



## Stability in aggression revisited

Alex R. Piquero <sup>a,\*</sup>, Michael L. Carriaga <sup>a</sup>, Brie Diamond <sup>a</sup>, Lila Kazemian <sup>b</sup>, David P. Farrington <sup>c</sup>

<sup>a</sup> University of Texas at Dallas, United States

<sup>b</sup> John Jay College of Criminal Justice, United States

<sup>c</sup> Cambridge University, United Kingdom

### ARTICLE INFO

*Article history:*

Received 24 January 2012  
 Received in revised form 23 February 2012  
 Accepted 15 March 2012  
 Available online 10 April 2012

*Keywords:*

Aggression  
 Continuity  
 Stability

### ABSTRACT

Research on the stability of aggression tends to show patterns of continuity and to a lesser extent discontinuity. In this study, we provide a review of research published in four specific journals that target the stability of aggression across distinct periods of the life course. Findings from these studies identify considerable support for both instability and stability of aggression, but with some unique findings related to aggression among females as well as adult-onset aggression. The review closes with an original empirical analysis using longitudinal data from the Cambridge Study in Delinquent Development linking teacher-rated aggression in childhood/adolescence to official conviction records in mid-adulthood, the findings of which suggest a strong degree of continuity in aggression/antisocial behavior among the most aggressive youths/chronic offenders. Conclusions and directions for future research are also discussed.

© 2012 Elsevier Ltd. All rights reserved.

### Contents

1. Introduction . . . . .	365
2. Stability of aggression in childhood and adolescence . . . . .	366
2.1. Stability across early childhood . . . . .	366
2.2. Stability from childhood to adolescence . . . . .	366
2.3. Stability through adolescence . . . . .	367
2.4. Gender and stability . . . . .	367
2.5. Heredity of stability . . . . .	367
2.6. Summary . . . . .	367
3. Stability of aggression across the life course . . . . .	368
3.1. Stable trajectories of aggression . . . . .	368
3.2. Instability of aggression across the life course . . . . .	368
3.3. Adult-onset aggression . . . . .	369
3.4. Summary . . . . .	369
4. Discussion . . . . .	369
References . . . . .	371

### 1. Introduction

A key finding in the study of aggression is that of a remarkably strong correlation between childhood, adolescent, and adult aggression (Olweus, 1979). This finding has been replicated across a wide range of longitudinal studies comprising an array of samples, time periods, measurement strategies, and geographic locations (Loeber &

Hay, 1997). Reports of the stability of aggression across different studies further show that the magnitude of the coefficients increases by early adolescence and that from early adolescence onward, aggression becomes more stable over time (Loeber, 1982).<sup>1</sup> It is not

<sup>1</sup> Throughout our review, we consider two types of stability, relative and absolute. The former focuses on rank ordering of aggression between individuals while the latter focuses on levels of aggression within individuals. There could be relative stability coinciding with absolute change if the average level of aggression decreased but the rank ordering of individuals was constant (and vice versa). A decrease in average aggression is not necessarily evidence of a decrease in relative stability although it is evidence of a decrease in absolute stability.

\* Corresponding author at: University of Texas at Dallas, Program in Criminology, 800 West Campbell Rd., GR31, Richardson, TX 75080-3021, United States. Tel.: +1 972 883 2482; fax: +1 972 883 6572.

E-mail address: apiquero@utdallas.edu (A.R. Piquero).

surprising then, that the continuity of childhood, adolescent, and adult problem behavior is “one of the few ‘knowns’ in criminology” (Juon, Doherty, & Ensminger, 2006; p.194). The same is true with respect to aggression (Huesmann, Dubow, & Boxer, 2009).

At the same time, there are large individual differences in the stability of aggression (Le Blanc, Cote, & Loeber, 1991; Loeber, 1982). Furthermore, high correlations do not consider population changes in levels of aggression across developmental periods. For example, a different mix of persons could exhibit high levels of aggression in adjacent periods and over the life course, but it is also true that constancy in average levels of aggression does not necessarily mean relative stability. Thus, while aggression early in the life course is strongly related to aggression at ensuing life course stages, the prediction is, as Loeber and Hay (1997, p.385) observe “far from perfect, both in terms of false-positive errors...and false-negative errors.” In fact, most high-aggressive children do not end up as adult criminals (Huesmann & Moise, 1998; Loeber & Stouthamer-Loeber, 1998; Moffitt, 1993); yet, early aggressive and antisocial behavior predicts a greater risk for becoming an adult criminal. As such, and as a corollary to the more general research on longitudinal patterns of criminal offending (Paternoster, Dean, Piquero, Mazerolle, & Brame, 1997; Piquero, 2011; Piquero, Farrington, & Blumstein, 2003), there is a pressing need to assess continuity and change in aggression, between- and especially within-persons, across transitioning stages of the life course, as well as over the full life course.

