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General versus Specific Predictors of Male Arrest Trajectories: A Test of the Moffitt and Patterson Theories

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Abstract

Developmental taxonomies of crime disagree on whether distinctive offender trajectories are related to common or unique risks. This study examined childhood risks of differing arrest trajectories across childhood through early adulthood (from ages 10–11 to 26–27 years) that were identified in prior work for 203 at-risk, predominantly Caucasian young men. Multivariate analyses revealed that when both distal (childhood risk factors) and proximal risk factors (deviant peer association as a time-varying covariate) were included in the model, relatively few childhood risk factors (assessed at age 9–10 years) discriminated the chronic offender groups from rare offenders (i.e., child antisocial behavior, child attention problems, parents' antisocial behavior). Rather, deviant peer association was significantly related to levels of offending *within* each trajectory group (i.e., chronic and rare offender groups). No predictor differentially predicted membership in the two chronic groups, supporting the linear gradation argument. Theoretical and prevention implications are discussed.

Keywords

childhood predictors; life span; offending; trajectories

Several long-term studies using growth mixture modeling techniques have demonstrated considerable heterogeneity in offender trajectories across the adolescent and early adult years (for overviews, see Piquero, 2008; Van Dulmen, Goncey, Vest, & Flannery, 2009). It is noteworthy that the existing hypothesized dual taxonomies of antisocial and criminal behavior across the life course (e.g., Moffitt, 1993, 1997; Patterson & Yoerger, 1993, 1997) have received only moderate support in these analyses. Key differences in recent findings include the lack of a clear adolescent-limited trajectory, a much more pronounced adolescent peak for the most severe offender trajectory than posited, and the lack of predictive value of age of onset in distinguishing between the higher and more moderate offender trajectories

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(Wiesner, Capaldi, & Kim, 2007). Furthermore, studies often found more than two trajectories when using self-reports of offending (Piquero, 2008), including unpredicted groups of low-level chronic and adult-onset offenders. Moffitt (2006) recently attempted to address some of these issues by adding a third hypothesized trajectory of chronic low-level offenders. Overall, several fundamental premises of these dual taxonomies have not been met fully by the empirical reality.

However, some of the issues regarding offending trajectories have received less attention in the literature. First, the accumulated results do not yet permit a conclusive answer to the question of whether different offender trajectories are associated mostly with common or unique childhood risks, because few studies have tested directly the equality of predictive effects across groups. For example, it is unclear whether childhood attention problems are associated predominantly with higher level chronic offending across the life course, as theorized by Moffitt (1993), or also with other offender trajectories. Second, very few studies have incorporated time-varying covariates into their prediction models. This is a critical shortcoming of the literature because time-invariant predictors from childhood alone are insufficient to capture the dynamic nature of proximal influences on levels of offending over time. Engagement in high-risk contexts, such as affiliation with deviant peers, provides positive reinforcement of antisocial behaviors (Patterson, Reid & Dishion, 1992) and is, thus, regarded as a strong proximal risk factor for delinquency and crime involvement in the adolescent and young adult years (see Wiesner, Capaldi, & Patterson, 2003). It thus is highly likely that associations with deviant peers would show a dynamic, within-individual association (i.e., a time-varying association) to delinquency over time. The purpose of this prospective study was to address these two issues in the prediction of arrest trajectories that were derived from official records data for an at-risk sample of young men. The study extends prior work that had identified three arrest trajectory groups for the current sample (the Oregon Youth Study men): High-Level Chronic, Low-Level Chronic, and Rare Offenders (Wiesner et al., 2007).

Prediction to Arrest Trajectory Membership: Common or Unique Risk Factors

Proponents of developmental taxonomies of crime that have predominated in the past decade have taken differing views on whether distinctive offender trajectories are associated mostly with common or unique early risk factors. Patterson and colleagues (e.g., Patterson, 1996; Patterson & Yoerger, 1993, 1997) posited that offenders with a more severe offending trajectory (hypothesized to be early starters) are similar to earlier depictions of unsocialized aggressors and reflect a mix of temperamental risk and coercive parenting in childhood years. Those with a less severe offending trajectory (hypothesized to be late starters), in contrast, are posited to be marginally skilled (e.g., in social skills) and to have experienced marginally risky family contexts in childhood years, less than do early starters but more than do nonoffenders. Affiliation with deviant peers during the adolescent years, because of family conflict and poor parental supervision, is hypothesized as a key vehicle for this subgroup to initiate and escalate offending behavior in adolescence. The described rank ordering of the three groups with regard to early risk status in temperamental and contextual factors implies that distinctive arrest trajectories should be related mostly to common childhood risk factors. Some recent findings suggest age at first arrest is not a defining characteristic of the more severe and less severe trajectories (Wiesner et al. 2007). It is still important, however, to test whether those who follow a more severe offending trajectory versus a less severe trajectory show childhood risk factors that “represent variations on the same underlying theme” (Patterson & Yoerger 2002, p. 155), both to test competing predictions from differing developmental taxonomies and to inform public policy makers about suitable prevention and treatment programs. For instance, if a pattern of predominantly common early risk factors would be found consistently in the literature, then

programs that do not differ as a function of the offender trajectory at hand might be sufficient.

