

# Trajectories of Antisocial Behavior and Psychosocial Maturity From Adolescence to Young Adulthood

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Most theorizing about desistance from antisocial behavior in late adolescence has emphasized the importance of individuals' transition into adult roles. In contrast, little research has examined how psychological development in late adolescence and early adulthood contributes to desistance. The present study examined trajectories of antisocial behavior among serious juvenile offenders from 14 through 22 years of age and tested how impulse control, suppression of aggression, future orientation, consideration of others, personal responsibility, and resistance to peer influence distinguished between youths who persisted in antisocial behavior and youths who desisted. Different patterns of development in psychosocial maturity from adolescence to early adulthood, especially with respect to impulse control and suppression of aggression, distinguished among individuals who followed different trajectories of antisocial behavior. Compared with individuals who desisted from antisocial behavior, youths who persisted in antisocial behavior exhibited deficits in elements of psychosocial maturity, particularly in impulse control, suppression of aggression, and future orientation.

AQ: 1 *Keywords:* psychosocial maturity, antisocial behavior

It is well established that antisocial and criminal activity increases during adolescence, peaks around age 17 (with the peak somewhat earlier for property than for violent crime), and declines as individuals enter adulthood; evidence for this so-called age-crime curve has been found across samples that vary in their ethnicity, national origin, and historical era (Farrington, 1986; Piquero, 2007; Piquero et al., 2001). Although there is a substantial literature on factors that contribute to the rise in delinquent activity that takes place during early and middle adolescence (e.g., in-

creases in susceptibility to peer pressure, decreases in parental monitoring), less is known about the decline in antisocial behavior that occurs during the transition to adulthood. Numerous explanations have been offered for this decline, including fatigue (Gottfredson & Hirschi, 1990); entrance into social roles that make continued antisocial activity difficult, such as work, marriage, and parenting (Laub & Sampson, 2001; Uggem & Staff, 2001); attainment of adult status (Moffitt, 1993); and psychosocial maturation, which brings with it increases in self-control, stronger resistance to peer influence, and the willingness to forsake immediate gratification in order to achieve future goals (Steinberg & Cauffman, 1996; for a review of theories of desistance from antisocial behavior, see Mulvey et al., 2004). Empirical research on these propositions is sparse, however, and much more is known about the factors that lead individuals into delinquency and antisocial behavior than about the factors that lead them out of it (Farrall & Bowling, 1999; Laub & Sampson, 2001; Warr, 1998).

The inverted *U*-shaped curve in antisocial and criminal behavior characteristic of adolescence and young adulthood describes a robust general trend, but there are exceptions to this developmental rule. That is, although the vast majority of individuals who are involved in illegal activity during adolescence cease or diminish their antisocial behavior as they move into adulthood, not all do, and even among those who desist from antisocial activity, there are variations in the timing and rate of their diminished antisocial behavior (Sampson & Laub, 2003). Perhaps the most widely cited perspective on individual differences in trajectories of antisocial behavior is that proposed by Moffitt (1993, 2006), who has drawn

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AQ: 2

a distinction between individuals whose antisocial behavior is limited to adolescence (“adolescence-limited offenders”) and those whose antisocial behavior starts at a younger age and continues into adulthood (“life-course-persistent offenders”).<sup>1</sup> Although the antisocial behavior of these groups is often indistinguishable during adolescence, the underlying causes of their antisocial behavior are hypothesized to be quite different. Adolescence-limited offenders, it is thought, engage in antisocial behavior to appear and feel more mature. According to Moffitt, this motive has intensified in modern society as a result of an ever-widening distance between the age of attainment of physical maturity and the age of attainment of adult status (what she refers to as the “maturity gap”). Once these individuals have attained adult status, their antisocial behavior stops. In contrast, life-course-persistent offenders are hypothesized to suffer from neuropsychological and cognitive deficits that, in combination with early family disadvantage, continue to affect functioning and underpin antisocial behavior that is maintained into adulthood.

Although Moffitt focuses on increased access to adult roles as the chief cause of desistance among adolescence-limited offenders, it is also possible that declines in antisocial behavior during the transition to adulthood are due to increases in psychosocial maturity. That is, if increases in antisocial behavior for this group reflect a desire to appear and feel mature, it stands to reason that as youths become more psychologically mature in the course of normative development, they will be less motivated to engage in antisocial activity. In contrast, because persistently antisocial youths engage in antisocial behavior as the result of the lasting impact of early neurological and contextual disadvantage, there is reason to expect that these individuals will evince chronic deficits in psychological functioning that will contribute to continued antisocial behavior.

Research on Moffitt’s taxonomy of offending has identified individuals whose behavior is consistent with the life-course-persistent and adolescence-limited patterns, as well as youths who abstain from antisocial activity; however, many studies of trajectories of antisocial behavior typically identify more patterns than these three. In a review of over 80 such studies, Piquero (2007) found that, on average, three to five groups are identified in trajectory analyses and that slightly more groups are found in studies that used self-reports of antisocial behavior than in those that used official arrest records. Consistent with Moffitt’s theory, studies typically identify those who abstain from antisocial behavior, an adolescent-peak pattern of antisocial behavior (although the specific peak age varies from study to study), and a chronic antisocial behavior trajectory. (Individuals in this trajectory tend to decline in their antisocial behavior at some point in adulthood, and this fact suggests that *persistent* and terms for trajectories such as *adolescent-peak* are relative, not absolute.) In addition to these patterns, studies identify individuals who consistently engage in moderate levels of antisocial behavior, a late-onset chronic group (individuals who begin antisocial behavior in middle-to-late adolescence and engage in antisocial acts at a steady rate into adulthood), and a group of individuals who are antisocial as children but not as adolescents or adults. Although the discovery of these additional trajectories has led to refinement of Moffitt’s framework (Moffitt, 2006; Moffitt, Caspi, Harrington, & Milne, 2002), one fundamental tenet of her viewpoint remains incontrovertible: Most individuals who engage in antisocial behavior in adolescence

(regardless of when such behavior began) discontinue it as they become adults, and only a small proportion of deviant adolescents will develop into deviant adults.

Moffitt’s taxonomy of offenders is not the only theory that is relevant to desistance from antisocial behavior, however. As noted earlier, one possibility, suggested by Steinberg and Cauffman (1996), is that the growth of psychosocial maturity more generally (which includes improvements in self-control) underlies desistance from antisocial behavior during the transition to adulthood. This notion is consistent with one of the most influential theories of antisocial behavior, Gottfredson and Hirschi’s general theory of crime (1990), which posits that deficiencies in self-control or in one’s ability to refrain from antisocial behavior are the root cause of all antisocial activity. The theory suggests numerous reasons for the link between antisocial behavior and poor self-control: (a) individuals with low self-control pursue immediate gratification and are oriented to the “now” as opposed to the future; (b) antisocial acts provide easy or simple gratification of desires; (c) antisocial acts are exciting and risky, and individuals with low self-control are active and physical; (d) because antisocial acts provide few long-term benefits, youths with low self-control tend to have unstable relationships and have little interest in long-term employment opportunities; (e) youths with low self-control exhibit little planning ability and instead use physical responses when frustrated; and (f) individuals with low self-control tend to be self-centered, indifferent, or insensitive to the suffering and needs of others, in particular the victims of their antisocial activity (Gottfredson & Hirschi, 1990, p. 89). The general theory of crime has received much empirical support, and many studies have demonstrated that low self-control is associated with greater antisocial behavior (e.g., Benson & Moore, 1992; Brownfield & Sorenson, 1993; Grasmick, Tittle, Bursik, & Arneklev, 1993; Paternoster & Brame, 1998; Piquero & Tibbetts, 1996; Polakowski, 1994; Pratt & Cullen, 2000; Winfree & Bernat, 1998).

Gottfredson and Hirschi’s (1990) theory posits a number of mechanisms, ranging from sensation seeking to limited foresight, under the broad rubric of self-control. A more focused, and developmental, theoretical formulation, presented by Steinberg and Cauffman (1996), maps onto Gottfredson and Hirschi’s theory. Steinberg and Cauffman suggest that during adolescence and early adulthood, youths develop increasing “temperance” (impulse control and suppression of aggressive behavior), “perspective” (the ability to consider the future consequences of actions and to view one’s actions from the vantage point of others), and “responsibility” (the ability to take personal responsibility for one’s behavior and to resist the coercive influence of others). Consistent with predictions derived from Gottfredson and Hirschi, youths with lower temperance, perspective, and responsibility are more in-

<sup>1</sup> Although we acknowledge that there are differences between “offending,” “delinquency,” and “criminal behavior,” some of which pertain to technical rather than behavioral differences among them (e.g., shoplifting is considered delinquency when committed by a minor but criminal behavior when it is done by an adult; carrying a firearm is an offense during adolescence but not necessarily during adulthood), we use the term *antisocial behavior* to refer to all types of offending, in keeping with the tradition within the field of developmental psychology.

clined to engage in antisocial behavior (Cauffman & Steinberg, 2000).

