of deviant behavior ($\alpha = 0.50$).

To determine the extent of peer rejection, we selected three items from the CBCL that dealt specifically with whether the parents thought their child had problems with peers (doesn’t get along with others, gets teased a lot, not liked by other children). Additionally, the similar items in the YSR (here, the answers were given by the child) were used. The construct of peer
rejection was measured by the combination of z-score transformed values from the three CBCL and three YSR items (α = 0.70).

Data Analysis

In the first step, frequencies of categorical data and mean, standard deviations, skewing, and probabilities for Kolmogorov-Smirnov tests of numeric variables were calculated. In an effort to understand how the individual risk factors are related to each other, in the second step, an intercorrelation matrix was computed for all the variables.

The hypothetical model, as described in the introduction and shown in Figure 1, was developed, in the third step. Measures on aggression and delinquency according to mothers’ and children’s ratings in the CBCL and YSR were used as the central dependent variables. To include information from both informants (mother and adolescent), a measurement model was used. This was necessary because the correlation between mothers’ (CBCL) and children’s (YSR) ratings in the scales of aggression and delinquency were only moderate (see above). Thus, aggressive, as well as delinquent conduct problems, were treated as unobserved variables that are indirectly measured by the two corresponding subscales in the CBCL and the YSR. The set of connections between the observed and unobserved variables (the latter are displayed as ellipses) is called the measurement model.

The hypothetical model was then tested using the Amos Structural Equation Program [Amos 4.01; Arbuckle, 1999], which is based on the Maximum Likelihood (ML) method for analysis of the variance/covariance matrix, using $\chi^2$ for the goodness of fit statistic. While the traditional power tables are not directly applicable to structural modeling, Ding and colleagues [1995] and Boomsma [1987] showed that as few as 100 participants can be acceptable, and the recommended ratio of sample size to free parameters is generally accepted as between 5:1 to 10:1 [Bentler and Chou, 1987]. Due to the small sample size, all indicators except aggressive and delinquent behavioral problems were treated as manifest. To determine

Fig. 1. Hypothetical model of aggressive and delinquent conduct problems in adolescence.
the regression model, the individual pathway coefficients of the error variables were set at 1, while the significance level of the individual pathways was set at \( p < 0.05 \). The overall model fit was assessed by examining the Nonnormed Fit Index \([\text{NNFI}; \text{Bentler and Chou, 1995}]\) and the Comparative Fit Index \([\text{CFI}; \text{Bentler, 1990}]\), as well as the Residual Mean Squared Error Approximation (RMSEA) Index \([\text{Hu and Bentler, 1998}]\). The NNFI and the CFI have typical values between 0 and 1, with a value close to 1 indicating a very good model fit. However, scores close to zero in the RMSEA denote a better fit.

**RESULTS**

Psychosocial characteristics, percentages of ASPD in children and fathers and percentages of parental AUDs are shown in Table I.

Regarding numeric variables, the distributions of scores for peer rejection, peer deviance, and self-esteem were skewed, while other factors followed the normal distribution. To evaluate this further, we calculated several Kolmogorov-Smirnov tests revealing that all but the above-mentioned variables were normal distributed. Our efforts to normalize these variables by submitting them to a log transformation were not successful. In order to examine the empirical impact of the observed degree of non-normality, nonparametric relationships (Spearman rank ordered correlations) were examined and compared with parametric correlations as displayed in Table II. These analyses revealed very similar results such that the use of parametric tests could be carried out. It should be kept in mind, however, that the results of the empirical path models (see below) must be discussed with caution and cannot automatically lead to asymptotic conclusions (conclusions that are approximately true for large samples) \([\text{Arbuckle, 1999}]\).