In contrast to that of Patterson, the dual taxonomy developed by Moffitt (1993, 1997, 2006) is clearly based on the notion of differential associations between childhood risk factors and distinctive offender trajectories. The more severe group (hypothesized as life-course-persistent offenders) are predicted to be affected by childhood individual risks, including difficult temperament, hyperactivity, and neurological impairment – as well as childhood family risks, such as poor parenting practices and parent deviance. The less severe group (hypothesized to be adolescence-limited offenders), in contrast, are not posited to show elevated levels on these or other risk factors during childhood years compared to normative youths. For this subgroup, the initiation of delinquent behavior during adolescence is hypothesized as motivated by the attempt to resolve a perceived maturity gap via mimicking antisocial behaviors displayed by deviant peers. Recently, Low-Level Chronic offenders were added to the taxonomy (see Moffitt, 2006) as a third group, which appears to share some of the early risk factors experienced by the life-course-persistent offenders, while at the same time being uniquely distinguished by exhibiting symptoms of isolated personality disorders. On the basis of this framework, distinctive arrest trajectories should be related mostly to unique childhood risk factors.

Regarding evidence for common or unique childhood risk factors and membership in more severe versus less severe offender trajectories, it should be noted that the following discussion focuses only on the childhood predictors examined in a given study and does not consider findings for any included adolescent predictors. Some studies revealed almost no differences in childhood risk factors among offender trajectories (e.g., Laub, Nagin, & Sampson, 1998; Sampson & Laub, 2003; Wiesner & Capaldi, 2003). Various other studies found several differences in childhood risks among offender trajectories without clearly supporting either hypothesis (e.g., Ayers et al., 1999; Kratzer & Hodgins, 1999; Loeber, Stouthamer-Loeber, van Kammen, & Farrington, 1991; Nagin, Farrington, & Moffitt, 1995; Smith & Brame, 1994; White, Bates, & Buyske, 2001).

Among the remaining group of studies that provided support favoring one of the two hypotheses, substantive findings were not in complete agreement. In two studies, findings generally supported the hypothesis of common childhood risks. In the first, a factor composed of social disadvantage, family dysfunction, and individual difficulties (Fergusson, Horwood, & Nagin, 2000), and in the second, measures of aggressiveness, drug availability, and deviant peer affiliation (Chung, Hill, Hawkins, Gilchrist, & Nagin, 2002) were associated with offender pathways in a manner consistent with the hypothesis of common childhood risk. However, in other studies that used very similar predictors, findings generally supported the hypothesis of unique childhood risks. For instance, verbal ability, hyperactivity, impulsivity (Bartusch, Lynam, Moffitt, & Silva, 1997), inept parenting (Simons, Wu, Conger, & Lorenz, 1994), neurocognitive problems, temperament and behavior problems, and inadequate parenting (Moffitt & Caspi, 2001) were each found to relate mostly to childhood-onset offending, whereas peer delinquency (Bartusch et al., 1997; Simons et al., 1994) was related mostly to adolescent-onset offending.

A problem with many of these studies is that few have tested directly for group invariance of predictive effects of childhood risks on trajectories. Instead, evidence for common versus trajectory-specific predictors has often been inferred from the pattern of significant versus nonsignificant associations between childhood risks and trajectory groups. Thus, it is hard to evaluate the evidence for common versus unique effects. Equality testing of predictive effects across pathways allows for more stringent tests of the discussed competing

contentions within the group-based modeling approach and thus provides more conclusive answers. This analytical strategy was applied, therefore, in the current study.

Hypotheses

The purpose of the current study was to test competing theories regarding childhood predictors of differing arrest trajectories from late childhood (ages 10–11 years) through early adulthood (ages 26–27 years) for at-risk young men. As described earlier, some researchers would expect distinctive offender trajectories to be related primarily to common childhood risk factors (i.e., that certain childhood risk factors would be related to any form of later delinquency involving arrests, with distinctions being in levels of severity), whereas others would expect them to be related mostly to unique childhood risk factors (i.e., that a more severe arrest group would show different risk factors from a less severe group). In the current study, childhood (age 9–10 years) risk factors included both family risks (i.e., parental antisocial behavior, poor parental discipline, low parental supervision) and youth behavioral risks (i.e., antisocial behavior, attention problems, academic achievement). Consistent with the Patterson framework (e.g., Patterson & Yoerger, 1993, 1997), we expected to find almost no unique or trajectory-specific childhood predictors – and thus that membership in a chronic high-level offender group would be predicted by higher levels of risk in childhood compared to any lower-level offender groups. These predictions were in contrast to those of Moffitt (1993, 1997, 2006), who would predict elevated attention problems in particular to be found only for the High-Level Chronic Offender group. In keeping with the general risk-factor theory, we expected also that contemporaneous deviant peer association would be a significant risk factor across time for engagement in crime regardless of the frequency of engagement in crime (as indexed by trajectory group membership). To test this hypothesis, association with deviant peers was included as a time-varying covariate in order to capture proximal contemporaneous influences of deviant peers on levels of the young men's offending behavior *within* each trajectory group throughout the observation period. This approach allows us to estimate the degree to which deviant peer association may either encourage crime involvement or hinder desistance from crime for youths across time. Consistent with hypotheses from Patterson and colleagues (e.g., Patterson, 1996; Patterson & Yoerger, 1993, 1997), it is theorized that deviant peers play a key role in the rapid growth and escalation of various antisocial behaviors among those with a more severe offender trajectory, and also – albeit to a lesser degree and relatively later in life – among those with less severe offender trajectories.