Gottfredson and Hirschi (1990) argued that self-control is determined early in life and is stable across development. But stability (which refers to individuals' relative standing on a given characteristic) and change (which refers to individuals' absolute levels of that characteristic) are not the same thing. Height, for example, is a trait that is characterized by high stability but significant change over time. Perhaps because of their interest in the stability of individual differences in self-control (rather than in changes in self-control over time), Gottfredson and Hirschi, although they acknowledged that antisocial behavior declines after adolescence, did not provide an especially satisfying account of why individuals desist from antisocial behavior during the transition into adulthood. They suggested only that because desistance from antisocial activity "*cannot be explained by change in the person* [italics added] or by his exposure to anti-criminal institutions, we are left with the conclusion that it is due to the inexorable aging of the organism" (1990, p. 141). It is not clear, though, within the general theory of crime, exactly what it is about this "inexorable aging" that contributes to desistance. We believe that clues can be found in recent research on psychosocial development in late adolescence and early adulthood that indicate that significant improvements in future orientation, planning, and impulse control take place during this period of development (Steinberg et al., 2008, 2009).

In this article, we argue that desistance from antisocial behavior among adolescence-limited offenders is in fact due to increases in psychosocial maturity and that the reason life-course-persistent offenders continue to engage in antisocial behavior as adults is that they do not experience the normative increases in psychosocial maturity that typically take place as individuals mature into adulthood. This view, which integrates notions borrowed from Moffitt (i.e., that desistance from antisocial behavior during late adolescence is normative), Gottfredson and Hirschi (i.e., that the root cause of antisocial behavior is deficient self-control), and Steinberg and Cauffman (i.e., that the development of psychosocial maturity accounts for reductions in problem behavior), is consistent with recent developmental research that has elucidated the neurobiological underpinnings of changes in behavior commonly seen in adolescence, in particular, the normative maturation in late adolescence and early adulthood of brain systems responsible for self-regulation (Steinberg, 2008).

It is important to note, as Moffitt (1993) suggested, that "on the basis of . . . commonly used indexes of adolescent delinquency," life-course-persistent and adolescence-limited offenders are "indistinguishable" and that during adolescence there is "no effective means for discriminating between the serious career offenders and nonserious offenders" simply on the basis of their behavior (p. 678). If our speculation is correct, however, adolescence-limited and life-course-persistent offenders should show very different patterns of psychosocial development during adolescence. That is, although the two groups should be indistinguishable in adolescence with respect to their antisocial behavior, persistent offenders would be expected to evince relatively lower levels of psychosocial maturity consistently over time, whereas adolescence-limited offenders would be expected to become increasingly mature as they age. This is not to say that persistent offenders will show no increase in maturity as they move into adulthood but, rather, that

youths who desist from antisocial behavior should show more rapid increases in psychosocial maturity during this transition than shown by peers who continue their illegal activity.

The present study examined the relation between trajectories of antisocial behavior and the development of psychosocial maturity in a sample of serious juvenile offenders (i.e., adolescents who have been adjudicated of a serious crime). One challenge inherent in the study of adolescence-limited versus life-course-persistent offenders is that chronic offending is relatively rare, as only about 5% of adolescents persist in antisocial behavior into adulthood. Because there is some evidence that individuals who engage in more serious offenses are more likely to persist in antisocial behavior over time (Wiersma & Forehand, 1995), studying a sample of serious offenders helps increase the probability of including persistent offenders and thereby ensures sufficient power with which to compare this group with their adolescence-limited counterparts. Although it is by no means a normative sample, a group of serious juvenile offenders constitutes an ideal one in which to compare adolescents who desist from antisocial behavior with those who continue their antisocial behavior into adulthood.

In the present study, we employed group-based trajectory modeling to identify distinct patterns of antisocial behavior by age within a sample of juvenile offenders who were followed for 4 years, from ages 14 to 18 until ages 18 to 22. Because we began with a sample of individuals who were known to be antisocial, by definition we had no genuine "abstainers" in our sample and therefore had eliminated one group that is commonly found in studies of antisocial behavior (i.e., youths in our study were either persistent offenders or adolescence-limited offenders). Although Moffitt's theory also differentiates between individuals who exhibit antisocial behavior before adolescence (and who are more likely to be antisocial across the life span) and individuals who are not antisocial until adolescence (and who are more likely to be adolescence-limited offenders), differences in age of onset of antisocial behavior are not the focus of the present analysis.

After identifying trajectories of antisocial behavior from adolescence into adulthood, we examined the development of psychosocial maturity in the various trajectory groups. The central hypothesis in the present study was that different trajectories of antisocial behavior would be distinguished by different levels of, and patterns of change in, psychosocial maturity. Generally speaking, we expected that individuals who exhibited higher levels of psychosocial maturity would demonstrate lower levels of antisocial behavior. We predicted that adolescents whose antisocial behavior significantly diminished as they transitioned to adulthood would be more likely than peers whose antisocial behavior did not decline to show relative gains in psychosocial maturity and, moreover, that the degree of decline in antisocial behavior over time would be correlated with the degree of gain in psychosocial maturity. In contrast, we hypothesized that youths whose antisocial behavior did not decline into adulthood would show little or no growth in psychosocial maturity over time.

## Method

### *Participants*

Participants were male adolescents enrolled in the Pathways to Desistance study (see Mulvey et al., 2004), a prospective study of

serious juvenile offenders in Phoenix ( $n = 565$ ) and Philadelphia ( $n = 605$ ; see Schubert et al., 2004, for complete details of study methodology; the sample did not include a sufficient number of young women with which to conduct the analyses used in the present report). Adolescents were eligible for study participation if they were between the ages of 14 and 17 and had been charged with a felony or similarly serious nonfelony offense (e.g., misdemeanor weapons offense, misdemeanor sexual assault). Because a large proportion of offenses committed by adolescents are drug offenses, the proportion of enrolled males whose enrollment offense was a drug offense was capped at 15% of the sample at each of the sites. Thus, only 15% of the sample at each site could be enrolled on the basis of a drug offense. All youths whose cases were being considered for trial in the adult system and had been arraigned were eligible for enrollment. Of eligible youths, 67% of those whom we located and invited to participate in the research agreed to enroll in the study ( $N = 1,170$ ).

Compared with youths who declined to participate, enrolled participants had more prior arrests leading to formal charges (2.1 vs. 1.5 for nonparticipants), were somewhat younger at first arrest (13.9 years vs. 14.2 years for nonparticipants), were somewhat younger at adjudication (15.9 years vs. 16.1 years for nonparticipants), and were somewhat more likely to be non-Hispanic Caucasian (25% vs. 20% for nonparticipants). Although statistically significant, these differences are modest in magnitude.

The baseline interview was conducted an average of 36.9 days ( $SD = 20.6$ ) after participants' adjudication (for those in the juvenile system) or, if participants were eligible for prosecution as an adult, their decertification (i.e., waiver) hearing in Philadelphia or their adult arraignment in Phoenix. The present analyses are limited to the 1,105 males in the sample who completed at least half of the interviews administered during the 5-year period covered by the present analyses (see below). At the time of the baseline interview, this group of participants was, on average, 16.5 years of age ( $SD = 1.11$ ) and predominantly of lower socioeconomic status. Less than 4.5% of the participants' parents held a 4-year college degree, and 40% of participants' parents had less than a high-school education. The ethnic backgrounds of participants were as follows: 41% African American, 35% Hispanic American, 20% non-Hispanic Caucasian, and 4% other.

### Procedures

The juvenile court in each locale provided the names of eligible adolescents (based on age and adjudicated offense). Interviewers then attempted to contact each eligible juvenile and his parent or guardian to ascertain the juvenile's interest in participation and to obtain parental consent. Once the appropriate consents had been obtained, interviews were conducted in a facility (if the juvenile was confined), in the juvenile's home, or at a mutually agreed-upon location in the community.