Table II describes the zero-order correlations among the twelve risk factors with aggression and delinquency. Seven factors correlated significantly with delinquency as well as with aggression, including parents’ and child’s ASPD, peer rejection, peer deviance, parental rejection and emotional warmth, novelty-seeking, and self-esteem. Age and gender were only

**TABLE I. Characteristics of the Sample**

<table>
<thead>
<tr>
<th>factors</th>
<th>% (mean/SD for continuous variables)</th>
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<tbody>
<tr>
<td>age (mean/SD)</td>
<td>14.48/2.10</td>
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<tr>
<td>gender: % of males</td>
<td>48.2</td>
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<td>Children per household (mean/SD)</td>
<td>1.38 (range 1–3)</td>
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<td>% of living with:</td>
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<tr>
<td>• both parents</td>
<td>87.5</td>
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<tr>
<td>• biological mother only</td>
<td>12.5</td>
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<tr>
<td>% of Family History of alcoholism</td>
<td>38.1</td>
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<tr>
<td>% of child’s ASPD (age &gt;15), OD or CD (age 11–15)</td>
<td>7.7</td>
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<tr>
<td>% of paternal ASPD*</td>
<td>10.7</td>
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<tr>
<td>obstetric complications</td>
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<tr>
<td>• % of low birth weight (&lt;1500g)</td>
<td>7.7</td>
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<tr>
<td>• % of need incubator</td>
<td>1.8</td>
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<td>• % of short pregnancy</td>
<td>3.0</td>
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*Scores 3 and higher in the SCID self rating section.
TABLE II. Intercorrelation Matrix of Included Variables

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<th></th>
<th>age</th>
<th>gender</th>
<th>ASPD of father</th>
<th>obstetric complications</th>
<th>child’s ASPD (age &gt;15), OD or CD (age 11–15)</th>
<th>peer characteristics</th>
<th>parenting styles</th>
<th>individual characteristics</th>
<th>behavior problems</th>
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<td>peer rejection (z-score)</td>
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Behavioral Problems in Adolescence
significantly related to delinquent conduct problems. The directions of the relationships among variables were consistent with what we hypothesized in Figure 1.

The test of the hypothesized model for aggression (model 1) resulted in the empirical values presented in Figure 2. Here, only vectors with standardized regression coefficients that were significant (p < 0.05) are shown. Overall, the goodness of fit of this model was good ($\chi^2 = 46.993$, df = 30, p = 0.056, with a $\chi^2$ df ratio of 1.566; NNFI = 0.978; CFI = 0.990; and RMSEA = 0.058). The squared multiple correlations of the endogenous variable “aggression” was $R^2 = 0.62$. Results indicated that parental ASPD, NS, parental rejection, peer rejection and peer deviance were each significantly related to increased aggression. Furthermore, OCs were associated with NS. Perceived feelings of emotional warmth of parents were positively related to self-esteem, while parental rejection was negatively associated with self-esteem. Children’s reports of lower self-esteem were related to elevated peer rejection.

The model using delinquency as the central dependent variable (model 2) also fits the data quite well ($\chi^2 = 40.399$, df = 30, p = 0.097, NNFI = 0.994, CFI = 0.994, RMSEA = 0.046) and the squared multiple correlations of the endogenous variable was $R^2 = 0.62$. These values did not differ greatly from model 1. Considering the magnitude of standardized regression coefficients, the relation between peer rejection and delinquency decreased from beta = 0.48 in model 1 to beta = .17 in model 2. Second, the path coefficient from peer rejection to delinquency decreased from beta = 0.22 in model 1 to beta = 0.12 in model 2.
deviance to delinquency in model 2 was markedly higher compared to the path coefficient of the relationship between peer deviance and aggression (.16 vs. .38). The empirical values of model 2 are shown in Figure 3.

Additional iterations of the empirical models were tested using age and gender as covariates. However, neither age nor gender were significantly associated with aggression and delinquency, and the inclusion of both covariates in the two models yielded only small changes for the estimation of the magnitudes of paths. Specifically, when age and gender were added to model 1, the R² only increased to 0.65, while the inclusion of age and gender in model 2 yielded an R² of 0.62, which was similar to that what we found in model 1.

In order to address the concern that some subjects came from addiction outpatient facilities, both model were re-evaluated after excluding these 23 youths. Using the 145 SHIP adolescents, all coefficients remained stable and the results were almost identical (not shown) to those reported in Figures 2 and 3, suggesting that the overrepresentation of children with FH+ did not have an impact on the empirical models described above.