Method

Sample

The analyses were conducted using data from the Oregon Youth Study (OYS), which is an ongoing multiagent and multimethod longitudinal study. A sample of boys was selected from schools in the higher-crime areas of a medium-sized metropolitan region in the Pacific Northwest. Thus, the boys were considered to be at heightened risk for later delinquency when compared to others in the same region. Of the eligible families, 206 agreed to participate (a 74.4% participation rate). The OYS consists of two successive Grade 4 (ages 9–10 years) cohorts of 102 and 104 boys, recruited in 1983–1984 and 1984–1985 (for details see Capaldi & Patterson, 1987). The average retention rate was 98% through the early 20s, and 94% of living participants still remained as part of the panel in Year 20. Participants who moved out of the area were retained in the study, with interviewers traveling to assess them. The two cohorts had very similar demographic characteristics and were combined for the current analyses. The sample was 90% Caucasian and 75% lower or working class; over 20% received some form of unemployment or welfare assistance in the first year of the study, which was a recession year for the local economy (Patterson et al., 1992). Three

young men who died during the study period were excluded from the analyses; hence, the final sample size was 203.

Procedures

Assessment on the OYS was yearly, multimethod, and multiagent, including in-person interviews and questionnaires for self and parents at the Center (each lasting approximately 1 hour), telephone interviews that provided multiple samples of recent behaviors (a total of six, 3 days apart), home observations (a total of three 45-minute observations), videotaped interaction tasks, school data (including teacher questionnaires and school achievement test scores), and court records. Family consent was mandatory. Participants were compensated for their time at each assessment wave.

Measures

Arrest trajectories—This study compared groups with different trajectories of offending (as indexed by number of arrests derived from juvenile and adult court records) that were already identified and described in an earlier report. Using semiparametric group-based modeling (Nagin, 1999, 2005), Wiesner et al. (2007) identified heterogeneous subgroups with distinct developmental trajectories of arrests from ages 10–11 through 26–27 years (i.e., Waves 2 to 18), controlling for exposure time and dormancy periods. A detailed account of the method, analysis strategy, model selection criteria, and model fit statistics is provided in their study. Briefly summarizing, Wiesner et al. (2007) identified three trajectory groups. One group contained 141 (68.5%) *Rare Offenders* who almost never were arrested during the entire study period (58.2% of the men in this group had one or more arrests, 27.7% had two or more arrests, 0% had ten or more arrests). The second group consisted of 43 (22.3%) *Low-Level Chronic Offenders* who had a consistently low rate of arrests across the study period, with a slight peak around the middle adolescent years (100% of the men in this group had 1 or more arrests, 53.5% had 10 or more arrests). The third group was composed of 19 (9.2%) *High-Level Chronic Offenders* who started with a similarly low arrest rate but then continuously increased toward a peak in the middle adolescent years, which was followed by a decrease to about the same level as the Low-Level Chronic group when they reached their early 20s and another slight upsurge around their mid 20s (100% of the men in this group had 1 or more arrests, 94.7% had 10 or more arrests). The classification quality was very high, with average posterior group membership probabilities ranging from .926 to .979 for the three classes, and median posterior group membership probabilities ranging from .988 to .998. Borderline individuals who had similar or equal probabilities across classes were extremely rare.

Computation of Childhood and Time-Varying Covariate Measures—Whenever possible, the measures were computed using data from multiple informants and various methods (after ascertaining that indicators from different informants or methods were substantially related to each other). The use of multi-method multi-informant composite variables has the advantage of providing more comprehensive and ecologically richer information about the construct of interest and also reduces the risk that significant findings are simply a function of shared measurement variance. The general strategy for building composite variables has been described by Capaldi and Patterson (1989) and Patterson et al. (1992). It has been applied consistently in prior publications with the OYS. In short, a three-stage process was used: First, the internal consistency of the items associated with each scale was established in Cohort 1 (alpha of at least .6; item-total correlation of at least .2). Second, the convergent validity of the indicators for a construct was examined within a principal component factor analysis (the factor loading for the one-factor solution had to be at least .3). Third, the internal consistency of the item scales and the convergent validity of the construct indicators had to replicate in Cohort 2. This procedure ensured that reports from

multiple informants and methods were substantively associated with each other prior to creating composite variable scores. If a composite variable consisted of indicators with differing response formats, indicators were standardized before averaging them.

Childhood measures—All childhood measures for this study were gathered when the boys were ages 9–10 years (Wave 1). Thus, the childhood measures were obtained before the assessment of the youths' officially recorded offending behavior was initiated. The variables were coded so that a higher score represented a more problematic behavior or situation (i.e., a higher score indicated a higher level of attention problems, poorer parental discipline, lower degree of supervision by parents), with the exception of academic achievement, where higher scores indicated better academic achievement. The childhood measures are described in Table 1, along with internal consistency estimates. Supplementary information is provided below for some measures as needed.

Parents' antisocial behavior—This construct was composed of three indicators: number of arrests, number of driver's license suspensions, and a summary score of two subscales from the Minnesota Multiphasic Personality Inventory (MMPI) – hypomania and psychopathic deviate. The State of Oregon arrest and Department of Motor Vehicles records were collected at Wave 1, and the MMPI was assessed at Wave 2. Mothers' and fathers' scores were averaged to indicate parents' antisocial behavior.

