Published in final edited form as:

J Adolesc. 2013 April ; 36(2): . doi:10.1016/j.adolescence.2012.12.007.

Identifying Gender-Specific Developmental Trajectories of Nonviolent and Violent Delinquency from Adolescence to Young Adulthood

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Abstract

Most research examining gender differences in developmental trajectories of antisocial behavior does not consider subtypes of antisocial behavior and is difficult to generalize due to small nonrepresentative samples. The current study investigated gender difference in developmental trajectories from adolescence to young adulthood while addressing those limitations. Analyses were limited to respondents ages 15 and 16 in wave 1 (16–17 in wave 2, and 21–22 in wave 3) of the National Longitudinal Study of Adolescent Health ($n = 6244$, 49.5% males). Self-report nonviolent and violent delinquencies were simultaneously entered into latent class analysis. Four latent classes were identified: *low*, *desister*, *decliner*, and *chronic* (male-only). In addition to finding a male-specific *chronic* class, gender differences included differences in levels of nonviolent and violent delinquency between synonymous classes of males and females, and differences in prevalence of classes across genders. Neighborhood disadvantage and family support predicted trajectories.

Keywords

nonviolent delinquency; violent delinquency; gender; latent class analysis; adolescence; young adulthood

With the onset of developmental trajectory research over the last decade our understanding of antisocial behavior across adolescence has become more complex. This research has revealed distinct developmental patterns of antisocial behavior across this developmental period (for comprehensive reviews, see Moffitt, 2006; Nagin & Tremblay, 2005a, 2005b). However, these findings are predominantly based on male samples, perhaps due to males' greater involvement in antisocial behavior (Archer & Côté, 2005). However, extant research on gender differences in antisocial behavior suggests that males and females may follow different trajectories (see Fontaine, Carbonneau, Vitaro, Barker, & Tremblay [2009] for a comprehensive review). Additional shortcomings of the current research include sample quality, measurement, and model identification methods. Our goal was to address these limitations with a study based on a large nationally representative sample with specific measures of nonviolent and violent antisocial behaviors. Before setting out specific aims, we

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first review literature on the developmental trajectories of antisocial behavior in general, and then studies specifically examining gender differences in these developmental trajectories.

Developmental Trajectories of Antisocial Behavior

While most antisocial adults demonstrate a life history of behavior problems that can be traced back to early childhood, not all antisocial children (in fact, only a relative few) continue to show antisocial behavior later in life (Maughan & Rutter, 2008). The most well-known model of antisocial behavior trajectories is Moffitt's (1993) developmental taxonomy, which provides that the general population of delinquents includes two distinct antisocial subgroups that follow different pathways and have unique etiologies: a small early-onset/life-course-persistent group (5–10%) and a larger adolescence-limited group (15–30%). Life-course-persistent individuals demonstrate early-onset symptoms of antisocial behavior, partially linked to neuropsychological characteristics (e.g., difficult temperament, neuropsychological deficits), which reciprocally interact with criminogenic environments (e.g., disruptive family, poor parenting) (Moffitt, 1993, 2006). Adolescence-limited individuals, however, manifest antisocial behavior primarily during adolescence due to temporary deviant peer influences and poor parental monitoring, but desist thereafter. These adolescence-limited individuals are also less inclined towards aggressive and violent behaviors compared to life-course-persistent individuals (Moffitt, 1993, 2006).

In addition to the life-course-persistent and adolescence-limited groups, which have been found in multiple independent empirical studies with various samples across countries (e.g., Broidy et al., 2003; DeLisi, 2001; Piquero & Brezina, 2001), other subgroups have been identified. These subgroups include a childhood-limited group, manifesting antisocial behavior mostly during childhood but desisting in adolescence (e.g., Odgers et al., 2008), as well as the never/low group, which is typically the largest, abstains from antisocial behavior, and is highly prosocial and high-functioning (e.g., Piquero, Brezina, & Turner, 2005). Additional identified groups, with labels varying to accommodate child- or adolescent-only samples, include: Chronic, which resembles the life-course-persistent group, and the low-desister/moderate-declining and high-desister/high-declining groups, which differ in severity, onset, and timing of desistence, but both resemble the adolescence-limited group (Nagin & Tremblay, 2005a, 2005b).

Gender Differences in the Developmental Trajectories of Antisocial Behavior

Despite well-documented gender differences in antisocial behavior (e.g., Archer & Côté, 2005; Moffitt et al., 2001), gender differences in the developmental trajectories of antisocial behavior haven been relatively understudied. Most research is based predominantly on males, or on mixed samples without explicit examination of gender differences. Given that males are more likely to be chronic offenders and involved in more violent behaviors than females (Moffitt et al., 2001), it is reasonable to expect that the prevalence of life-course-persistent groups would be higher among males, whereas the prevalence of the adolescence-limited group would be similar across gender groups. There is some evidence that trajectory prevalence differs by genders. For example, males seem more likely to be early-onset/life-course-persistent than females, whereas they are only slightly more likely to belong to the adolescent-limited group (Moffitt & Caspi, 2001; Moffitt et al., 2001). Conversely, the prevalence of the low trajectory appears to be higher in females than in males (Lahey et al., 2006; Odgers et al., 2008).