The baseline interview was administered over 2 days in two, 2-hr sessions. Interviewers and participants sat side by side facing a computer, and questions were read aloud to avoid comprehension problems caused by reading difficulties. Youths were informed that the only exceptions to confidentiality were if child abuse was suspected or if a participant expressed plans to hurt himself or someone else, described a specific plan to commit a crime in the future, disclosed that someone was in jail for a crime the partici-

pant had committed. Honest reporting was strongly encouraged, and interviews were conducted out of earshot of other individuals whenever possible. All recruitment and assessment procedures were approved by the institutional review boards of the participating universities, and adolescents were paid \$50 for their participation in the baseline interview (when allowed by facility rules).

Each of the follow-up interviews was completed in one 2-hr session, and participant compensation increased at each time point. Participants were reinterviewed every 6 months for 3 years following the baseline interview; after 36 months, participants were interviewed annually. Follow-up interviews were conducted only if completed within 6 weeks of the scheduled date. Participant payments for the follow-up interviews were increased gradually with each contact, in order to minimize attrition; retention of the sample was excellent. From baseline interview to the 48-month follow-up, 841 individuals included in the present analyses (76%) completed all 8 interviews; 162 youths (15%) completed 7 interviews; 67 youths (6%) completed 6 interviews; 32 youths (3%) completed 5 interviews; and 3 youths (>1%) completed 4 interviews. The number of youths incarcerated at a given interview time point varied (baseline = 47.1% incarcerated, 6-month follow-up = 43.9% incarcerated, 12-month follow-up = 34.6% incarcerated, 18-month follow-up = 28.9% incarcerated, 24-month follow-up = 27.7% incarcerated, 34-month follow-up = 25.5% incarcerated, 36-month follow-up = 25.8% incarcerated, and 48-month follow-up = 25.7%). To create uniform time measurement for purposes of the present analyses, we combined data from the 6- to 36-month semiannual follow-up interviews into yearlong intervals, by averaging (in the case of psychosocial variables) or by counting the variety of endorsed offenses (in the case of self-reported antisocial behavior) from the 6-month and 12-month, the 18-month and 24-month, and the 30-month and 36-month interviews, respectively. The present analyses therefore include a total of 5 time points, each 1 year apart. Individuals had to provide data at both time points to have valid data for any annual period; this requirement resulted in the loss of 14 participants from the analytic sample. Because the design of the study is an accelerated cohort design, there was a different number of participants at each age-group from 14 to 22 years (14 years,  $n = 141$ ; 15 years,  $n = 344$ ; 16 years,  $n = 658$ ; 17 years,  $n = 969$ ; 18 years,  $n = 1,034$ ; 19 years,  $n = 893$ ; 20 years,  $n = 673$ ; 21,  $n = 386$ ; 22,  $n = 84$ ).

### Measures

Of interest in the present report are measures of antisocial behavior and a measure of the amount of time the adolescent spent in the community, as opposed to in an institutional placement, during each interval (this measure was used as a covariate in the analyses, because it affects opportunity to engage in antisocial behavior). Also of interest were six elements of psychosocial maturity: impulse control, suppression of aggression, consideration of others, future orientation, personal responsibility, and resistance to peer influence (see Table 1 for means, standard deviations, and intercorrelations of key variables).

*Antisocial behavior.* Involvement in antisocial activities was measured with the Self-Report of Offending (Huizinga, Esbensen, & Weiher, 1991). Participants reported if they had been involved in any of 22 aggressive or income-generating antisocial acts (e.g., "Taken something from another person by force, using a weapon,"

Table 1  
Means, Standard Deviations, and Bivariate Correlations of Key Variables

Variable	Baseline <i>M</i> ( <i>SD</i> )	48-month <i>M</i> ( <i>SD</i> )	1	2	3	4	5	6	7
1. Antisocial behavior	4.77 (4.19)	1.28 (2.30)	—	-.28, -.38	-.32, -.39	-.14, -.30	-.09, -.22	-.08, -.22	-.02, -.11 <sup>a</sup>
2. Impulse control	2.95 (0.95)	3.25 (0.95)		—	.56, .60	.12, .19	.21, -.29	.30, .45	.16, .27
3. Suppression of aggression	2.77 (0.98)	3.05 (0.92)			—	.17, .22	.11, .20	.26, .38	.08, .16
4. Consideration of others	3.45 (0.89)	3.71 (0.81)				—	.39, .40	.07, .22	.05, .13 <sup>b</sup>
5. Future orientation	2.32 (0.55)	2.65 (0.54)					—	.16, .37	.10, .26
6. Personal responsibility	3.00 (0.47)	3.23 (0.45)						—	.31, .45
7. Resistance to peer influence	2.96 (0.58)	3.32 (0.53)							—

Note. All correlations are significant at the  $p < .05$  level unless otherwise noted.

<sup>a</sup> Resistance to peer pressure was not significantly correlated with antisocial behavior at the 5-year follow-up. <sup>b</sup> Resistance to peer pressure was not significantly correlated with consideration of others at the baseline interview, 1-year follow-up, 2-year follow-up, and 5-year follow-up.

“Carrying a weapon,” “Stolen a car or motorcycle to keep or sell,” “Used checks or credit cards illegally”). At the baseline and 48-month interviews, these 22 questions were asked with the qualifying phrase “In the past 12 months, have you . . .” At the 6-through 36-month follow-up interviews, these questions were asked with the qualifying phrase, “In the past 6 months, have you . . .”

Responses were summed across semiannual time points to create annual variety score measures of antisocial activity. For example, the number of offenses endorsed across time was counted, but the same offenses (e.g., “Carrying a weapon”) could count only once in a given yearlong recall period if an individual endorsed the item at two subsequent 6-month intervals. Thus, we created a count of the total number of different antisocial acts that an individual endorsed across a yearlong interval.

Variety scores, a count of the number of different types of antisocial acts that an individual endorsed, were calculated for each annual interval. Variety scores are widely used in criminological research because they are highly correlated with measures of seriousness of antisocial behavior yet are less subject to recall bias than are self-reports of the frequency of antisocial behavior, which yield unreliable estimates for higher frequency behaviors, such as drug-selling. Hindelang, Hirschi, and Weis (1981) have argued that variety scores and frequency scores represent the same antisocial propensity, and given the problems associated with frequency measures, variety scores represent a preferred method of measuring antisocial behavior, especially in a sample with high rates of antisocial behavior.

*Exposure time.* Because incarceration can limit opportunity to engage in antisocial acts, failure to account for this can affect the identification of trajectories of antisocial behavior (Piquero et al., 2001). Youths reported on a calendar the number of days during the recall period that they had been in a detox/drug-treatment program, psychiatric hospital, residential treatment program, or secure institutions. Accordingly, all analyses controlled for exposure time, operationalized as the proportion of time in a year an individual was in the community and not in these four secure settings. Because this information was not available at the baseline interview, all baseline values for this variable were set to 1, a method consistent with other work on antisocial behavior that utilizes exposure time as a covariate (e.g., Mulvey et al., 2008). The amounts of exposure time reported for each 6-month period were averaged to derive the exposure time covariate for each annual interval.

*Psychosocial maturity.* Steinberg and Cauffman’s (1996) model of psychosocial maturity consists of three elements—temperance, perspective, and responsibility—each of which has two components. In the present article, we examine each of these six components independently. For temperance, we examine impulse control and suppression of aggression; for perspective, we examine consideration of others and future orientation; and for responsibility, we examine personal responsibility and resistance to peer influence. Four measures, described below, were used to create these six indices: the Weinberger Adjustment Inventory (Weinberger & Schwartz, 1990), which includes subscales that assess impulse control, suppression of aggression, and consideration of others; the Future Outlook Inventory (Cauffman & Woolard, 1999), which was used to derive a measure of future orientation; the Psychosocial Maturity Inventory (Greenberger, Josselson, Knerr, & Knerr, 1974), which includes a scale that assesses personal responsibility; and the Resistance to Peer Influence measure (Steinberg & Monahan, 2007).

Three subscales of the Weinberger Adjustment Inventory were used: Impulse Control (e.g., “I say the first thing that comes into my mind without thinking enough about it”), Suppression of Aggression (e.g., “People who get me angry better watch out”), and Consideration of Others (e.g., “Doing things to help other people is more important to me than almost anything else”). The measure asks participants to assess how accurately a series of statements matched their own behavior in the previous 6 months (on a 5-point scale, from *False* to *True*). Each subscale was found to have adequate reliability (as indexed by Cronbach’s alpha) and good fit to the baseline data (as indicated by confirmatory factor analysis): Impulse Control (8 items;  $\alpha = .76$ , normed fit index [NFI] = .95, comparative fit index [CFI] = .95, root-mean-square error of approximation [RMSEA] = .07); Suppression of Aggression (7 items;  $\alpha = .78$ , NFI = .96, CFI = .97, RMSEA = .06); Consideration of Others (7 items;  $\alpha = .73$ , NFI = .98, CFI = .99, RMSEA = .04).