Child antisocial behavior—This construct was measured with items from teacher and parent reports of the Childhood Behavior Checklist (Achenbach, 1991). Similar to earlier work with data from the OYS (e.g., Capaldi & Stoolmiller, 1999), the construct was created using items from the delinquent and aggressive behavior subscales but excluding items from those scales that either overlapped with other constructs or were ambiguous (e.g., those pertaining to alcohol and drug use, and mood changes). The composite variable contained both overt and covert antisocial behaviors, including arguing a lot, being disobedient at school, getting into many fights, lying, and also cruelty, bullying, and meanness to others.

Harsh inconsistent parental discipline—This measure assessed inconsistent discipline and harsh behavior of the parents during late childhood. Two indicators, the probability of nonexplosive negative parental behavior and the probability of explosive negative parental behavior, were derived from behavioral data coded by independent raters from the three 45-minute home observations. The Family Process Code (Dishion et al., 1987; Patterson et al., 1992) was used to code observed parent-child interactions. The code is a five-digit real-time behavioral process code, with a code for actor, recipient, a two-digit behavioral content code, and a single-digit affect or valence code on a scale of one to five. The probability that the parent directed some nonexplosive negative behavior toward the child (e.g., nattering, criticisms) was derived from the Family Process Code, including negative verbal, coerce ambiguous, refuse, negative nonverbal, noncomply, command with negative valence, and physical interact with negative valence. The probability of explosive negative behavior being directed toward the boy (e.g., verbal attacks, or physically aggressive or threatening behavior) was derived from the content codes for yelling, humiliating, threatening, and hitting. Twenty percent of the observations were double coded by independent coders to compute inter-coder reliabilities, and coders were required to maintain at least 75% agreement. The third indicator was developed from home visitors' global ratings of parental discipline skills (e.g., parent discipline was erratic, inconsistent, haphazard) that were averaged across three observation sessions.

Time-varying covariate deviant peer association—This was a composite measure of the young men's association with deviant peers from waves where it was measured (i.e.,

Waves 1 and 3–17) across ages 9–10 through 25–26 years. The score from Wave 1 was used to estimate the score from Wave 2 when the construct was not measured. Similarly, the score from Wave 17 was used to estimate the score from Wave 18 (ages 26–27 years) when deviant peer association was not measured. The construct was assessed using self-reports (12 or more items, e.g., “how many of your friends have stolen something worth more than \$50 during the last year”); parent ratings (3 or more items per parent, e.g., “son hangs out with friends who steal”); and other information, including teacher reports (4 items, e.g., “child hangs around with children who get in trouble”), as developmentally appropriate (e.g., there were no teacher reports once the youth left school). At the first wave only, peer nominations (1 item, “child belongs to a tough group of kids”) were also available and included in the construct. More details about the composition of the deviant peer association construct can be found in Dishion, Capaldi, and Yoerger (1999). Cronbach alphas of individual scales met the .60 criterion at each wave and ranged from .80 to .92 for self-reports, from .61 to .91 for parent reports, and from .87 to .93 for teacher reports across the waves. Correlations among indicators from different informants were generally of medium to large size and ranged from .33 to .59 across the waves. Because the composition of the measures changed slightly as the study participants became older, the total score of each wave was standardized prior to analysis in the current study. Higher scores indicated higher levels of association with deviant peers.

Analytic Plan

A semiparametric group-based modeling technique (Jones & Nagin, 2007; Jones, Nagin, & Roeder, 2001; Nagin, 1999, 2005) was used. Analyses were conducted using PROC TRAJ (Version 2; Jones & Nagin, 2007) with the statistical software package SAS 9.2; thus, class assignment uncertainty was taken into account (i.e., error-free measurement was not assumed). A conditional trajectory model was estimated in which membership in the Low-Level Chronic and High-Level Chronic groups, respectively, was predicted by various childhood predictors relative to the baseline group (i.e., Rare Offenders), and deviant peer association was included as a time-varying covariate. This means that prediction from deviant peer association was to levels of offending *within* trajectory groups rather than to membership in the chronic trajectory groups.

Finally, in order to determine whether the childhood variables differentially predicted membership in the two chronic offender groups, the Wald Test (Wald, 1943) was conducted to test the equality of predictive effects across these two groups. According to Jones and Nagin (2007), differences in the magnitude of coefficient estimates would imply that they differentially predict membership in the various offender trajectory groups. Alternatively, if the coefficient estimates are individually significantly different from zero but the null hypothesis of their equality cannot be rejected, this would imply that – although the childhood variables are a significant predictor of offending behavior – they do not distinguish among its alternate developmental courses.

Results

Mean Levels of Descriptor Variables by Trajectory Group Membership

Shown in Table 2 are descriptive statistics (means and standard deviations unless otherwise noted), along with the results of univariate analyses of variance (chi-square tests for categorical variables, respectively) for each variable. Overall, most variables were significantly associated with trajectory group membership. Although the mean levels generally indicated more problematic backgrounds and outcomes for the High-Level Chronic group, there were a number of instances where the mean levels for the Low-Level Chronic group were very similar to those of the High-Level Chronic group (e.g., child

attention problems) or even more problematic for the Low-Level Chronic group (e.g., childhood academic achievement). One factor that seemed particularly problematic in the High-Level Chronic group was harsh and inconsistent parental discipline. The only predictor that did not differ significantly by arrest trajectory group was parental supervision. Levels of deviant peer association were significantly different across the three groups at each time point, being particularly low for the rare offenders. Overall, levels of deviant peer association appeared to be relatively similar for the Low- and High-Level Chronic groups in childhood and adolescence, but the High-Level Chronic group showed consistently high levels of such associations past the juvenile period (i.e., from Time 10 or ages 18–19 years upward).