Among the few researchers to focus explicitly on gender, Silverthorn and Frick (1999) proposed a female-specific adolescent-delayed-onset group that shares similar risk factors

(e.g., neuropsychological deficits, dysfunctional family environment) with male early-onset/life-course-persistent groups, but does not manifest antisocial behavior until adolescence. This group was also found in a small at-risk sample (Silverthorn, Frick, & Reynolds, 2001). Using data from a large longitudinal cohort study and official records, D'Unger, Land, and McCall (2002) identified three female trajectories: Non-offenders, low-rate, and high-rate adolescent peaked, which were similar to never/low, low-desisting, and high-desisting, respectively. Two other trajectories were identified in males: low-rate chronic and high-rate chronic. Among both low-rate and high-rate adolescent groups, males reported more police contacts than did females; and the female high-rate adolescent group showed more similarity to the male low-rate chronic group than to the male high-rate adolescent group.

Previous Limitations and the Scope of the Current Study

As demonstrated in the above studies, gender differences in trajectories do exist. The goal of the current study was to add to the understanding of such gender differences in antisocial behavior trajectories by addressing several limitations in the current literature. First, and perhaps most important in relation to potential gender differences, most studies use aggregated measures of antisocial behavior without differentiating subtypes of antisocial behavior (e.g., Moffitt & Caspi, 2001; Odgers et al., 2008). This measurement issue could potentially mask differences in developmental pathways for antisocial behavior subtypes of nonviolent and violent delinquency. These different aspects of antisocial behavior have been shown to have different etiologies and may represent qualitatively different types of antisocial behavioral trajectories (e.g., Burt & Neiderhiser, 2009; Lacourse et al., 2002). The importance of these differences is suggested in findings from Fergusson and Horwood (2002), which revealed similar latent class trajectories but different prevalences when using property offenses vs. violent offenses to identify trajectories.

Second, many previous studies used a priori criteria or single threshold criteria (e.g., age of onset) to identify trajectories (e.g., Mazerolle, Brame, Paternoster, Piquero, & Dean, 2000; Silverthorn et al., 2001) that could be subjective and lead to rather different findings (Fontaine et al., 2009). Recent advances in group-based methods such as growth mixture modeling (GMM; Muthén & Shedden, 1999), latent class growth analysis (LCGA; Nagin, 1999, 2005) and latent class analysis (LCA; Collins & Lanza, 2009) could provide more robust estimation. These mixture approaches assume that there are mutually exclusive and exhaustive latent groups in the population and are especially useful in capturing heterogeneity in developmental trajectories.

Third, many studies have used official crime records (e.g., DeLisi, 2001; D'Unger et al., 2002; Mazerolle et al., 2000). These records have been shown to primarily capture more chronic and severe antisocial behaviors and underestimate overall rates of antisocial behavior (Thornberry & Krohn, 2000), especially during adolescence and for minor nonviolent delinquent acts. The use of such records could affect the particular groups identified—in particular, making it more likely to identify groups made up of more chronic and violent life-course-persistent individuals. For example, using conviction records across 20 years (from age 10 to 30), Nagin (2005) found two persistent groups: low chronic and high chronic. In contrast, using teacher-, parent- and self-report conduct problems, Odgers et al. (2008) only identified one persistent group: the early-onset-persistent trajectory.

Fourth, research in this area is challenged by the use of samples that are relatively small, at-risk, or clinically-based (e.g., Silverthorn et al., 2001) or restricted in age (e.g., limited to adolescence; Nagin & Tremblay, 1999; Odgers et al., 2008). These samples may make it more difficult to identify subgroups that may be low in prevalence (e.g., 5% life-course-persistent) or distinguished from others by their childhood or adult behaviors.

Attempting to address these limitations, using latent class analysis the current study drew on a large nationally representative sample from the National Longitudinal Adolescent Health data set (Add Health) to examine gender differences in developmental trajectories of self-reported antisocial behavior from adolescence to young adulthood. We expected that, in addition to differences in the prevalence of analogous trajectories across genders, gender-specific trajectories also might arise. This study had two secondary and related goals: to 1) determine the impact of distinguishing between nonviolent and violent delinquency on identifying latent trajectories, and 2) determine the risk factors associated with identified trajectories. Because different types of antisocial behavior have different influences and prevalence across genders, distinguishing between subtypes of antisocial behavior is especially important for investigating potential gender differences.

Method

Data and Sample

The current study used the first three waves of In-Home Interview data of the National Longitudinal Study of Adolescent Health (Add Health; Harris et al., 2009), which included over 20,000 respondents (mean age = 16.7 years, 49.5% males, 50.6% non-Hispanic Whites) in the first wave. The analysis sample consisted of 6,244 respondents (48.8% males, 53.4% non-Hispanic Whites) interviewed in 1995 (1st wave, 15–16 years old) and approximately one year later in 1996 (2nd wave, 16–17 years old). The third wave was conducted between July 2001 and April 2002 when respondents were in young adulthood (21–22 years old). The age group of 15–16 years old (mid-adolescence, 45.6% 15 years old) was chosen in part because it represented the largest age group in the first wave. We analyzed data from a specific age group rather than all available respondents with three waves of data because including early adolescents (12–13 years old) and late adolescents (18–19 years old) simultaneously in the analysis could confound developmental patterns in the same age with developmental differences across different ages. For example, a decline in nonviolent delinquency for a 16-year-old respondent from wave 1 to wave 2 does not have the same developmental meaning as the same decline for a 12 or 18 year old.

Measures

Nonviolent and violent delinquency—The nonviolent and violent delinquency measures covered behaviors with a type of scale widely used in delinquency and violence research (Thornberry & Krohn, 2000), and were closely related to scales used in other Add Health studies (e.g., Guo, Roettger, & Cai, 2008; Hagan & Foster, 2003). To make the means of nonviolent and violent delinquency comparable across waves, only items included in all three waves were used.