The Future Outlook Inventory is a 15-item measure that includes items from the Life Orientation Task (Scheier & Carver, 1985), the Zimbardo Time Perspective Scale (Zimbardo, 1990), and the Consideration of Future Consequences Scale (Strathman, Gleicher, Boninger, & Edwards, 1994). The inventory asks participants to rank the degree to which each statement reflects how they usually act, on a scale of 1 (*Never True*) to 4 (*Always True*). A future orientation score is calculated based on the mean of eight items from the scale (e.g., equivalent to “I will keep working at

difficult, boring tasks if I know they will help me get ahead later”). The scale showed good reliability and an excellent fit to the baseline data ( $\alpha = .68$ ,  $NFI = .96$ ,  $CFI = .97$ ,  $RMSEA = .03$ ).

The Psychosocial Maturity Inventory (Greenberger et al., 1974) includes a 30-item, reverse-scored subscale that assesses personal responsibility (e.g., “If something more interesting comes along, I will usually stop any work I’m doing”). Individuals respond on a 4-point scale, from *Strongly Disagree* to *Strongly Agree*. An overall personal responsibility score is calculated as the mean across all 30 items. The measure showed excellent reliability and an adequate fit to the baseline data ( $\alpha = .89$ ;  $NFI = .82$ ,  $CFI = .87$ ,  $RMSEA = .04$ ).

Finally, the measure of Resistance to Peer Influence (Steinberg & Monahan, 2007) assesses the degree to which adolescents act autonomously in interactions with their peer group. Participants are presented with two conflicting statements (e.g., “Some people go along with their friends just to keep their friends happy” and “Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy”) and then are asked to choose the characterization that most closely reflects their behavior. Next, participants are asked to rate the degree to which the statement is accurate (i.e., “sort of true” or “really true”). Each item is scored on a four-point scale, ranging from 1 (*Really True*) for the characterization indicating less resistance to influence to 4 (*Really True*) for the characterization indicating more resistance to influence; answers of “Sort of True” are assigned a score of 2 (if associated with the less resistant option) or 3 (if associated with the more resistant option). Ten such items are presented to participants. Each item explores a different dimension of peer influence (e.g., going along with friends, saying things one doesn’t really believe), and one resistance to peer influence score is computed for this measure by averaging scores on the 10 items. The measure showed excellent reliability and adequate fit to the baseline data ( $\alpha = .73$ ,  $NFI = .92$ ;  $CFI = .94$ ;  $RMSEA = .04$ ).

### Plan of Analyses

Analyses were conducted in two steps. First, mixture modeling was used to identify trajectories of antisocial behavior by age. Group-based trajectory modeling is an exploratory, data-driven analytic technique that derives patterns of antisocial behavior based on clustering, not a priori ideas. Second, patterns of change (e.g., growth curves) in the six components of psychosocial maturity were compared among individuals who followed different trajectories of antisocial behavior identified in the mixture models. In particular, average levels of psychosocial maturity and changes in psychosocial maturity among adolescents who persisted in antisocial behavior were compared with data for those who desisted from antisocial behavior during adolescence. Thus, in the Results section, we identify patterns of antisocial behavior within our data and subsequently explore how psychosocial maturity varies as a function of trajectory group membership.

## Results

### Trajectories of Antisocial Behavior

We used group-based trajectory modeling (Nagin, 2005; Nagin & Land, 1993) to identify subgroups of individuals who followed

similar patterns of antisocial behavior across age. Because analyses were based on count data (number of different antisocial acts endorsed), we used zero-inflated Poisson modeling to account for the clustering at zero (Lambert, 1992). We estimated the probability that each individual belonged to a given group on the basis of the data and simultaneously derived maximum-likelihood parameter estimates associated with membership in each of the defined trajectories (i.e., posterior probabilities of group membership). On the basis of posterior probabilities, individuals were assigned to their most likely group trajectory. Antisocial behavior was examined across five measurement points, with a total age range of 14 to 22. Because we are interested in developmental changes in psychosocial maturity that covary with antisocial behavior, we conducted group-based trajectory analyses by age. However, if there were no expected developmental differences, such as the impact of antisocial sanctions on antisocial behavior, one could also model the data by time (e.g., not grouping people on the basis of age; Mulvey et al., 2008).

Data were tested for different numbers of latent classes, and the fit of different models was compared with the Bayesian information criterion (BIC; Jones, Nagin, & Roeder, 2001). Mixtures of up to seven latent classes were considered. The best trajectory solution was determined by three criteria: the lowest BIC value across models, a conceptually clear model, and a model in which each group included at least 5% of the sample. We decided on the number of classes and then determined the form of the polynomial (e.g., linear, quadratic) used to capture the shape of each trajectory. The highest significant polynomial trend was included in analyses.

Although the BIC values indicated that a six-group solution best fit the data, a five-group solution was selected because the six-group solution did not add substantially to the understanding of different group patterns (see Table 2). Furthermore, the additional subgroup in the six-group solution was distinct neither in shape nor in level of antisocial behavior when compared with the groups identified in the five-group solution, and one trajectory group in the six-group solution consisted of less than 5% of the sample. Thus, the five-group solution was selected because it had a low BIC value, a conceptually clear model, and an adequate percentage of the sample in each trajectory group.

Figure 1 shows the final five-group antisocial behavior trajectory solution. Group 1 (the low antisocial behavior trajectory) consisted of 37.3% of the sample. Individuals in this trajectory were involved in very little antisocial behavior over the course of 5 years. Individuals in Group 2 (the moderate antisocial behavior trajectory; 18.7% of the sample) engaged in a slightly higher rate

Table 2  
Bayesian Information Criterion (BIC) and  $2\log_e(B_{10})^a$  of the Models Considered

No. groups	BIC	Null model	$2\log_e(B_{10})$
1	-5,124.44		
2	-5,145.47	1	42.06
3	-6,238.54	2	2,186.14
4	-4,794.47	3	2,888.14
5	-4,766.23	4	56.48
6	-4,759.78	5	12.90
7	-4,765.34	6	11.12

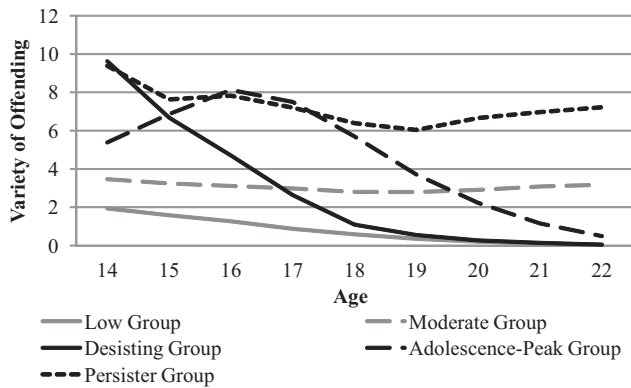


Figure 1. Trajectories of antisocial behavior.

of antisocial behavior than did those in the low antisocial behavior trajectory and were consistent in antisocial behavior across time. Those in Group 3 (the mid-adolescence-peak trajectory; 14.6% of the sample) displayed increased antisocial behavior through adolescence, peaking around age 16, and lessened antisocial behavior thereafter. Group 4 (the steadily desisting trajectory; 23.7% of the sample) consisted of youths who were involved in high levels of antisocial behavior at younger ages but rapidly decreased their involvement in antisocial behavior over time. Finally, members of Group 5 (the persisting trajectory; 5.7% of the sample) consistently engaged in high levels of antisocial behavior from adolescence into young adulthood.

Posterior probabilities, which estimated the likelihood of an individual's being a member in each of the five groups, were calculated. In general, posterior probabilities are an index of how well individuals are matched to their assigned group. Ideally, each individual should have a very high probability of belonging to the group to which he is assigned and a very low probability of belonging to other groups. To assess how well individuals have been matched to their respective groups, one averages posterior probabilities across all individuals within each group. Posterior probabilities above .70 indicate that individuals are well matched to groups and that an adequate group solution has been achieved (Nagin, 2005). In the present analyses, posterior probabilities indicated that, on average, individuals were well matched to the groups to which they were assigned (average posterior probabilities were as follows: low antisocial behavior group = 80%, moderate antisocial behavior group = 79%, mid-adolescence-peak group = 75%, steadily desisting group = 73%, persisters = 85%).