Childhood Predictors of Trajectory Group Membership

Next, prospective relations of childhood predictors to arrest trajectories were examined in a model that included deviant peer association as a time-varying covariate. A conditional trajectory model was estimated in which membership in the Low-Level Chronic and High-Level Chronic groups, respectively, was predicted by various childhood constructs relative to the baseline group (i.e., Rare Offenders), while adjusting for the time-varying covariate deviant peer association. Predictor variables included parents' socioeconomic status (SES), parental antisocial behavior, child antisocial behavior, child attention problems, child academic achievement, harsh/inconsistent parental discipline, and low parental supervision. All childhood predictor variables were assessed at Wave 1 when the study participants were ages 9–10 years. Intercorrelations among the predictors (not shown) were generally in the expected direction and small to moderate in size, with the largest absolute correlation being observed for child antisocial behavior and child academic achievement, $r = -.33$, $p < .001$.

Because the multinomial logit coefficients estimated in SAS PROC TRAJ are unstandardized, the risk factors were standardized prior to analysis so that the effect sizes of significant predictors could be compared more easily. The results of this analysis are shown in Table 3. Univariate effects for each predictor variable are also given for comparison purposes.

Just two childhood variables significantly predicted membership in the Low-Level Chronic versus Rare Offender grouping in the multivariate analysis, namely higher levels of parental antisocial behavior and attention problems. Membership in the High-Level Chronic versus Rare Offender group was significantly predicted by three childhood variables in the multivariate analysis. Young men – who at age 9–10 years had parents with higher levels of antisocial behavior, displayed higher levels of antisocial behavior themselves, and had higher levels of attention problems – were more likely to belong to the High-Level Chronic group than to the Rare Offender group. Finally, higher levels of deviant peer association were consistently and significantly linked to higher levels of offending *within* each trajectory group (see the first row of Table 3).

Finally, in order to examine the hypothesis that there would be no trajectory-specific associations of the childhood predictors to the two offending groups, the Wald Test (Wald, 1943) was conducted to test the equality of predictive effects across the High-Level Chronic and Low-Level Chronic arrest groups. Findings did not reveal any significant differential predictive effect (see Table 3, final main column). This suggests that the significant childhood predictors (i.e., parents' antisocial behavior, child antisocial behavior, and child attention problems) were common, or shared, risk factors of officially recorded offending behavior.

Discussion

Proponents of developmental taxonomies of crime have offered differing views about whether distinctive trajectories of offending are related to common or unique early risk factors. For instance, the early/late starter model from Patterson and colleagues (e.g., Patterson, 1996; Patterson & Yoerger, 1993, 1997) is predicated on a linear gradation argument that implies that distinctive offender trajectories should be related mostly to common childhood risk factors. The dual taxonomy of antisocial behavior from Moffitt (1993, 1997, 2006), on the other hand, is clearly based on the notion that differing offender trajectories should be related mostly to unique childhood risk factors. The existing literature offers few systematic tests of these competing theoretical predictions. Furthermore, time-varying effects of proximal influences on levels of offending over time also have received scant attention in empirical research. The current study sought to extend the literature by focusing on these two issues.

An at-risk U.S. community sample of 203 young men was used to examine associations between three distinct trajectory groups of offending and childhood predictors, as well as the effects of contemporaneous deviant peer association (a time-varying covariate) on offending within trajectories. These trajectories of High-Level Chronic, Low-Level Chronic, and Rare Offenders were identified on the basis of arrest histories in a prior study (Wiesner et al., 2007). Whereas two major groups of offenders were identified in the prior study, one more severe than the other, they did not fit with predictions from the dual taxonomy models of Patterson and Moffitt in a number of respects. Specifically, they did not show differential ages at first arrest, there was no clear adolescent-limited trajectory, and both groups continued offending after adolescence but both showed a substantial downward trend in offending in later adolescence, particularly the Chronic High-Level offenders. Despite these differences, hypotheses related to predictors, based in part on the dual taxonomy models, were tested for the Chronic High-Level and Chronic Low-Level offender groups in the current study.

Overall, the multivariate analyses in the current study revealed relatively few childhood risk factors that discriminated either chronic offender groups from the Rare Offenders: Membership in the High-Level Chronic offender group was predicted by higher levels of childhood antisocial behavior, childhood attention problems, and parents' antisocial behavior; membership in the Low-Level Chronic offender group was predicted by higher levels of parental antisocial behavior and child attention problems. None of the childhood risk factors differentially predicted membership in the two chronic offender groups. In addition, higher levels of deviant peer association assessed proximally as a time-varying covariate were linked consistently to higher levels of offending within each trajectory group. Thus, little evidence was found to support the predictions of the Moffitt dual taxonomy model regarding hypothesized differences between more severe versus less severe offenders.