This review seeks to provide an overview of two strands of literature regarding the stability of (direct physical) aggression: during childhood and adolescence and then across the life course—into adulthood. Toward this end, we originally conducted a search of research literature from eleven journals (*Aggression and Violent Behavior*, *Aggressive Behavior*, *Development and Psychopathology*, *Journal of Family Violence*, *Journal of Interpersonal Violence*, *Journal of Psychopathology and Behavioral Assessment*, *Psychopathology*, *Trauma Violence and Abuse*, *Violence Against Women*, *Violence and Victims*, and *Youth Violence and Juvenile Justice*) using the key terms (‘aggress and stability’, and then ‘aggress and trajet’), but ultimately we found that four of these journals provided the most usable and pertinent studies (*Aggressive Behavior*, *Violence and Victims*, *Development and Psychopathology*, and the *Journal of Interpersonal Violence*). Moreover, a few studies appeared to be on topic; however, upon closer inspection their measures of aggression included both physical and indirect aggression and were thus omitted. Other studies were found to use outcomes of antisocial personality disorder and conduct disorder, which obviously include much more than direct physical aggression; therefore, these were excluded as well.

Our review of this literature appeared strongly divided into two sections. The first section of the review covers shorter-term longitudinal studies of childhood and adolescent aggression, while the second section reviews long-term longitudinal studies spanning youth and adulthood. After our review of this literature, we provide a set of directions for future research and also present some original, empirical analysis using data linking aggression in the first decade of life to criminal offending at age 50 with data from the Cambridge Study in Delinquent Development. Our purpose in such an analysis is to provide one example linking aggression as judged by teachers in childhood/adolescence to criminal offending as assessed in official conviction records by middle adulthood. To the best of our knowledge, this provides one of the first empirical examinations of such a linkage.

## 2. Stability of aggression in childhood and adolescence

Our search identified a number of studies assessing the stability of physical aggression across time. The majority consisted of short-term longitudinal analyses of children and adolescents spanning two to eight years in length. Altogether, the literature shows evidence of stability for many individuals. However, a sizeable proportion of youth

are characterized by instability in aggression (i.e., low-rate aggressives can have increased aggressiveness in adolescence and high-rate aggressives can have reduced aggressiveness in adolescence). Many of these studies also assessed the role of gender on the stability of aggression over time and one focused on the influence of heredity. Taken as a whole, these findings point to considerable stability across time and gender, although marked instability still persists across ages. This pattern of findings is consistent with the criminal career literature, which displays strong continuity in criminal offending across developmental periods in addition to non-negligible patterns of change across the time periods between childhood and adolescence as well as adolescence and adulthood (see Piquero et al., 2003). In the remainder of this section, we provide some examples of this specific aspect of the stability literature across early childhood, from childhood to adolescence, and through adolescence, while also highlighting studies that focus on issues related to the stability of aggression as it pertains to both gender and heredity.

### 2.1. Stability across early childhood

Consistent with the work of Tremblay (2000), Côté, Vaillancourt, Barker, Nagin, and Tremblay (2007) find desistance from aggressive behaviors to be the norm throughout early childhood. Following a Canadian sample of 1183 two year-olds until age eight, Côté et al. identified four developmental trajectories<sup>2</sup> of aggressive behavior. Roughly 80% of these children fell into one of two groups that evidenced a gradual decrease in aggression across waves. The smallest proportion of youth (5.2%) was classified as stable low- or non-aggressors. Meanwhile, a high, stable level of aggression from two to eight years of age characterized nearly 15% of children.

### 2.2. Stability from childhood to adolescence

The relative proportion of the high stable group remains consistent across studies of older children as well. Studies categorized anywhere from 12% (males; Harachi et al., 2006) to 19% (Underwood, Beron, & Rosen, 2009) of youths as exhibiting high, stable levels of physical aggression into adolescence. Across studies, the high stable group exhibited higher rates of aggressive behavior than the other groups at every time period. In addition, individuals on the high trajectories appear to differ in important ways from those on the less aggressive developmental paths. These studies have shown high stable aggressors to be at increased odds of having attention problems (Harachi et al., 2006; Jester et al., 2005) as well as to be hyperactive (Jester et al., 2005) and unpopular in childhood (Xie, Drabick, & Chen, 2011). Poor home environments, academic performance and school attachment have also appeared as significant predictors of high stable offending patterns (Harachi et al., 2006; Jester et al., 2005; Xie et al., 2011). Finally, high stable aggression across childhood and adolescence has been shown to coincide with reliance upon aggressive problem-solving strategies and a lack of developing alternative, prosocial strategies with age (Keltikangas-Järvinen & Pakaslahti, 1999).