*Patterns of Psychosocial Maturity Over Time as a Function of Trajectory Group Membership*

Because we were interested in comparing patterns of developmental change in various aspects of psychosocial maturity across trajectory groups, rather than examining overall change in maturity within the entire sample, we conducted separate growth models examining impulse control, suppression of aggression, consideration of others, future orientation, personal responsibility, and resistance to peer influence as a function of age. Growth curve modeling is well suited to the present analyses, because it allows a test of differences between groups in both level and change in

each element of psychosocial maturity. Moreover, unlike other data analytic techniques (such as dual trajectory analysis), growth curve modeling permitted us to identify patterns in the development of psychosocial maturity that are associated with a given trajectory group, rather than examine of psychosocial maturity within the whole sample. Individuals were classified into age-groups based on their age at enrollment into the study (e.g., 14, 15, 16, 17). For purposes of analysis, age was centered at 18 years, which was approximately the average age across all of the time points as well as a transitional point from adolescence into adulthood.

First, we conducted unconditional growth models to examine the average pattern of each component of psychosocial maturity over time. Unconditional models determine the average pattern of change over time and whether there is significant variability within the sample in level of psychosocial maturity (intercept) and change in psychosocial maturity with age (slope). If sufficient variability exists in either intercept or slope, antisocial behavior trajectory membership is used to predict this variance.

After we had determined the general pattern of development in unconditional models, if sufficient variability was found in intercept or slope, we estimated conditional models in which trajectory group membership was used to predict differences in the intercept and/or slope of the component of psychosocial maturity. For all intercept and slope terms for which antisocial behavior group trajectory membership predicted heterogeneity around the parameters, we conducted planned contrasts to compare persistently antisocial individuals with those in each of the other trajectory groups. Because it is possible that growth in one domain of psychosocial maturity was highly correlated with growth in other domains of psychosocial maturity, when we examined change in one component of psychosocial maturity (e.g., impulse control), we controlled for simultaneous change in the five other domains of psychosocial maturity (i.e., suppression of aggression, consideration of others, future orientation, personal responsibility, and resistance to peer influence). Thus, we always examined growth in one domain of psychosocial maturity independently of growth in other domains.

*Impulse control.* Results indicated linear growth in impulse control with age (see Table 3); both the intercept and slope terms were significant, and there was significant heterogeneity around both. Accordingly, conditional models were estimated that allowed both intercept and slope terms to vary; antisocial behavior trajectory membership was used to predict this variance.

Controlling for concurrent change in other domains of psychosocial maturity, we tested whether antisocial behavior trajectory membership predicted differences in the intercept and slope of impulse control (see Table 4). As hypothesized, antisocial behavior group trajectory membership predicted differences in both (see Figure 2). Planned contrasts were used to examine specific differences in the intercept and slope of impulse control as a function of antisocial behavior trajectory group membership. Contrasts indicated that individuals in the low antisocial, moderate antisocial, steadily desisting, and mid-adolescence-peak groups reported greater impulse control than did youths in the persisting trajectory group (the contrast between the adolescence-peak group and persistent offenders reached borderline significance). Although they showed differences in average levels of impulse control, youths in the low antisocial, moderate antisocial, and steady desister groups

Table 3  
Unconditional Growth Models of Impulse Control, Suppression of Aggression, and Consideration of Others

Effect	Model 1		Model 2		Model 3	
	Impulse control		Suppression of aggression		Consideration of others	
	B	SE	B	SE	B	SE
Fixed effects						
Intercept	3.08**	0.02	2.84**	0.02	3.51**	0.02
Linear slope	0.03**	<0.01	0.03**	<0.01	0.04**	<0.01
Random effects						
Intercept	0.49**	0.02	0.48**	0.02	0.33**	0.02
Linear slope	0.01**	<0.01	0.01**	<0.01	0.01**	<0.01
Level 1 error	0.37**	0.01	0.39**	0.01	0.35**	0.01
Model fit						
-2 log likelihood	18,834.0		19,116.4		17,896.7	
AIC	18,846.0		19,128.4		17,908.7	
BIC	18,876.0		19,158.4		17,938.7	

Note. AIC = Akaike's information criterion; BIC = Bayesian information criterion.  
\*\*  $p < .01$ .

did not differ from the persisters in the pattern of change in impulse control with age. However, persisters and individuals in the mid-adolescence-peak antisocial behavior trajectory showed opposite patterns of change with age; those whose antisocial behavior peaked in mid-adolescence and then declined showed increases in impulse control across adolescence and young adulthood, whereas persisters showed declines. Thus, individuals in the persistent antisocial behavior group showed diminished self-control at age 18 and declines in self-control over time.

*Suppression of aggression.* Growth in suppression of aggression from adolescence to early adulthood was examined with a similar strategy. Analyses indicated linear growth in suppression of aggression with age; both the intercept and slope terms of the unconditional model were significant and indicated significant individual variability in both coefficients (see Table 3).

The conditional model revealed that trajectory group membership predicted differences both in the intercept and the slope of suppression of aggression (see Table 4 and Figure 3). Planned

Table 4  
Conditional Growth of Impulse Control, Suppression of Aggression, and Consideration of Others on Offending Trajectory Group

Effect	Model 1		Model 2		Model 3	
	Impulse control		Suppression of aggression		Consideration of others	
	B	SE	B	SE	B	SE
Fixed effects						
Intercept	0.59**	0.09	0.54**	0.09	2.15**	0.09
Trajectory group	$F(4, 6198) = 12.87^{**}$		$F(4, 6198) = 16.87^{**}$		$F(4, 6198) = 15.96^{**}$	
Impulse control	—	—	0.48**	0.01	>0.01	0.01
Aggression suppression	0.46**	0.01	—	—	0.01	0.01
Consideration of others	>-0.01	0.01	0.01	0.01	—	—
Future orientation	0.07**	0.02	0.01	0.02	0.36**	0.02
PSMI	0.21**	0.02	0.19**	0.02	0.08**	0.02
RPI	0.07**	0.01	0.01	0.02	0.02	0.02
Linear slope (age)	0.03	0.01	0.02**	0.01	0.03**	0.01
Trajectory group	$F(4, 6198) = 4.08^{**}$		$F(4, 6198) = 3.69^{**}$		$F(4, 6198) = 4.29^{**}$	
Random effects						
Intercept	0.25**	0.01	0.26**	0.01	0.23**	0.01
Linear slope	>0.002**	>0.01	0.004**	>0.01	0.004**	>0.01
Level 1 error	0.29**	0.01	0.30**	0.01	0.34**	0.01
Model fit						
-2 log likelihood	16,077.8		16,418.5		17,174.9	
AIC	16,115.8		16,456.5		17,212.9	
BIC	16,210.9		16,551.6		17,308.0	

Note. Dashes indicate that term was not estimated. PSMI = Psychosocial Maturity Index; RPI = Resistance to Peer Influence; AIC = Akaike's information criterion; BIC = Bayesian information criterion.  
\*\*  $p < .01$ .



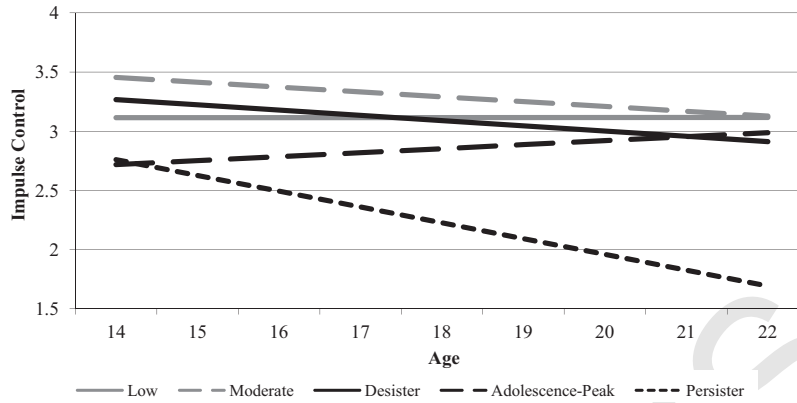


Figure 2. Growth in Impulse Control × Antisocial Behavior Trajectory Group Membership.

contrasts indicated that low antisocial and steady desister individuals showed greater suppression of aggression than did persistent offenders. Examination of patterns of change in suppression of aggression over time indicated that individuals in the steadily desisting and mid-adolescence-peak trajectory groups showed more rapid increases in suppression of aggression with age than did persisters, who, as with impulse control, declined in suppression of aggression from adolescence to adulthood. There were no differences between persisters and either the low or the moderate antisocial behavior group in patterns of change in suppression of aggression with age. Again, youths who did not desist in antisocial behavior across the transition to adulthood showed diminished suppression of aggression both at age 18 and over time.