The High-Level and Low-Level chronic offenders groups were linked to individual and family childhood risk factors in the multivariate models, although this was not the case for parenting practices, which play a key role in the dual taxonomy from Patterson (e.g., Patterson & Yoerger, 1993, 1997). Harsh/inconsistent parental discipline, in particular, had only significant univariate effects on membership in the chronic offender groups. It is the case, however, that the current model tests were controlled for antisocial behavior at ages 9–10 years, which may mediate the association of parenting with later offending. Unlike parenting practices, parental antisocial behavior showed a robust association with subsequent offending trajectories, even in the presence of other associated factors such as low SES, parenting, and childhood antisocial behavior, which might have been expected to mediate the association with subsequent offending trajectories. This effect may be due both

to genetic risk (Simonoff, 2001) and to unmeasured environmental factors, possibly even including modeling or encouragement of criminal behavior (Murray, Janson, & Farrington, 2007).

Another noteworthy finding was that contemporaneous association with deviant peers, when included in the multivariate analysis as a time-varying covariate, was related consistently to higher levels of offending within each offender group, including the rare offender (i.e., least criminal) group. In other words, deviant peer affiliation appears to be a risk factor for offending behavior among both normative and more problematic (i.e., those on a high- or low-level chronic offender trajectory) young men, although the overall *level* of deviant peer association differed significantly across the three trajectory groups. Thus, deviant peer association appears to be a general process associated with offending for men and is not specific to a particular level of frequency and severity of either crime or deviant peer association. This finding is quite inconsistent with the developmental taxonomy of antisocial behavior from Moffitt (e.g., Moffitt, 1993), and it demonstrates the value of incorporating dynamic effects of relevant proximal context factors into prediction models (Capaldi & Wiesner, 2009). As posited by several theories (e.g., Thornberry & Krohn, 2001) and supported by empirical studies (e.g., Dishion, Andrews, & Crosby, 1995; Dishion, Spracklen, Andrews, & Patterson, 1996), deviant peer associations represent a mix of both selection and social influence effects on antisocial behavior and offending. Future research should strive to incorporate additional time-varying covariates, such as the occurrence of adverse events or life stressors in the participants' immediate social environment and dynamic influences of parental and intimate partner behaviors. Direct tests of whether the effects of deviant peer association on levels of offending within each trajectory group remain constant over time or vary across developmental periods are also warranted, although not easily feasible in this study.

Findings of the current study were only partially consistent with findings from prior work with the same sample that focused on identifying predictors of offender trajectories derived from self-reports (see Wiesner & Capaldi, 2003). This might be expected to some degree because of differences between self-reported offending and offending that comes to the attention of the police. For example, the ratio of police contacts to self-reported offenses has been estimated at around 3–10:100 (Elliott & Voss, 1974; Gold, 1966). Therefore, self-report measures and official records provide two alternative views on offending behavior (Farrington et al., 2003), and as might be expected, more trajectories of differential offending patterns were identified for the OYS sample using self-reports than arrest records (six versus three). However, some additional features were also different. Notably, the arrest trajectory groupings encompassed a 5-year longer time period than the prior study with self-report trajectories, and there were a few differences in the set of predictor variables (e.g., a more comprehensive measure of parents' criminality was used in the current study). These differences in measures, pathways, and developmental windows might account for some of the differential findings. Note that when predictive models for the self-report offender trajectories were rerun using exactly the same Wave 1 predictor set as in the current study, the general pattern of significant effects became more similar but differences still remained. At the very least, this suggests that findings for predictors of differing offender trajectories may not necessarily converge across self-report and official records measures of offending behavior. It would be helpful if this would be investigated more systematically in further research, with important study features being held constant (e.g., predictor sets, time-spans, number of pathways).

Overall, the current study found very strong evidence favoring the assumption of common (as opposed to trajectory-specific) childhood risks for differing developmental pathways of offending. Findings were largely in agreement with the linear gradation argument posited by

Patterson and colleagues (e.g., Patterson & Yoerger, 1993). They offer considerably less support for Moffitt's hypothesis of differential childhood etiologies (e.g., Moffitt, 1993, 2006). Of course, a possible explanation for our failure to find compelling evidence in support of associations of trajectory-group membership with unique childhood risks is a lack of statistical power. Group sizes for the chronic offender groups were relatively small, especially in relation to the baseline group of Rare Offenders. Nevertheless, a number of significant predictive effects were detected in the current study. It was also the case that the arrest trajectories identified for this sample did not contain a clear adolescence-limited pathway. However, this is a frequent finding (see Piquero et al., 2008) that also indicates substantial evidence against the viability of the Moffitt theory. In addition, childhood measures of isolated personality disorder symptoms were not available, which might have allowed for differentiation of the Low-Level from the High-Level Chronic offenders if Moffitt's (2006) recent extension of her dual taxonomy (i.e., the described characteristics of the newly added group of Low-Level Chronic offenders) holds true. Therefore, additional tests of these issues are needed. One considerable challenge to such tests is that because the life-course persistent and adolescent-limited pathways (and early and late starter characteristic) do not always emerge clearly from empirical modeling, fundamental premises of the theories are absent from these trajectory groups. Because the theory does not fit the evidence on multiple dimensions, continuing to try to work from this restrictive frame within the field of crime research is increasingly limiting and problematic.