Nonviolent delinquency: A 5-item 4-point scale was used to measure nonviolent delinquency: In the past 12 months, how often did you deliberately damage property that didn't belong to you; steal something worth more than 50 dollars; go into a house or building to steal something; sell marijuana or other drugs; steal something worth less than 50 dollars? All items' response ranged from 0 "never", 1 "once or twice", 2 "three or four times" to 3 "five times or more." Cronbach α were between 0.66 and 0.74 across three waves.

Violent delinquency: A 3-item 4-point scale was used to measure violent delinquency: In the past 12 months, how often did you use or threaten to use a weapon to get something from someone; take part in a fight where a group of your friends was against another group; hurt someone badly enough to need bandages or care from a doctor or nurse? All items'

response ranged from 0 “never”, 1 “once or twice”, 2 “three or four times” to 3 “five times or more.” Cronbach α were between 0.58 and 0.63.

Scale transformation: Prior to entry in Latent Class Analysis (LCA), continuous values for nonviolent and violent delinquency were categorized into three levels: “Never”, “Mild”, and “Moderate/Serious.” This transformation was necessary for fitting latent mixture models. More detail on this transformation is provided in analytic strategy. The non-count nature of the scales also prevents them from being modeled in Latent Profile Analysis with Poisson distribution. Scales were trichotomized because three levels maintains more of the full meaning of the original scales than simply dichotomizing, which would combine mild delinquents with moderate delinquent respondents, or combine mild delinquents with non-delinquents. To keep the meaning of each level comparable across waves, the same numerical cut-offs were used rather than maintaining the same proportion in each level across waves.

The specific cut-offs used to trichotomize the scales were as follows: All values of 0 in each original scale were coded as “Never.” However, due to different numbers of items in nonviolent and violent delinquency, different cut-offs were used between “Mild” and “Moderate/Serious”. For nonviolent delinquency, values greater than 0 and less than 0.6 were coded into “Mild”, and values equal to or larger than 0.6 were coded into “Moderate/Serious”. The cut-off of 0.6 was chosen because there were five items on the nonviolent delinquency scale. Respondents would have a value of 0.4 if they responded “once or twice” (1) for two of the five items but “never” (0) to the three other items, or if they responded “three or four times” (2) to one of the 5 items but responded “never” to the other four items. These respondents were regarded as mildly delinquent. Any respondent reporting more nonviolent delinquency would receive a value of 0.6 or higher and were regarded as moderately to seriously delinquent. For the 3-item violent delinquency scale, respondents with mean values greater than 0.33 who had responded to two or more of the three items with “once or twice” (1) or at least one item with “three or four times” (2) or greater were categorized into “Moderate/Serious.” Respondents who responded only “once or twice” (1) to a single item had a score of 0.33 on the 3-item scale and were categorized as “Mild.”

To ensure that the cut-offs used correctly ranked respondents into never, mild, and moderate/serious levels across two scales, the means for nonviolent and violent delinquency on the original scales were calculated by the three levels and compared to the overall sample means (see Table 1). For example, the mean for wave 1 nonviolent delinquency for the full sample was 0.18 ($SD = 0.38$). The mean for the “Never” level was 0. The mean for the “Mild” level was 0.26, which was only 0.21 SD higher than the full sample mean, indicating that the “Mild” level of nonviolent delinquency was mildly higher than the overall sample mean. In contrast, the mean for the “Moderate/Serious” level was 1.01, more than 2 SD higher than the full sample mean. Distributions were similar for wave1 violent delinquency and for the other two waves.

Covariates

Neighborhood disadvantage: A composite of three proportion scores was used: proportion of non-intact family households, proportion of low-income families (less than \$15,000) and proportion of unemployment rate measured in 1st wave. Higher scores indicated more disadvantage. Data were collected from the Census of Population and Housing 1990 measured at the Block Group level. Cronbach α was 0.85.

Family support: This construct was measured with a 10-item scale constructed from the average of five items about mother and five about father. Items for mother were: How close

do you feel to your mother; how much do you think she cares about you; you are satisfied with the way your mother and you communicate with each other; overall you are satisfied with your relationship with your mother; and, most of the time your mother is warm and loving towards you. All item responses ranged from 1 to 5 but with different anchors. The first two items ranged from *not at all* to *very much*, and the others from *strongly disagree* to *strongly agree*. Higher scores indicated more family support. Cronbach α was 0.87.

Analysis Framework

Latent Class Analysis was fitted in SAS 9.2 using PROC LCA (Lanza, Collins, Lemmon, & Schafer, 2007) to trichotomized nonviolent and violent delinquency scores over three waves. This procedure provides Maximum Likelihood (ML) estimates using the Expectation-Maximization (EM) algorithm, which also handles missing data on latent class items (Lanza et al., 2007). LCA can be considered a special case of GMM without modeling slope (e.g., Collins & Lanza, 2009, p. 186). GMM uses a latent mixture approach to model a single outcome's development (intercept and slope). However, GMM typically requires well-distributed continuous variables and more observations with generally equal time intervals (e.g., 4 or 5 times with 1 or 2 years between two points), thereby obtaining more accurate slope estimates. The current available data from Add Health (only 3 times, one year apart in the 2nd wave and 5 years later in the 3rd wave, ordinal response items) are not well-suited for this approach.