*Consideration of others.* Unconditional models showed that consideration of others showed linear growth from adolescence to adulthood, with intercept and slope significant, as well as significant heterogeneity around these parameters (see Table 3). Consequently, both terms were allowed to vary, and we used antisocial behavior trajectory group membership to predict this variability in the intercept and slope of consideration of others while controlling for change in other aspects of maturity.

Antisocial behavior trajectory group membership significantly predicted differences in average level of consideration of others as

well as in the pattern of change in this aspect of maturity with age (see Table 4 and Figure 4). Planned contrasts examining differences among trajectory groups indicated that, compared with individuals in the persistent antisocial behavior trajectory, individuals in every other trajectory group (low antisocial, moderate antisocial, steadily desisting, and mid-adolescence-peak) showed greater consideration of others (the difference between individuals in the mid-adolescence-peak and persistent groups reached borderline significance). Surprisingly, however, individuals in the persistent antisocial behavior trajectory increased more rapidly with age in their consideration of others than did individuals in either the low or the moderate antisocial behavior trajectory groups. (The lower average level of consideration of others shown by persisters is attributable to their substantially lower scores on this variable at younger ages; as Figure 4 indicates, by early adulthood they have caught up with the other groups.) There were no differences between individuals in the persistent antisocial behavior group and either the steadily desisting or the mid-adolescence-peak group in patterns of change in consideration of others with age. Thus, although there were differences among groups at age 18, with persistently antisocial youths showing diminished consideration of others at age 18, persisters increased

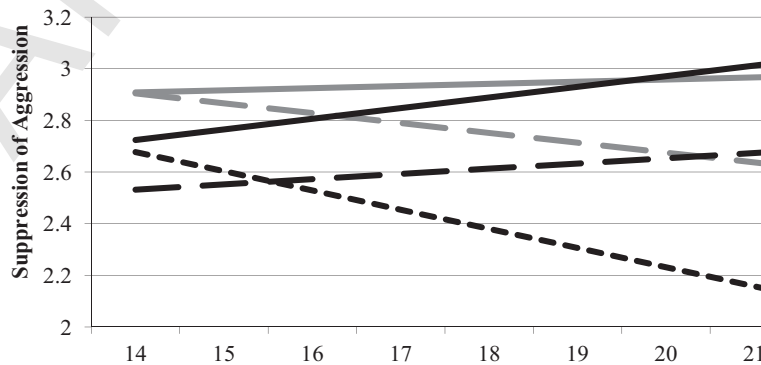


Figure 3. Growth in Suppression of Aggression × Antisocial Behavior Trajectory Group Membership.

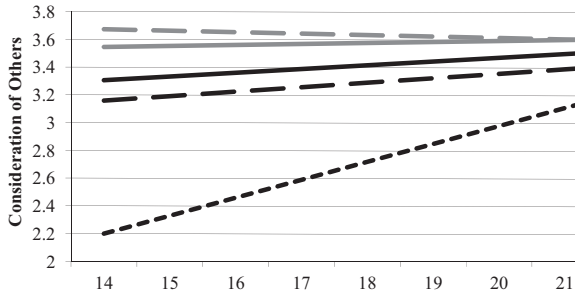


Figure 4. Growth in Consideration of Others × Antisocial Behavior Trajectory Group Membership.

more rapidly in their consideration of others and reached the level of consideration reported by others by age 22.

*Future orientation.* Across the sample, there was a significant linear increase in future orientation during adolescence but a deceleration in growth as youths transitioned into adulthood (as indexed by a significant quadratic trend; see Table 5). Significant heterogeneity was found around the intercept and slope terms but not around the quadratic term (i.e., all individuals decelerated at the same rate). Consequently, conditional models predicted differences in intercept and linear slope of future orientation but not in quadratic growth.

Antisocial behavior trajectory group membership predicted differences in individuals' average level of future orientation but not in changes in future orientation with age (see Table 6 and Figure 5). Planned contrasts indicated that low antisocial, moderate antisocial, and steadily desisting adolescents evinced significantly greater future orientation than did persistently antisocial individuals; there were no differences in future orientation between individuals in the mid-adolescence-peak and persistent antisocial behavior trajectories. Thus, individuals in the mid-adolescence-peak and persister groups showed the lowest future orientation at age

18, and there is no evidence that they caught up, or further declined, in future orientation over time.

*Personal responsibility.* Unconditional growth models indicated significant linear growth in personal responsibility during adolescence but a significant deceleration in growth as individuals transitioned into adulthood; this pattern was similar to that seen for future orientation (see Table 5). There was significant individual variability around the intercept and linear slope parameters but not around the quadratic parameter, and this indicated that all individuals slowed in their development of personal responsibility at the same rate. In subsequent models, therefore, the intercept and linear slope were allowed to vary.

Average level of personal responsibility did not vary as a function of trajectory group, but there were significant differences between groups in patterns of change with age (see Table 6 and Figure 6). Planned contrasts indicated that individuals in the low antisocial, moderate antisocial, and steadily desisting groups did not differ from persistently antisocial youths in the pattern of growth in personal responsibility with age. However, and unexpectedly, compared with persisters, adolescence-peak individuals reported slower linear growth in personal responsibility over time.

*Resistance to peer influence.* In general, resistance to peer influence showed a pattern similar to that seen in personal responsibility: a linear increase across adolescence, with growth slowing as youths transitioned into adulthood (see Table 5). Although there was significant heterogeneity in the intercept and linear slope of resistance to peer influence, there was no variability in the quadratic term (e.g., all individuals slowed growth at the same rate). Consequently, subsequent models tested if antisocial behavior group membership predicted differences in intercept or slope, controlling for concurrent development in other domains of psychosocial maturity.

Conditional models revealed that this variability in the intercept and slope of resistance to peer influence was unrelated to trajectory group membership (see Table 6). That is, once other aspects of psychosocial maturity were taken into account, the trajectory

Table 5  
Unconditional Growth Models of Future Orientation, Personal Responsibility, and Resistance to Peer Influence

Effect	Model 4		Model 5		Model 6	
	Future orientation		Personal responsibility		Resistance to peer influence	
	B	SE	B	SE	B	SE
Fixed effects						
Intercept	2.50**	0.01	3.09**	0.01	3.09**	0.01
Linear slope	0.06**	>0.01	0.03**	>0.01	0.06**	>0.01
Quadratic slope	-0.01**	>0.01	-0.01**	>0.01	-0.01**	>0.01
Random effects						
Intercept	0.14**	0.01	0.11**	0.01	0.15**	>0.01
Linear slope	0.003**	>0.01	0.002**	>0.01	0.002**	>0.01
Level 1 error	0.16**	>0.01	0.11**	>0.01	0.16**	>0.01
Model fit						
-2 log likelihood		11,278.3		7,894.3		11,199.9
AIC		11,292.3		7,908.3		11,213.9
BIC		11,327.4		7,943.4		11,248.9

Note. AIC = Akaike's information criterion; BIC = Bayesian information criterion.  
\*\*  $p < .01$ .

Table 6  
Conditional Growth of Future Orientation, Personal Responsibility, and Resistance to Peer Influence on Offending Trajectory Group

Effect	Model 4		Model 5		Model 6	
	Future orientation		Personal responsibility		Resistance to peer influence	
	B	SE	B	SE	B	SE
<b>Fixed effects</b>						
Intercept	1.07**	0.06	1.96	0.04	2.15	0.06
Linear slope	0.05**	0.01	0.001	0.01	0.04	0.01
Quadratic slope	-0.005	>0.01	-0.001	>0.01	-0.001	>0.01
Trajectory group	$F(4, 6197) = 2.94^*$		$F(4, 6197) = 0.35$		$F(4, 6197) = 0.26$	
Impulse control	0.04**	0.01	0.07**	0.01	0.04**	0.01
Aggression suppression	>0.01	0.01	0.06**	0.01	0.01	0.01
Consideration of others	0.17**	0.01	0.02**	0.01	0.01	0.01
Future orientation	—	—	0.09**	0.01	0.07**	0.01
PSMI	0.14**	0.01	—	—	0.20**	0.01
RPI	0.07**	0.01	0.13**	0.01	—	—
<b>Linear slope</b>						
Trajectory group	$F(4, 6197) = 0.52$		$F(4, 6197) = 3.52^{**}$		$F(4, 6197) = 0.42$	
Quadratic slope	-0.005	>0.01	-0.001	>0.01	-0.001	>0.01
<b>Random effects</b>						
Intercept	0.09**	0.01	0.07**	>0.01	0.12**	0.01
Linear slope	0.001**	>0.01	0.001**	>0.01	0.001**	>0.01
Level 1 error	0.15**	>0.01	0.10**	>0.01	0.16**	>0.01
<b>Model fit</b>						
-2 log likelihood	10,395.9		6,917.6		10,795.3	
AIC	10,435.9		6,957.6		10,835.3	
BIC	10,536.0		7,057.8		10,935.4	

Note. Dashes indicate that term was not estimated. PSMI = Psychosocial Maturity Index; RPI = Resistance to Peer Influence; AIC = Akaike's information criterion; BIC = Bayesian information criterion.