Some caveats are warranted in interpreting the findings of this study. First, the study was conducted with data from a mostly Caucasian sample of at-risk, young men. The findings from this study may not generalize to samples from the general population, special populations such as incarcerated offenders, offenders from other ethnic groups or sociocultural contexts, and female offenders. It is imperative that the effects of sample diversity are studied more closely. Second, as mentioned above, the sample size was relatively small, limiting statistical power. This may have decreased the chances of finding differential predictors of chronic offender pathways in the Wald equality tests. Replication of the current findings with larger samples is critical. Third, identification of arrest trajectories was based on right-censored data, which is necessarily the case when studying ongoing behaviors. Other research has shown that length of follow-up can affect identified trajectories of crime (Eggleston, Laub, & Sampson, 2004). We cannot rule out the possibility that this has introduced some bias for comparisons involving men in the High-Level Chronic group, whose criminal behavior was still unfolding at the end of the observation period. These study limitations are offset by several strengths -- including the long-time span from late childhood through the later 20s, with annual assessments of the men; usage of sound measures garnered from multiple informants/methods; and the very little likelihood that the observed prospective associations with arrest trajectory groupings are exacerbated by shared measurement variance. These study features allowed to address some important unresolved issues in the literature on associations of childhood risks and time-varying proximal influences to differing offender trajectories.

The findings from this study have several implications for prevention and intervention efforts. Knowledge about common and trajectory-specific predictors has immediate implications for the development and implementation of more etiologically informed prevention models of offending and criminal behavior. More specifically, the consistent evidence for common predictors in this study questions a recommendation often advocated in trajectory research pertaining to the necessity for targeted prevention programs. If this finding is substantiated in further research using similarly stringent statistical tests, then it might be concluded that universal prevention programs are an equally promising avenue, with the added benefits of avoiding stigmatization of children selected for targeted

prevention and avoiding grouping together the most antisocial teens for treatment, which is known to result in risk for iatrogenic effects (e.g., Dishion, McCord, & Poulin, 1999).

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Table 1

Description of Time 1 Childhood Predictor Constructs and Scales

Construct/ Measure	No. of Items	Cronbach Alpha	Description or Sample Item
<i>Parents' Antisocial Behavior:</i>			
1. Official Arrest Records	---	---	Number of parents' lifetime arrests
2. DMV Records	---	---	Number of parents' license suspensions
3. Parents – MMPI (Hathaway & McKmley, 1943)	---	---	Sum of Scale 4 (Hypomania) and Scale 9 (Psychopathic deviate)
<i>Child Antisocial Behavior:</i>			
1. Mother – CBCL (Achenbach, 1991)	15	.82	Gets in many fights
2. Father – CBCL (Achenbach, 1991)	15	.82	Lying or cheating
3. Teacher – CBCL (Achenbach, 1991)	19	.94	Steals outside the home
<i>Child Attention Problems:</i>			
1. Mother – CBCL (Achenbach, 1991)	11	.79	Can't concentrate, can't pay attention for long
2. Father – CBCL (Achenbach, 1991)	11	.74	Can't sit still, restless, or hyperactive
3. Teacher – CBCL (Achenbach, 1991)	11	.87	Impulsive or acts without thinking
<i>Child Academic Achievement:</i>			
1. Self – WRAT (Jastak & Jastak, 1978)	1	---	Reading achievement (total score)
2. Parents, Teacher – CBCL (Achenbach, 1991)	4	---	Performance in reading, spelling, writing, and arithmetic
3. School Records – Scholastic Aptitude Test	4	---	Test scores in reading, spelling, language arts, and math
<i>Low Parental Supervision:</i>			
1. Child, Parents – Telephone and Structured Interviews	8	.51	How often, before you go out, do you tell your parents when you will be back Was your son out after dark last night without an adult along
<i>Harsh/Inconsistent Parental Discipline:</i>			
1. Family Problem Solving Task – Nattering (FPPC: Stubbs, Crosby, Forgatch & Capaldi, 1998))	---	---	Nonexplosive negative behavior toward the child (e.g., nattering, criticisms)
2. Family Problem Solving Task – Abusive (FPPC: Stubbs et al., 1998)	---	---	Explosive negative behavior toward the child (e.g., humiliating, hitting)
3. Home Visitor Ratings – Questionnaire	5	.85	Parent discipline was inconsistent

Note: Reliabilities (Cronbach alpha) are reported for Wave 1. CBCL = Child Behavior Checklist; FPPC = Family and Peer Process Code; WRAT = Wide Range Achievement Test; MMPI = Minnesota Multiphasic Personality Inventory.

Table 2

Descriptive Statistics for all Study Variables (N=203)