**DISCUSSION**

The goal of this study was to identify complex interrelationships between various different risk domains and aggressive, as well as, delinquent conduct problems in adolescence. One
unanticipated finding was that gender and age were significantly correlated with delinquency, but not with aggression. Although many studies reported more behavioral problems in boys, the evidence about gender differences is conflicting. Behavioral problems have generally been found to be more common in boys, other evidence suggests, however, that girls are simply less likely than boys to exhibit serious conduct problems, and that the predictors of conduct problems are similar for boys and girls [Ackermann et al., 2003; Ferguson and Horwood, 2002; Lahey et al., 1999; Moffitt et al., 2000]. Regarding age, there is a growing evidence that after approximately age 10, aggressive syndrome scores decline, whereas delinquent syndrome scores increase until about age 17 [Stanger et al., 1997] which support our finding in that only delinquent conduct problems were significantly related to age.

One strength of our study was that we distinguished between aggressive and delinquent behavioral problems using both kinds of behavior as central dependent variables in two separate models. Although, a number of the relationships predicted in the two models were confirmed for aggressive, as well as, delinquent behavior, several assumptions proved to be incorrect. In the first step, we hypothesized that the presence of a paternal antisocial personality disorder (ASPD) and/or alcohol-abuse disorder (AUD) was significantly related to parental behavior perceived by the adolescent as negative (rejection or low emotional warmth) (see Figure 1). This assumption was not confirmed by the empirical analysis of both models. The data available on this matter is a focus of controversy, however [Johnson et al., 2001]. For example, several studies found that the relationship between parental ASPD and behavioral problems, such as aggressive and delinquent conduct problems in offspring, are mediated primarily by genetic mechanisms and that parenting behavior appears to be relatively insignificant as a mediator [Slutske et al., 1998]. It should also be noted that there was insufficient power due to the small size of the sample, and, thus, only moderate effects could be shown. Thus, the standardized regression coefficient for the path between the factors paternal ASPD and emotional warmth as perceived by children was $\beta = 0.12$, confirming the direction indicated by the prediction, but failing to achieve significance.

Our second hypothesis that diagnosed paternal ASPD is directly associated with the degree of aggression and delinquency in these adolescents was confirmed both in the correlation studies and in empirical testing of the models. This supports our above-mentioned assumption that paternal ASPD tends to have a direct influence on subsequent aggressive and delinquent behavior in offspring [Barnow et al., unpublished data], although we cannot make reliable statements about the mediation process.

The third hypothesis in the model assumed a causal relationship between OCs and adolescent impulsivity as indexed with the extent of novelty seeking. This hypothesis was based on the findings of Moffitt [1990, 1993], which suggest that OCs leading to brain damage can result in a decreased capacity to adapt to social situations and lower self-control (impulsivity). The empirical test of the hypothetical model supported these findings to the extent that a relationship—although only a moderate one—was found between Ocs and the degree of NS in the model.

For our fourth hypothesis, we assumed in the hypothetical models that a temperament inclined toward impulsiveness was associated with stronger feelings of parental and peer rejection, and directly related to aggressive or delinquent behavior problems. While the hypothesis of a direct relationship between NS and adolescent aggressive and delinquent behavior, respectively, was confirmed, no significant association between NS and parental-, and peer rejection was found. Regarding the latter, our results are consistent with findings, however, showing that child behavior tends to have only a moderate influence on parent
The confirmed direct relationship between NS and aggression and delinquency agrees with a number of studies that showed that impulsive children were less capable of controlling their behavior, which lead to a stronger propensity to develop aggressive and delinquent conduct problems later on [Chassin et al., 1993; Cloninger et al., 1988; Posner and Rothbart, 1998].

The fifth hypothesis in our model assumed a relationship between parenting styles, and aggressive and delinquent conduct problems, respectively. For example, there is strong evidence for relations between coercive parenting and the externalizing problems of boys [Patterson et al., 1998]. Our findings showed, however, that perceived parental rejection was associated with aggression and delinquency in offspring only, whereas neither aggression nor delinquency was significantly correlated with perceived parental emotional warmth. Due to the design of the study (use of cross-sectional data), however, it was not possible to demonstrate causal relationships. Thus, the alternative hypothesis that children with behavioral problems tend to feel rejected by their parents cannot be ruled out. It is also important to consider that the expected protective effect of parenting styles characterized by emotional warmth was confirmed in the correlation analyses (see Table II). This relationship was, however, only moderate. It should be noted that these same parental characteristics have also been found to be associated with other forms of psychopathology in children (e.g., phobias and social anxiety, obsessive-compulsive disorders and emotional problems). Thus, it is likely that such negative parental child-rearing practices may make children vulnerable to psychopathology in general, rather than to one or a few specific forms of psychopathology.