\*\*  $p < .01$ .

groups demonstrated comparable levels of resistance to peer influence and comparable patterns of change in resistance to peer influence with age.

### Discussion

Little research has examined the extent to which normative advances in psychosocial maturity contribute to the decline in antisocial behavior that typically occurs as youths exit adolescence and enter young adulthood. We found that gains in two aspects of

temperance—impulse control and suppression of aggression—are linked to desistance from antisocial behavior during the transition from adolescence to adulthood and that youths lowest in temperance (the persistently antisocial individuals) remain the lowest in these traits over time. Additionally, and consistent with Steinberg and Cauffman's (1996) formulation, we found that, compared with their persistently antisocial counterparts, youths who declined in antisocial behavior showed increases in psychosocial maturity. Notably, however, youths who persisted in antisocial behavior did

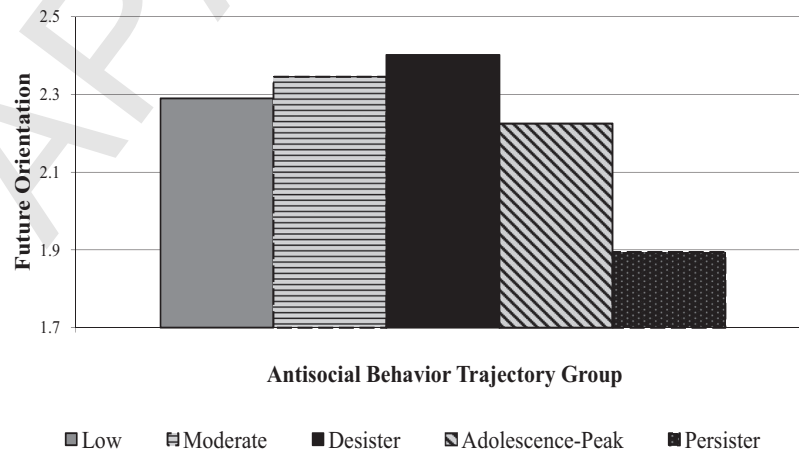


Figure 5. Future Orientation at Age 18 × Antisocial Behavior Trajectory Group Membership.

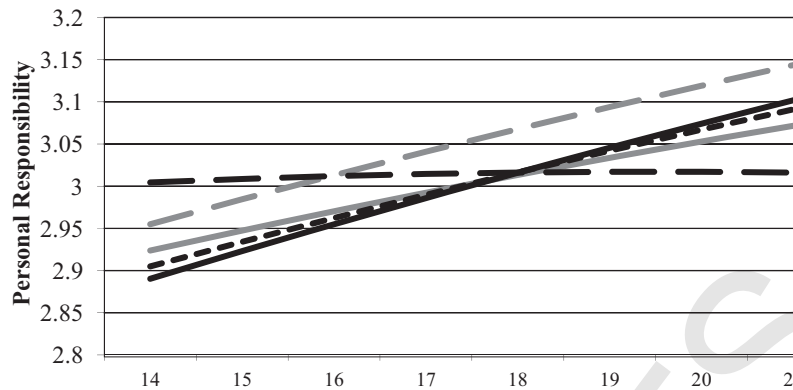


Figure 6. Growth in Personal Responsibility at Age 18  $\times$  Antisocial Behavior Trajectory Group Membership.

not show universal deficits in psychosocial maturity and were in some ways indistinguishable from desisting youths. This suggests that, at least for purposes of understanding the underlying psychological contributors of antisocial behavior, it is valuable to distinguish among different aspects of psychosocial development. Moreover, our findings indicate that only some elements of Gottfredson and Hirschi's (1990) conceptualization of poor self-control are consistently related to higher levels of antisocial behavior as youths transition from adolescence into adulthood.

Five trajectories of deviant behavior were identified in this sample of serious juvenile offenders: (a) individuals who consistently report antisocial behavior at low levels; (b) youths who consistently report antisocial behavior but at moderate levels; (c) individuals who engage in high levels of antisocial behavior in early adolescence but who rapidly decline in antisocial behavior after that; (d) youths whose antisocial behavior peaks during mid-adolescence but declines thereafter; and (e) individuals who engage in antisocial behavior at high levels in adolescence and persist in their antisocial behavior into adulthood. In general, the patterns of antisocial behavior over time identified in the present study are consistent with theory (Moffitt, 1993, 2006) as well as other empirical work (Piquero, 2007) on trajectories of antisocial behavior in adolescence. This consistency is important for two reasons. First, results of this study bolster support for taxonomic theories of antisocial behavior, in that patterns of antisocial behavior found in community or birth-cohort samples are also found among serious offenders. Second, our findings indicate that only a small percentage of delinquent youths (less than 6%, in the present study) engage in chronic, high levels of antisocial behavior over time. That is, even among juvenile offenders, who typically generate the greatest concern among policymakers, practitioners, and the public, the vast majority are not likely to persist in high levels of antisocial behavior into adulthood. Most important, with the exception of the small percentage of youths who are persistently antisocial, the juvenile offenders studied here show continued development in psychosocial maturity as they move through adolescence. In fact, even persistently antisocial individuals show normative development in some elements of psychosocial maturity.

Our ability to unpack psychosocial maturity into its constituent components and assess their independent relations to antisocial

behavior allows us to extend the literature on factors that contribute to desistance from antisocial behavior. Consistent with other studies and with the general theory of crime, increases in temperance, both with respect to impulse control and to suppression of aggression, are correlated with declines in antisocial behavior over time (Cauffman & Steinberg, 2000; Perrone, Sullivan, Pratt, & Margaryan, 2004; Pratt & Cullen, 2000; Pratt, Turner, & Piquero, 2004). In particular, youths who desist from antisocial behavior show either stable or increasing impulse control and suppression of aggression over time, whereas youths who persist in antisocial behavior actually become less temperate as they age. This finding maps clearly onto Moffitt's assertion that youths who engage in persistent antisocial behavior show chronic deficits in normative development (Moffitt, 2006), and it pinpoints the domains of functioning in which these deficits are most marked. Consistent with our hypothesis that improvement in self-control underlies desistance from antisocial behavior, individuals whose antisocial behavior increases in early adolescence and then declines show the most marked increases in temperance over the course of adolescence. Among youths with relatively more stable patterns (low and moderate antisocial behavior trajectories) there is little change in temperance over time; these youths are more self-controlled to begin with, and they remain so as they age.

Inspection of the growth curves for other aspects of psychosocial maturity suggests a different story, however. With respect to future orientation, differences between persistently antisocial individuals and other youths are not seen in trajectories of growth but are evident in average levels of future orientation, with persistently antisocial individuals, on average, less oriented to the future than are their peers at age 18. Although this difference in average level of future orientation is consistent with the general theory of crime—recall that low orientation to the future and a strong inclination toward immediate gratification are central components of poor self-control, according to Gottfredson and Hirschi (1990)—the absence of group differences in patterns of change in future orientation over time is contrary to our developmental hypothesis. One possibility is that the differences among antisocial individuals in future orientation are maintained across time. This proposal is consistent with the general theory of crime, according to which antisocial behavior is hypothesized to be partially the product of a lack of future orientation. Characteristically low

future orientation may be a part of a larger constellation of attributes, such as weak impulse control and poor suppression of aggression, that contribute to antisocial behavior. Finally, given that there is evidence that self-report measures of future orientation often tap multiple constructs that may follow different developmental trajectories (Steinberg et al., 2009), future research should examine whether particular dimensions of future orientation (e.g., planning ahead, time perspective, anticipation of future consequences) show different patterns of development among antisocial individuals.