Another rationale for choosing LCA over GMM is that currently available GMM software is better suited for modeling univariate outcomes (e.g., delinquency) than simultaneously estimating groups from multivariate outcomes (i.e., estimating the intercepts and slopes of nonviolent and violent delinquency in the same model). A common solution is to use a two-step procedure where GMMs are separately fit for each outcome first; then, crosstabs are calculated *post hoc* to describe patterns of classification based on each model (e.g., Fergusson & Horwood, 2002). By incorporating trichotomized nonviolent and violent delinquency into the same model, however, LCA can investigate whether simultaneously modeling these two subtypes of antisocial behavior can help identify otherwise hidden patterns of antisocial behavioral trajectories, a main goal of the current study. As a result, the LCA modeling of trichotomized data applied here traded the modeling of continuous univariate outcomes and estimating slope possible in GMM for the advantages of simultaneously modeling across the wave patterns of two aspects of antisocial behavior in the same model.

Starting from a 2-class model with parameters constrained to be equal across genders, a hundred iterations were run for each model using randomly generated starting values to avoid local ML solutions. The models with the most frequent solutions were chosen. Bayesian Information Criterion (BIC, the smaller the better) was primarily used to choose the best trajectory number because it emphasizes parsimony, especially with large sample sizes, together with Akaike's Information Criterion (AIC, the smaller the better) and entropy (similar to R^2). Using gender as a grouping variable, parameters were then allowed to vary across gender after the model of best number of class was identified. Gender invariance was examined by comparing the fit of gender in constrained vs. unconstrained models. In the case of gender non-invariance, LCA was run in each gender group separately to identify gender-specific trajectories. A final step used covariates to conduct multinomial logistic regressions to predict different developmental trajectories in each gender separately.

Results

Gender-specific Latent Trajectory of Nonviolent and Violent Delinquency

As shown in the first column of each gender group in Table 3, females consistently reported less nonviolent delinquency (e.g., 0.14 vs. 0.24 in the 1st wave) and violent delinquency (e.g., 0.03 vs. 0.15 in the 3rd wave) than males throughout three waves. However, both gender groups demonstrated similar patterns of desistence in nonviolent delinquency (0.14 to 0.05 for females; 0.24 to 0.16 for males) and violent delinquency (0.15 to 0.03 for females; 0.26 to 0.15 for males) from adolescence to young adulthood. While there were no obvious gender differences in neighborhood disadvantage, females reported slightly less family support ($M = 4.29$, $SD = 0.68$) than did males ($M = 4.46$, $SD = 0.53$).

Based on BIC, a 5-class solution with parameters constrained to be equal across genders (AIC = 1624.8, BIC = 2083.1, entropy = 0.69, $\chi^2(1389) = 1488.8$) was the best fit compared to a 4-class model (AIC = 1811.9, BIC = 2175.8, entropy = 0.60) and a 6-class model (AIC = 1545.1, BIC = 2097.7, entropy = 0.67). A nested model allowing parameters to be freely estimated across genders provided a 5-class model with a $\chi^2(1329)$ of 1299.4, indicating significant gender noninvariance ($\chi^2_{\text{diff}}(60) = 189.4$, $p < .001$). This gender non-invariance could have two sources: 1) the five classes have different characteristics and resulting meanings across genders, and/or 2) there are gender-specific classes. To investigate the sources of gender non-invariance, models were run separately by gender.

Female classes—Based on BIC, females were best described by a 3-class solution (AIC = 759.1, BIC = 989.8, entropy = 0.64) compared to a 2-class model (AIC = 875.0, BIC = 1026.7, entropy = 0.65) and a 4-class model (AIC = 724.9, BIC = 1034.5, entropy = 0.66). Shown in the right half of Table 2, about 60% of females in the sample belonged to the first class—*low*, defined by a high probability ($p > .92$) of reporting that they had never engaged in antisocial behavior from adolescence to young adulthood. Means for nonviolent and violent delinquency (see Table 3) suggested that *low* females reported the least antisocial behavior across all three classes, substantially lower than females' grand average.

Approximately one-third of females belonged to the second class—*desister*. In wave 1 *desister* had somewhat higher chances of reporting “Never” levels of nonviolent and violent delinquency ($p = .53$ and $.42$, respectively) than other levels. Probabilities of “Never” in wave 2 increased to $.69$ and $.63$, respectively, and approached total desistence by young adulthood, with $.85$ and $.91$ probabilities of “Never” by wave 3. As a group, *desister* females reported levels of antisocial behavior that were above the grand average of all females, but gradually desisted to close to the overall average in young adulthood, although still higher than the *low* group.

The third class, *decliner*, had a prevalence of 11%. Female *decliners* tended to report “Moderate/Serious” levels of nonviolent delinquency during adolescence ($p = .52$ and $.61$, respectively), but were more likely to report “Never” in young adulthood ($p = .73$). With regard to violent delinquency, although females tended to report “Never” through three waves, their probabilities of “Never” were much higher in young adulthood ($p = .88$) than in adolescence ($p = .46$ and $.51$, respectively), and much lower than that of *low*. Means indicated that *decliner* females actually reported the most antisocial behavior among all classes through three waves, and consistently reported approximately twice the level of nonviolent delinquency as violent delinquency. Despite a clear reduction in antisocial behaviors by young adulthood, they failed to reach the same low levels of antisocial behavior as *desister* females.

Male classes—Based on BIC, males were best described by a 4-class solution (AIC = 914.3, BIC = 1281.4, entropy = 0.69) compared to a 3-class model (AIC = 1079.7, BIC = 1308.5, entropy = 0.72) and a 5-class model (AIC = 911.2, BIC = 1296.6, entropy = 0.71). As shown in the left half of Table 2, the first class, *low*, appeared similar to its female counterpart in reporting no engagement in antisocial behavior from adolescence to young adulthood, with high probabilities ($p > .82$). Their means were the least among all male classes, substantially lower than males' average and comparable to females'.