Our assumptions regarding parenting behavior and feelings of self-worth in adolescents were confirmed in both the correlation analyses and in the empirical models. While the perception of a parenting style characterized by rejection was negatively associated with the assessment of self-worth, perceived parental emotional support strengthened feelings of self-worth. Buikhuizen [1988] argued that it is likely that parental rejection impedes the development of a conscience, decreases feelings of empathy, and lowers the child’s self-esteem; while perceived emotional support increases feelings of self-worth due to positive feedback from parents [Cohen et al., 1994]. One finding also showed that adolescents, who had a low self-esteem, were more frequently rejected by their peers. This is consistent with that insecure children who tend to be more anxious are more likely to be rejected by members of the peer group and are generally less popular [Cloninger, 1987]. This illustrates the necessity of considering complex patterns of interaction in order to develop an understanding of how behavioral problems develop. The absence of a direct relationship between feelings of self-worth and aggressive or delinquent conduct problems, however, must not lead to the conclusion that low self-esteem plays no role in the development of conduct problems.

Our last hypothesis was based on findings that confirm the influence of the peer group on adolescent personality and behavior [Dishion et al., 1995; Fergusson et al., 1995]. We predicted that peer rejection may lead directly to both aggressive and delinquent behavior by prompting rejected individuals to seek out deviant, like-minded peers. This assumption was, however, not supported by our data. Moreover, the separate testing of the theoretical models for aggression and delinquency revealed some differences in the magnitudes of the individual path coefficients with respect to the relationships between peer deviance, peer rejection, and aggression and delinquency. Although peer rejection and membership in a deviant peer group correlated positively with the extent of aggressive and delinquent behavior problems, peer
deviance was more strongly associated with delinquency, while peer rejection was more tightly linked to aggression. Regarding the association between peer rejection and aggression, there has been a growing recognition of the contribution made by peer relations in forecasting subsequent aggressive conduct problems. For example, Coie and colleagues [1992] showed that both childhood aggression and peer rejection independently predicted subsequent aggressive behavior. Bierman and Wargo [1995] found in their longitudinal study that boys who were both rejected and aggressive continued to exhibit higher levels of aggression than did boys who were aggressive but not rejected [see also Miller-Johnson et al., 2002]. Furthermore, rejected children can be subjected to negative experiences that might shape their attitudes toward other peers in a way that amplifies aggressive behavior. On the other hand, the influence of group membership in a deviant peer group on adolescent delinquent behavior problems identified in the study may be explained by considering such processes as overt group pressure, peer modeling, and adaptation to group attitudes. These factors can lead to increased delinquent conduct problems in each individual group member in groups in which the behaviors are regarded as positive, which is often the case in deviant peer groups.

In summary, the results of our study point to the significance of child personality traits, family environment and group influences on aggressive and delinquent adolescent behavior. It is possible to derive approaches to prevention and intervention from these findings. First, it is likely that only intervention and prevention strategies that integrate multiple areas of life (shared as well as unshared environment) can effectively reduce behavioral problems such as aggression and delinquency. Secondly, failure to distinguish between aggressive and delinquent conduct problems could limit the generalizability of results by neglecting different developmental courses of aggression and delinquency.

Finally, several limitations of the study should be mentioned. First, cause-effect relationships could not be determined from these cross-sectional data. Prospective examinations, however, are underway and might be more helpful in evaluating the proposed model. Second, relatively few of the total of 317 potential family groups were available for the current analyses. Thus, the sample of this study was relatively small considering the size of the model being evaluated. Our results should, therefore, be considered as preliminary. It is also likely that only medium or higher effects could be identified. Third, because there were multiple children in some families, the observations were not fully independent. Fourth, some data were collected using self-reporting questionnaires. Responses to questions about problems and social support may be biased by individuals’ willingness to self-disclose their feelings, selective recall, and their desire to present themselves in a socially desirable way. Fifth, the extent to which the findings can be generalized beyond the scope of our sample remains unclear.

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