Studies spanning childhood into adolescence also show a degree of stability on the low end of aggressive behavior. A higher percentage of children in these studies were categorized as being on a low- or non-aggressive trajectory through late childhood and adolescence than was reported in early childhood by Côté et al. (2007). Those on a low and stable developmental path of aggressive behavior constituted between nearly 30% (Underwood et al., 2009) and over 40%

<sup>2</sup> We note here that a developmental trajectory describes the course of an outcome over age or time, in our case aggression or offending. Moreover, trajectories reflect within-individual absolute change as finalized trajectories do not show movement of persons between trajectories.

(males; Harachi et al., 2006) of children in their samples. The low stable aggressive groups consistently exhibited less aggressive behavior across waves than their counterparts. Harachi et al. (2006), using teacher reports of aggression, were the only researchers to report evidence of a non-aggressive developmental group characterized by a complete lack of aggressive behavior from Grade 2 to Grade 9.

Still, a dominant trend at this age is one of instability. Over half (53%) of Underwood et al.'s (2009) youth followed a path of gradually decreasing aggression from ages 9 to 13. In a sample of 335 high-risk children, Jester et al. (2005) noted that, overall, aggressive behavior decreased from childhood to adolescence. As well, nearly 30% of boys included in Harachi et al.'s (2006) analysis were marked by a moderate degree of aggression at Grade 2 that gradually tapered off to mirror that of the stable low- and non-aggressive boys by Grade 8.

### 2.3. Stability through adolescence

Similar levels of instability characterize studies on aggression during adolescence. In our review, the adolescence period represents the first indication of a group that increases in aggression over time. Xie et al. (2011) assessed the aggression trajectories of 220 youths from ages ten to eighteen and found that while most individuals were decreasing in aggression, nearly one quarter of these youths showed a gradual increase in aggressive behavior across the adolescent years. Martino, Ellickson, Klein, McCaffrey, and Edelen (2008) found similar results with a sample of almost 2000 youth followed from Grade 7 to Grade 11. These youth also exhibited increased educational failure and criminal involvement in early adulthood compared to youths in the low-aggression trajectory. A three-year longitudinal study of nearly 3000 youths in New York City schools (Lynne-Landsman, Graber, Nichols, & Botvin, 2011) found that close to 40% of these students were characterized by increased frequency of aggression over time. This group initially appeared similar to the low-aggressive group in the frequency of their aggressive behavior, but by Grade 8 their aggression had drastically risen to reflect that of the high-aggressive trajectory.

Despite the prevalence of increasing and decreasing pathways, a substantial subset of youth in each of these studies is aptly characterized as stable in their aggression during adolescence. A chronically high-aggressive subset of individuals were present in every adolescent study and constituted between 14% (Lynne-Landsman et al., 2011) and 17% (Martino et al., 2008) of youths. Not surprisingly, high stable trajectory membership tends to coincide with numerous deleterious outcomes. This finding is consistent with hypotheses from developmental/life-course theories of antisocial behavior, especially the theories of Moffitt (1993) and Patterson et al. (Patterson, DeBaryshe, & Ramsey, 1989; Patterson & Yoerger, 1997) concerning early onset/life-course persistent antisocial behavior. Adolescents exhibiting high stable aggression have been shown to have higher rates of teen parenthood, educational failure, and criminal involvement in early adulthood (Xie et al., 2011) as well as substance abuse issues (Herrenkohl, Catalano, Hemphill, & Toumbourou, 2009), poor health outcomes (Piquero, Shepherd, Shepherd, & Farrington, 2011), and more general life difficulties and failures (Piquero, Farrington, Nagin, & Moffitt, 2010). On the other end of the spectrum, the low-aggression pathway continues to account for a sizeable portion of these samples—around 40% of youths in each study. Not surprisingly, individuals in this trajectory tend to confer the least amount of threat for future problems and evidence fewer childhood risk factors (Herrenkohl et al., 2009; Xie et al., 2011).

### 2.4. Gender and stability

An interesting caveat to many of these studies is the exploration of gender differences in aggression trajectories. Theoretical contributions concerning the role of gender in the development of aggression

have been the exception and not the rule, as most theories—especially of severe forms of antisocial behavior—tend to be focused on males. Further, the theoretical models that do consider gender issues are often contradictory. Silverthorn and Frick (1999) hypothesize that female physical aggression will only take one form (adolescent onset), while Moffitt (1993) argues that female trajectories of aggression will reflect that of males, but with restricted representation in the higher aggression pathways (see Moffitt, Caspi, Rutter, & Silva, 2001; White & Piquero, 2004). The studies reviewed in our search are consistent with Moffitt's view.