About a quarter of males belonged to the second class—*desister*. These respondents tended to report “Mild” (e.g., $p = .48$ for nonviolent delinquency) in wave 1, but declined to the point that “Never” was their most likely response in subsequent waves. The one exception to the pattern of declining across waves was the lower than expected wave 2 violent delinquency score. This score may have been due to uncertainty in class membership (see the note on Table 3 for a more detailed explanation). Although their means were higher than for the corresponding female class, the overall pattern of male *desister* is otherwise similar to the pattern for female *desister*. Class means indicated a moderate level of antisocial behavior compared to other male classes.

About 13% of the males belonged to the third class—*chronic*, which showed a quite distinct pattern from all other classes. Members of this group tended to respond “Never” for both nonviolent and violent delinquency in young adulthood ($p = .76$ and $.63$, respectively), “Never” for nonviolent delinquency ($p = .69$ and $.57$, respectively) in adolescence, but “Mild” or “Moderate/Serious” for violent delinquency ($p = .52$ and $.47$ in 2nd wave). An examination of their means showed that they consistently reported mild to moderate levels of antisocial behavior from adolescence to young adulthood (the exception being a low mean for 1st-wave nonviolent delinquency, which again may be due to class membership uncertainty) without any clear pattern of desistance. A distinguishing aspect of their antisocial behavior was a much higher rate of violent delinquency than the overall male average—twice as high as their nonviolent delinquency rate, which was similar to the full sample mean across waves.

The last male class, *decliner*, had a prevalence rate of 12%. Male *decliners* tended to report a “Moderate/Serious” level of nonviolent delinquency ($p = .70$ and $.58$, respectively) and violent delinquency ($p = .69$ and $.62$, respectively) in adolescence but “Never” in young adulthood ($p = .50$ and $.54$, respectively). They showed a pattern of desistance similar to that for *desister* males but failed to reach the same low level of antisocial behavior as *desister* males in young adulthood. Because they began with such high levels of antisocial behavior and did not entirely desist in young adulthood, this group reported the most total antisocial behavior across the three waves. Unlike *decliner* females, *decliner* males reported similar levels of nonviolent and violent delinquency within each wave.

Predicting Trajectory Membership

Among males, those from more disadvantaged neighborhoods were less likely, compared to *low*, to be in the *desister* class (.01 OR) but more likely to be in the *chronic* class (12.49 OR) (see Table 4). Compared to being in the *desister* class, they were much more likely to be in the *chronic* or *decliner* class (2090.99 and 384.29 OR). They were less likely to be in the *decliner* class relative to *chronic* (.18 OR). Males with more family support were less likely to be in the *desister* or *decliner* class (.63 and .35 OR) relative to being in the *low* class. Those with more family support were less likely to be in the *decliner* class relative to being in the *desister* (.56 OR) or *chronic* class (.38 OR).

Females from more disadvantaged neighborhoods were more likely to be in the *desister* class but less likely to be in the *decliner* class (40.20 and .04 OR) relative to *low* (see Table

5). However, a greater level of neighborhood disadvantage predicted a lower likelihood of being in the *decliner* compared to the *desister* class (.00 OR). Females with more family support were less likely to be in the *desister* or *decliner* class relative to the *low* class (.65 and .31 OR). Similar to males, females with more family support were also less likely to be in the *decliner* class compared to being in the *desister* class (.50 OR).

Discussion

The current study applied latent class analysis to data for 15 and 16 year olds during the Wave I In-Home survey of the National Longitudinal Study of Adolescent Health to determine developmental patterns of self-reported nonviolent and violent delinquency from adolescence to young adulthood. Males and females demonstrated similarities and differences in their respective antisocial behavior trajectories. Like some previous studies (e.g., D'Unger et al., 2002), several synonymous classes were found across genders (e.g., male *desister* and female *desister*). The *low* class appears to be the most similar class across genders. Individuals in this class self-reported abstinence from antisocial behavior from adolescence to young adulthood, and represented the majority of the population (e.g., Piquero et al., 2005). For this class the means for nonviolent and violent delinquency were comparable between males and females across waves. Consistent with males' greater general involvement in antisocial behavior (Moffitt et al., 2001), however, the *low* class was somewhat more prevalent among females than males (59% vs. 50%) (e.g., D'Unger et al., 2002; Odgers et al., 2008).

Two other classes, *desister* and *decliner*, were also fairly similar across genders. Both were similarly prevalent across genders (25% and 29% for *desister*; 12% vs. 11% for *decliner*), comparable with previous studies (e.g., Lahey et al., 2006; Moffitt & Caspi, 2001; Nagin, 1999). Both *desister* males and females reported antisocial behavior substantially above each gender's average in adolescence and gradually desisted to slightly above their gender's average in young adulthood. However, *desister* males consistently reported more antisocial behavior than *desister* females across waves. In addition, *desister* females reported more nonviolent delinquency than violent delinquency in adolescence, the opposite of the pattern exhibited by *desister* males. Both *decliner* males and females reported the most antisocial behavior among all classes, with means considerably higher than the averages of other groups, including *chronic*. Their antisocial behaviors declined in young adulthood but did not desist. An important gender difference involved *decliner* males, who reported comparable means for nonviolent and violent delinquency within each wave. In contrast, *decliner* females primarily reported engaging in nonviolent delinquency. Patterns exhibited by both the *decliner* and *desister* classes are consistent with Moffitt's adolescence-limited pattern and resemble the high-desister/high-declining and lowdesister/moderate-declining classes, respectively, identified by Nagin and colleagues (Nagin, 1999; Nagin & Tremblay, 2005b). They also resemble the high-rate adolescence-peaked and low-rate adolescence-peaked groups identified by D'Unger and colleagues (2002).