Somewhat surprisingly, patterns of change across other domains of psychosocial maturity do not show consistent disadvantages among persistently antisocial individuals. Indeed, the pattern of change in personal responsibility suggests one of stunted development among those whose antisocial behavior peaks in mid-adolescence and then declines, among whom growth in personal responsibility is absent; other groups, including the persistent antisocial individuals, show modest but gradual growth in this area. The pattern of increase in consideration of others is most striking where we would least expect to see it: among persistently antisocial individuals, who are lower in empathy in early adolescence but are indistinguishable from the other groups by young adulthood. And resistance to peer influence increases at a similar rate across all of the trajectory groups. What accounts for these disparities?

One possibility, consistent with recent studies of brain development in adolescence, is that the maturation of personal responsibility, resistance to peer influence, and consideration of others is subserved by a different brain system than is the maturation of impulse control, suppression of aggression, and future orientation and that maturation of these two brain systems may be differentially related to desistance from antisocial behavior. Developmental change in self-knowledge (Pfeifer, Lieberman, & Depratto, 2007) and attentiveness to social information (Nelson, Leibenluft, McClure, & Pine, 2005)—both of which would be expected to influence one's sense of self-reliance, susceptibility to peer pressure, and empathy—are linked to changes in what has been described as a "socio-emotional system," which is localized in medial areas of the prefrontal cortex and in connections between medial cortical and paralimbic areas. Improvements in the control of impulses and in planning, in contrast, are more strongly related to maturation of a "cognitive control system," which is localized in the dorsolateral prefrontal and parietal cortices (Steinberg, 2008). Thus, although personal responsibility, resistance to peer influence, and consideration of others also increase over the course of late adolescence, and although there is variability in individuals' levels and patterns of growth along these dimensions, individual differences in mean levels or patterns of growth in these aspects of maturity are not predictive of persistent antisocial behavior. This idea is consistent with Moffitt's theory (2003), in that while persistently antisocial individuals may show chronic deficits in certain aspects of functioning, such as neurological deficits, youths who persistently engage in antisocial behavior do not, necessarily, show deficits in all domains.

Finally, in light of much past research indicating that adolescents who are more responsible, resistant to peer pressure, and empathic are less likely to engage in antisocial behavior, it is puzzling to find that these factors do not reliably differentiate between persistently antisocial individuals and their desisting

counterparts. It may be the case that these factors are more important in differentiating between those adolescents who do and do not engage in antisocial activity at all than in distinguishing between antisocial individuals who do and do not desist. Unfortunately, the absence in the present study sample of individuals who have abstained from antisocial behavior makes it impossible for us to test the intriguing hypothesis that different aspects of psychosocial maturity, which are undergirded by different brain systems, predict the onset versus cessation of adolescent antisocial behavior. This is an important question for future study.

At first glance, it may appear that mid-adolescence-peak individuals—those whose antisocial behavior increases during the first part of adolescence but declines after age 16—are more similar to persistently antisocial individuals than they are to those in the low antisocial, moderate antisocial, and steadily desisting groups, at least with respect to their average scores on measures of psychosocial maturity. Examination of trajectories of self-control indicate, however, that mid-adolescence-peak individuals are likely on their way to differentiating themselves from persistently antisocial youths and to becoming more comparable in psychosocial maturity to individuals in the other adolescence-limited antisocial behavior groups identified in this study. Evidence for this is seen in the fact that adolescence-peak individuals can be distinguished from persistently antisocial youths in their pattern of change in psychosocial maturity over time, as they evince increases in temperance that the persistently antisocial individuals do not show. This fact points to the importance of comparing groups with respect to patterns of change in maturity over time and not just with respect to overall mean levels.

Our finding that increases in several aspects of psychosocial maturity are generally associated with decreases in antisocial behavior has important implications for understanding adolescence-limited offenders. Moffitt originally hypothesized that these individuals engage in antisocial acts as means of attaining adult-like status and that they desist from antisocial behavior as adult status is achieved (Moffitt, 1993, 2006); other views of the desistance process have also emphasized the movement of adolescents into adult roles (e.g., Laub & Sampson, 2001). The present study suggests that attaining adult levels of psychosocial maturity, and not just adult social status, may also lead adolescent-limited individuals to desist. We do not know whether, in our sample, gains in psychosocial maturity were in fact accompanied by attainment of adult status. Nevertheless, there is need for more research exploring mechanisms that might account for desistance among individuals whose antisocial behavior is adolescence limited. Such research would help us better understand both the psychological and the social correlates of the phenomenon.

Our conclusion that persistent and adolescence-limited antisocial individuals can best be differentiated by different patterns in the development of psychosocial maturity must be tempered by several limitations of the study. Although this study is strengthened by its focus on relatively more serious offenders, longitudinal design, ethnically diverse sample, and use of advanced statistical methodology, it is nonetheless limited in several respects. First, because of the age range studied, we are unable to examine childhood levels of antisocial behavior. This is particularly important with regard to the adolescents whose antisocial behavior was very high in early adolescence and then declined steadily. Without data on their preadolescent behavior, we cannot determine whether

these youths increased antisocial behavior as they entered adolescence and simply peaked at a different age than the mid-adolescence-peak group or, instead, began their antisocial behavior in childhood and were already on a declining trajectory by the time they were enrolled in our study. Similarly, it would be useful for researchers to examine whether patterns of psychosocial maturity differ as individuals move further into adulthood and in particular to determine if the long-term deficits in psychosocial maturity and declines in temperance seen among the persistently antisocial individuals continue as these youths age.

A second limitation in the present study is that we have relied on self-report measures. Although we are confident that self-reports of antisocial behavior are reliable and valid (in this sample, self-reported antisocial behavior is highly correlated with official arrest data; Brame, Fagan, Piquero, Schubert, & Steinberg, 2004), we have no such validation of our self-report measures of psychosocial maturity. We have no reason to expect that these reports are biased in ways that would create the particular patterns of findings observed here (in particular, the fact that different outcomes showed different patterns of change across trajectory groups), but it is certainly possible that measures that reflect the likelihood to engage in aggressive acts (e.g., suppression of aggression) may have more shared variance with measurement of antisocial behavior and that this may inflate their apparent relationship. It is also the case that, given our sample, we observed a restricted range in psychosocial maturity. If our sample had included youths who abstained from all antisocial behavior, we might have captured more variation in temperance, perspective, and responsibility. Future research should replicate the present findings using other assessments of psychosocial maturity.

It should also be noted that the group-trajectory modeling we utilized in the present study to identify patterns of antisocial behavior over time is a data-driven technique. Indeed, mixture modeling, similar to cluster analysis, is susceptible to the problem of creating arbitrary groupings that may not prove useful for classifying individuals. Thus, the trajectories identified in the present study may not necessarily be replicated in other studies. However, the trajectories identified in the present study are frequently identified in other work on longitudinal patterns of antisocial behavior (Piquero, 2007) and are consistent with developmental theory (Moffitt, 1993).

Finally, we note that these analyses were done to test a number of specific hypotheses derived from influential theories of adolescent antisocial behavior. We did not examine the entire universe of possible predictors of persistent antisocial behavior, a universe that, on the basis of previous research, would include such factors as psychopathy, substance abuse, the presence of attention-deficit/hyperactivity disorder, neuropsychological functioning, intelligence, and family, peer, and neighborhood influences. Thus, although we are confident that psychosocial maturity does in fact differentiate individuals who follow different trajectories of antisocial behavior, it is likely that other variables, not included in the present analyses, do so as well. Some of these factors may be especially important in differentiating between adolescents who do and do not engage in antisocial behavior; others may be more important in distinguishing among different groups of adolescent-limited antisocial youths, and still others may be more useful in differentiating between adolescence-limited and life-course-persistent offenders. Those conducting future studies should keep

in mind that different sets of factors may predict the onset, nature, and cessation of adolescent antisocial activity. In addition, although it was necessary to study a sample of seriously antisocial youths to test the hypotheses of the present study, we do not know whether the general pattern of findings concerning the relation between antisocial behavior and psychosocial maturity observed here would also be seen in more normative samples of adolescents. This is a question that warrants further study.

In conclusion, our analyses help integrate critical propositions derived from three different perspectives on the nature and causes of antisocial activity in adolescence. We find, as Moffitt (1993) has suggested, that individuals who are involved in comparable levels of antisocial activity as teenagers—even serious antisocial activity—are heterogeneous in their psychological functioning. More important, especially to those interested in juvenile justice policy, we find that only a small subset of seriously antisocial youths can be expected to continue their antisocial behavior into adulthood. The one psychosocial factor that best distinguishes this small subsample of serious persistently antisocial individuals from their peers is the relative lack of temperance shown by persisters and their decline in temperance during the transition to adulthood. Understanding how these differences in psychosocial maturity interact with other factors, such as contextual conditions, in influencing trajectories of antisocial behavior is an important challenge for future research.

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