Variable	By Arrest Trajectory Group				p-value
	Total (n = 203)	Rare Offenders (n = 141)	Low-Level Chronics (n = 43)	High-Level Chronics (n = 19)	
Childhood Predictors					
T1 Parents' SES	32.54 (0.91)	34.44 (10.23)	28.14 (7.82)	28.21 (7.38)	.000
T1 Parents' Antisocial Behavior	0.06 (0.67)	-0.10 (0.55)	0.45 (0.83)	0.32 (0.63)	.000
T1 Child Antisocial Behavior	0.32 (0.27)	0.27 (0.22)	0.40 (0.34)	0.48 (0.33)	.007
T1 Child Attention Problems	4.53 (3.10)	3.97 (3.08)	5.80 (2.84)	5.85 (2.75)	.000
T1 Child Academic Achievement	0.02 (0.75)	0.10 (0.74)	-0.26 (0.72)	0.01 (0.70)	.020
T1 Harsh/Inconsist. Parental Discipline	-0.00 (0.73)	-0.13 (0.62)	0.18 (0.71)	0.57 (1.09)	.004
T1 Low Parental Supervision	1.58 (0.43)	1.54 (0.40)	1.63 (0.49)	1.77 (0.40)	ns
Time-Varying Covariate					
Deviant Peer Associations T2	0.00 (1.00)	-0.31 (0.77)	0.79 (1.16)	0.52 (0.99)	.000
Deviant Peer Associations T3	0.00 (1.00)	-0.38 (0.68)	0.78 (0.96)	1.02 (1.33)	.000
Deviant Peer Associations T4	0.00 (1.00)	-0.40 (0.73)	0.77 (0.82)	1.21 (1.13)	.000
Deviant Peer Associations T5	0.00 (1.00)	-0.42 (0.79)	1.00 (0.69)	0.85 (0.85)	.000
Deviant Peer Associations T6	0.00 (1.00)	-0.40 (0.63)	0.75 (1.06)	1.27 (1.13)	.000
Deviant Peer Associations T7	0.00 (1.00)	-0.39 (0.72)	0.85 (0.88)	0.98 (1.19)	.000
Deviant Peer Associations T8	0.00 (1.00)	-0.38 (0.70)	0.87 (0.97)	0.85 (1.20)	.000
Deviant Peer Associations T9	0.00 (1.00)	-0.28 (0.90)	0.62 (1.01)	0.65 (0.74)	.000
Deviant Peer Associations T10	0.00 (1.00)	-0.36 (0.81)	0.70 (0.88)	1.08 (0.95)	.000
Deviant Peer Associations T11	0.00 (1.00)	-0.27 (0.82)	0.52 (1.13)	0.78 (1.06)	.000
Deviant Peer Associations T12	0.00 (1.00)	-0.28 (0.86)	0.54 (0.98)	0.85 (1.11)	.000
Deviant Peer Associations T13	0.00 (1.00)	-0.28 (0.83)	0.44 (1.13)	1.04 (0.86)	.000
Deviant Peer Associations T14	0.00 (1.00)	-0.19 (0.87)	0.25 (1.14)	0.86 (1.03)	.000
Deviant Peer Associations T15	0.00 (1.00)	-0.24 (0.85)	0.39 (0.98)	0.91 (1.29)	.000
Deviant Peer Associations T16	0.00 (1.00)	-0.20 (0.91)	0.22 (0.98)	0.96 (1.05)	.000
Deviant Peer Associations T17	0.00 (1.00)	-0.29 (0.72)	0.55 (1.13)	0.89 (1.41)	.000
Deviant Peer Associations T18	0.00 (1.00)	-0.29 (0.72)	0.55 (1.13)	0.89 (1.41)	.000

Note. T1 to 18 stand for Time 1 to Time 18. Each column shows group means, and standard deviations are given in parentheses. Descriptive statistics are reported in unstandardized metric for T1 childhood predictors and in standardized metric for the time-varying covariate.

Table 3
Conditional Trajectory Model with Time-Varying Covariate Predicting Trajectory Group Membership (N=203)

	Rare Offenders Estimate		Low-Level Estimate		Chronics SE		High-Level Estimate		Chronics SE	
		SE								
TVC Deviant Peer Associations	0.55***	0.14	0.47***	0.09	0.32***	0.05				

	Low-Level Chronics (1) vs. Rare Offenders (0)			High-Level Chronics (1) vs. Rare Offenders (0)			Wald Equality Test	
	Univariate	Multivariate	SE	Univariate	Multivariate	SE	χ^2 -Statistic	
Intercept	---	-0.78	0.45	---	-1.56***	0.42	-----	
T1 Parents' SES	-0.85***	-0.71	0.37	-0.78*	-0.68	0.38	$\chi^2_{(1)} = 0.00$	
T1 Parents' Antisocial Behavior	1.18***	1.25***	0.34	0.99***	1.40***	0.36	$\chi^2_{(1)} = 0.37$	
T1 Child Antisocial Behavior	0.56**	0.50	0.31	0.79***	0.81**	0.30	$\chi^2_{(1)} = 1.34$	
T1 Child Attention Problems	0.71***	0.71*	0.31	0.69**	0.64*	0.32	$\chi^2_{(1)} = 0.05$	
T1 Child Academic Achievement	-0.54**	0.17	0.31	-0.19	0.13	0.34	$\chi^2_{(1)} = 0.01$	
T1 Harsh/Inconsistent Parental Discipline	0.50*	0.00	0.34	0.87***	0.34	0.31	$\chi^2_{(1)} = 1.47$	
T1 Low Parental Supervision	0.27	0.27	0.27	0.50*	0.25	0.28	$\chi^2_{(1)} = 0.00$	
Model Fit	$AIC = 1946.76$, $BIC = -1999.78$, $LL = -1914.76$							

Note: Wald equality tests were performed for multivariate effects. Childhood predictors were entered in standardized metric. TVC = Time-varying covariate, BIC = Bayesian Information Criterion, AIC = Akaike Information Criterion, LL = Negative Log Likelihood.

 $p < .001$.

**
 $p < .01$.

*
 $p < .05$.