The gender differences in the three groups (*low*, *desister*, and *decliner*) were relatively subtle. In contrast, the *chronic* group was gender-specific, existing among males but not females. D'Unger et al. (2002) also identified *chronic* groups among males only. The all-male membership of the *chronic* group confirms that a gender may exhibit a distinct developmental pattern. These males reported mild to moderate levels of antisocial behavior without showing any clear pattern of desistence. An additional distinguishing characteristic of this group is that their antisocial behavior was more characterized by violent than nonviolent delinquency, with nearly the highest rates for the former but only moderate rates for the latter. This class bears some resemblance to Moffitt's life-course-persistent group (1993), with about the same prevalence. However, unlike D'Unger et al. (2002), who

identified low-rate and high-rate chronic groups, we only found one chronic group, perhaps because we used self-reported antisocial behavior rather than crime records indicating more serious antisocial behaviors.

Nonviolent and Violent Delinquency in Latent Trajectories

Specific consideration of nonviolent and violent delinquency is intrinsically linked to this study's identification of the novel male class, *chronic*. Separately entering nonviolent and violent delinquency also allowed differences between male and female *decliners* and *desisters* to emerge. *Decliner* males reported similar levels of nonviolent and violent delinquency, whereas *decliner* females reported more nonviolent delinquency than violent delinquency. *Desister* males generally reported more nonviolent delinquency than violent delinquency, whereas *desister* females were the opposite, reporting more adolescent violent delinquency than nonviolent delinquency. It is also interesting to note that female *desisters* may be more like male *chronics* than male *desisters*, as shown in D'Unger et al. (2002). These nuanced gender differences would not have been found had the study used an aggregated antisocial behavior score, combining nonviolent and violent delinquency. Doing so would have removed the opportunity to consider how these two aspects of antisocial behavior—which have been found to have somewhat different, yet not unique, etiological and developmental paths (Burt & Neiderhiser, 2009; Lacourse et al., 2002)—characterize individuals differently across time and genders.

Developmental Meanings and Prediction of Latent Trajectories

What is the developmental meaning of these groups? *Desister* seemed to correspond to adolescent-limited delinquents. *Chronic* may be the best match for life-course-persistent delinquents, at least with regard to their consistency. However, the *decliner* group, while having reduced their antisocial behavior the most overtime, continued to report the highest young adult levels of antisocial behavior. Thus, both the male *chronics* and male and female *decliners* represent problematic developmental patterns.

Class prediction and identification are equally important because both can offer new understandings of different trajectories. Key predictions included the following: being in a more disadvantaged neighborhood made it more likely for a female or male to be in the *decliner* than *desister* class, and more likely for a male to be a *chronic* delinquent; and neighborhood quality distinguished *low* from *chronic* and *decliner* class for males and *decliner* class for females. Both findings are consistent with social disorganization theory, which argues that disadvantaged community and neighborhood's ineffective informal social control increases adolescents' antisocial behavior (Sampson, 1997; Shaw & McKay, 1969).

However, being in/from a disadvantaged neighborhood does not always increase the risk of belonging to an antisocial group. Males from more disadvantaged neighborhoods were less likely to be in the *desister* than *low* class. Females in disadvantaged neighborhoods were less likely to be in the *decliner* compared to the *low* or *desister* class. These apparent protections against being in the normative delinquent *desister* group may be linked to the meanings and implications of delinquency in disadvantaged vs. adequate neighborhoods. It may be that, among males for example, desisting delinquency is a privilege of living in an adequate neighborhood—a middle-class indulgence similar to emerging adulthood (see Osgood, Ruth, Eccles, Jacobs, & Barber, 2005). In contrast, antisocial behavior in disadvantaged neighborhoods may have greater long-term consequences. Similar behaviors may have very different meanings and implications depending on the neighborhood. Thus, individuals from more disadvantaged neighborhoods might actively and carefully avoid antisocial behavior because their few chances for a bright future could be undercut by such behavior.

Family support generally acted as a protective factor against initiation or escalation, which has been well documented in the literature (Moffitt, 1993, 2006; Patterson & Stouthamer-Loeber, 1984). In both gender groups, individuals with more family support were less likely to belong to any antisocial class, *desister* or *decliner*, relative to *low*; and less likely to escalate into more serious class, *decliner*, relative to *desister*. Thus, family support may protect adolescents from deviant peers' negative influences (Patterson & Stouthamer-Loeber, 1984). An interesting finding is that males with more family support were more likely to be in the *chronic* than *decliner* class. The finding that *decliners* had the least family support—a variable consistently related to risk behavior—supports the argument that *decliner* members were more problematic than *chronic* members. This finding underscores the severe nature of the behaviors (more violence) exhibited by male *decliners*. However, results could be driven in part by the large sample size, especially given the modest amount of pseudo- R^2 that they explained, so should be viewed cautiously.

Limitations

Several study limitations are worthy of attention and future study. One concerns measurement. First, the Add Health data do not have information on antisocial behavior between 1996 and 2002. It would be preferable to identify developmental patterns of antisocial behavior with data from this time period. Sparse data coupled with the non-countable nature of the original scale items also made it difficult to adopt GMM estimation. In addition, the current data did not measure early childhood antisocial behavior, preventing identification of the childhood-limited trajectory (Moffitt, 2006). Further, self-reports of antisocial behavior, which have been shown to capture different forms from those found in crime records data (Thornberry & Krohn, 2000), should be reviewed with caution for several reasons, including the difficulty in making straightforward comparisons with some previous studies (e.g., D'Unger et al., 2002). Second, in order to use the same items across all three waves, only a limited set of the total antisocial behavior items available in the Add Health data were used. Another approach would be to use all items available across all waves regardless of their inclusion across waves (e.g., Guo et al., 2008; Hagan & Foster, 2003). Finally, it would have been possible to use different cut-offs to trichotomize between “Mild” and “Moderate/Serious” levels. However, the current cut-offs successfully classified respondents similarly into three levels for both nonviolent and violent delinquency, and also distinguished between *chronic* and *low* classes. Similar results with previous studies add validity to the current transformation. Another analysis using a stricter cutoff between mild and moderate levels produced the same patterns of developmental trajectories.

Implications

The major contributions of this study are linked to the use of separate measures of nonviolent and violent delinquency rather than a composite antisocial behavior score to identify trajectories and to separate estimation of trajectories across genders. Findings include differences in the prevalence of trajectory groups across genders, a gender-specific class, and different patterns of the two subtypes of antisocial behavior across genders. These results highlight the necessity of considering gender and subtypes of antisocial behavior in developmental trajectory research (Fontaine et al., 2009). Predictions of trajectory membership by adolescent neighborhood disadvantage and perceived family support reveal expected and unexpected links between adolescents' experiences and their developmental patterns of antisocial behavior. Associations between group membership and family support are straightforward: less support leads to more risk. Links between neighborhood disadvantage and relative risk of membership in different trajectory groups are more subtle and may reflect differences in both the potential risk inherent in neighborhood settings for engaging in antisocial behavior as well as the implications of such behaviors across

neighborhood contexts. These findings send prevention research a clear message: prevention efforts must be sensitive to different developmental needs and special attention must be paid to developmental context and social settings (Tremblay, 2006).

Acknowledgments

This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from grant P01-HD31921 for this analysis.

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Means (standard deviations) and group size of nonviolent and violent delinquency by trichotomized levels from adolescence to young adulthood

Table 1

		Wave 1		Wave 2		Wave 3	
		Trichotomized Levels (Cut-offs)					
		<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>
Nonviolent	Never (0)	0	4066	0	3692	0	3672
	Mild (0 ~ 0.6)	0.26 (0.09)	1371	0.27 (0.09)	884	0.26 (0.09)	592
	Moderate/Serious (0.6)	1.01 (0.50)	777	0.99 (0.49)	519	0.87 (0.39)	352
	Overall	0.18 (0.38)	6214	0.15 (0.34)	5095	0.10 (0.26)	4616
Violent	Never (0)	0	4201	0	3939	0	3975
	Mild (0 ~ 0.33)	0.33 (0.01)	1094	0.33 (0.01)	680	0.34 (0.02)	386
	Moderate/Serious (0.33)	1.00 (0.50)	915	0.98 (0.48)	495	0.94 (0.44)	263
	Overall	0.21 (0.40)	6210	0.14 (0.33)	5114	0.08 (0.25)	4624

Table 2

Gender-specific latent class model using nonviolent and violent delinquency and from adolescence to young adulthood

		Males (<i>n</i> = 3049)				Females (<i>n</i> = 3,195)			
		Class 1 low	Class 2 desister	Class 3 chronic	Class 4 decliner	Class 1 Low	Class 2 desister	Class 3 decliner	
Prevalence ^a		50.06%	24.93%	13.28%	11.73%	59.12%	29.46%	11.42%	
Group size ^b		1592	720	410	314	2075	807	304	
Item	Response	Conditional Item Response Probability ^c							
Wave 1	Never	0.89	0.20	0.69	0.04	0.92	0.53	0.15	
Nonviolent	Mild	0.11	0.48	0.31	0.26	0.08	0.39	0.33	
Delinquency	Moderate/Serious	0.00	0.32	0.00	0.70	0.00	0.08	0.52	
Wave 1	Never	0.84	0.54	0.37	0.11	0.94	0.42	0.46	
Violent	Mild	0.12	0.24	0.30	0.20	0.06	0.36	0.23	
Delinquency	Moderate/Serious	0.03	0.22	0.33	0.69	0.00	0.22	0.31	
Wave 2	Never	0.92	0.47	0.57	0.19	0.94	0.69	0.09	
Nonviolent	Mild	0.08	0.35	0.29	0.23	0.05	0.31	0.30	
delinquency	Moderate/Serious	0.00	0.18	0.14	0.58	0.01	0.00	0.61	
Wave 2	Never	0.95	0.92	0.01	0.13	0.96	0.63	0.51	
Violent	Mild	0.05	0.08	0.52	0.25	0.04	0.26	0.24	
delinquency	Moderate/Serious	0.00	0.00	0.47	0.62	0.00	0.11	0.25	
Wave 3	Never	0.82	0.52	0.76	0.50	0.92	0.85	0.73	
Nonviolent	Mild	0.13	0.25	0.15	0.20	0.07	0.12	0.15	
delinquency	Moderate/Serious	0.05	0.23	0.09	0.30	0.01	0.03	0.12	
Wave 3	Never	0.89	0.68	0.63	0.54	0.97	0.91	0.88	
Violent	Mild	0.06	0.20	0.22	0.15	0.03	0.07	0.07	
delinquency	Moderate/Serious	0.05	0.12	0.15	0.31	0.00	0.02	0.05	

Note.

^aEstimated proportion of a specific class in the population. For example, about 25% of males in the population belong to *desister*.^bCalculated by assigning each individual to the class with the highest class membership probability. Thirteen males and 9 females could not be classified into any class because they have equal probabilities of belonging to more than one specific class.

^cThe probability of an average hypothetical individual who belongs to a specific class endorsing different levels of each item. For example, on average, males in *low* had a probability of .84 responding “Never” for wave 1 violent delinquency. To facilitate interpretation, item response probabilities > .65 were regarded as clearly differentiating between levels (bolded). Item response probabilities > .45 and < .65 were regarded as moderately differentiating (italicized and bolded).

Table 3
Means (standard deviations) of nonviolent and violent delinquency and covariates by gender and class

	Males					Females				
	All males	Class 1 low	Class 2 desister	Class 3 chronic	Class 4 decliner	All females	Class 1 low	Class 2 desister	Class 3 decliner	
Wave 1 nonviolent delinquency	0.24 (0.43)	0.02 (0.07)	0.49 (0.45)	0.08 (0.13)	0.97 (0.62)	0.14 (0.30)	0.02 (0.07)	0.20 (0.26)	0.75 (0.53)	
Wave 1 violent delinquency	0.26 (0.46)	0.06 (0.17)	0.31 (0.46)	0.45 (0.46)	0.95 (0.68)	0.15 (0.32)	0.02 (0.08)	0.38 (0.37)	0.43 (0.59)	
Wave 2 nonviolent delinquency	0.19 (0.39)	0.02 (0.06)	0.27 (0.36)	0.19 (0.34)	0.83 (0.69)	0.11 (0.28)	0.02 (0.10)	0.11 (0.14)	0.77 (0.47)	
Wave 2 violent delinquency	0.18 (0.39)	0.01 (0.07)	0.01 (0.06)	0.59 (0.38)	0.84 (0.61)	0.10 (0.26)	0.01 (0.06)	0.23 (0.32)	0.35 (0.52)	
Wave 3 nonviolent delinquency	0.16 (0.32)	0.07 (0.18)	0.27 (0.40)	0.12 (0.33)	0.36 (0.47)	0.05 (0.18)	0.03 (0.11)	0.07 (0.20)	0.17 (0.38)	
Wave 3 violent delinquency	0.15 (0.34)	0.06 (0.21)	0.18 (0.33)	0.24 (0.44)	0.39 (0.55)	0.03 (0.11)	0.01 (0.06)	0.05 (0.15)	0.07 (0.22)	
Neighborhood disadvantage	0.15 (0.11)	0.14 (0.10)	0.10 (0.07)	0.19 (0.12)	0.15 (0.11)	0.15 (0.11)	0.15 (0.11)	0.21 (0.14)	0.11 (0.08)	
Family support	4.46 (0.53)	4.54 (0.47)	4.40 (0.51)	4.56 (0.44)	4.21 (0.67)	4.29 (0.68)	4.41 (0.59)	4.25 (0.64)	3.80 (0.81)	

Note. To further clarify the meaning of different classes, respondents were assigned to classes based on their highest class membership probability. However, cautions have to be made because class membership uncertainty disappeared when respondents were assigned to one specific class (rather than having a membership probability for each class) (see Collins & Lanza, 2009). Therefore, means in each class merely served for the ease of class labeling and interpretation.

Table 4
Multinomial logistic regression predicting male class membership with adolescent neighborhood disadvantage and family support

Variables	Desister				Chronic				Decliner			
	B^a	OR	95% CI	B^a	OR	95% CI	B^b	OR	95% CI	B^b	OR	95% CI
Neighborhood disadvantage	-5.14	0.01	(0.00, 0.07)	2.53	12.49	(3.13, 49.91)	7.65	2090.99	(129.64, 33726.00)	0.83	2.30	(0.66, 7.98)
Family support	-0.47	0.63	(0.45, 0.87)	-0.09	0.92	(0.63, 1.32)	0.38	1.47	(0.93, 2.31)	-1.04	0.35	(0.28, 0.44)
										-0.58	0.56	(0.40, 0.80)
										-1.69	0.18	(0.04, 0.85)
										-0.96	0.38	(0.26, 0.55)

Note. OR = odds ratio; CI = confidence interval. All covariate tests were significant at $p < .001$. Sixty-seven males were excluded because of missing values in covariates. Inclusion of the two covariates helped to explain 2.4% more error in the male model identification in Table 2. McFadden's pseudo- R^2 compared to an intercept-only model is 0.6%.

^aThe *low* class served as the reference group.

^bThe *desister* class served as the reference group.

^cThe *chronic* class served as the reference group.

Multinomial logistic regression predicting female class membership with adolescent neighborhood disadvantage and family support

Table 5

Variables	Females (n = 3,134)					
	Desister			Decliner		
	B ^a	OR	95% CI	B ^a	OR	95% CI
Neighborhood disadvantage	3.69	40.20 (12.40, 130.33)	-3.33	0.04 (0.00, 0.33)	-6.89	0.00 (0.00, 0.01)
Family support	-0.44	0.65 (0.51, 0.82)	-1.16	0.31 (0.26, 0.38)	-0.69	0.50 (0.38, 0.67)

Note. OR = odds ratio; CI = confidence interval. All covariate tests were significant at $p < .001$. Sixty-one females were excluded because of missing values in covariates. Inclusion of the two covariates helped to explain 3.1% more error in the female model identification in Table 2. McFadden's pseudo- R^2 compared to an intercept-only model is 1.3%.

^aThe low class served as the reference group.

^bThe desister class served as the reference group.