In general, these studies consistently show female aggression trajectories to overlay almost perfectly with that of males. Martino et al. (2008) showed females and males to have the same number of trajectory groups with the same trends over time. In fact, the genders were so similar that the researchers ultimately collapsed the sexes into a single analysis. The only meaningful differences were found in the prevalence of girls in the high and low stable groups. Girls were significantly less likely to be classified as high, stable aggressors and more often represented in the low, stable group—a result consistent with those studies focusing on sex differences in longitudinal offending trajectories (D'Unger, Land, & McCall, 2002; Piquero, Brame, & Moffitt, 2005). These findings are supported by other studies in our review (Côté et al., 2007; Harachi et al., 2006; Lynne-Landsman et al., 2011; Underwood et al., 2009; Xie et al., 2011) with Harachi et al. finding that females were twice as likely to be categorized into the non-aggressive trajectory. In summary, while females appear to be more often categorized as low- or non-aggressive, those girls that deviate from this trend do so in ways that are remarkably consistent with males.

### 2.5. Heredity of stability

One behavioral genetic study assessing the role of genetics in the stability of aggressive behavior met the criteria for inclusion in our review. Analyzing over 1200 adolescent twins from California, Tuvblad, Raine, Zheng, and Baker (2009) decomposed physical aggression into its reactive (e.g. hitting others when teased) and proactive (e.g., bullying other kids) counterparts to assess the genetic contribution to each. Their findings suggest a strong genetic component for both behaviors. Forty-eight percent of the stability in reactive aggression was found to be due to genetic factors while an overwhelming 85% of the stability in proactive aggression was due to heredity. Heredity appears to contribute meaningfully to the stability of aggression; however, the authors note “new” environmental influences at follow-up—possibly indicative of the increased importance of peer socialization in adolescence. Given the small number of behavioral genetic studies exploring issues related to aggression (and criminal behavior) across the life-course, more investigation is necessary before strong summary statements are articulated.

### 2.6. Summary

In summary, theoretical expectations concerning aggression find support in the studies reviewed in this section. For example, across childhood, most individuals show decreasing or low levels of aggressive behavior, consistent with Tremblay's (2000) view that aggression peaks in infancy and declines thereafter. Consistent with the developmental models of Moffitt (1993), Patterson and Yoerger (1997), and Patterson et al. (1989), the reviewed studies point to a class of early-onset individuals that exhibit high aggressiveness throughout childhood and adolescence. Additionally, a number of investigations (Lynne-Landsman et al., 2011; Martino et al., 2008; Xie et al., 2011) provide empirical support for the existence of an adolescent-onset pathway. However, the assumptions of Silverthorn and Frick (1999) regarding female aggressive development do not receive much empirical support. Although showing lower average

levels of aggression, females largely follow similar developmental pathways of physical aggression as males. Despite being based on a very small knowledge base, the stability of aggression appears to be partially guided by genetic influences. While the above studies do much in the way of illuminating the nature of physical aggression in the younger years, they tell us little about patterns of relative and absolute stability of such behavior into and throughout adulthood. A number of longitudinal studies spanning several decades have assessed the stability of aggression across a more full range of the life course. We review these studies in the following section.

### 3. Stability of aggression across the life course

In the next part of our review, we consider the degree to which early aggressive behaviors coincide with aggression in adulthood. Our review in four specific journals uncovered only five studies that specifically address the continuity of aggressive behavior across significantly large portions of the life course. It is also pertinent to note that these studies have produced mixed findings regarding the stability of aggression: some studies indicate stable paths of aggression from childhood into adulthood, while others illustrate patterns of desistance from early adulthood onward. To this end, we review the literature concerning the stability of aggression through adulthood focusing on both stability and instability of aggression as well as the rarely-investigated issue of adult-onset aggression.

#### 3.1. Stable trajectories of aggression

Some scholars have hypothesized that the stability of aggression is not only evident during childhood and adolescence, but also well into adulthood (Huesmann et al., 2009; Kokko & Pulkkinen, 2005; Molero, Larsson, Larm, Eklund, & Tengstrom, 2011; Siegel, 2000). In one investigation, Kokko and Pulkkinen (2005) examined this hypothesis using data from the Finnish Jyväskylä Longitudinal Study of Personality Development, a thirty-five year study related to aggressive behavior. The study gathered behavioral information, including aggression, among 299 individuals at ages 8, 14, 36, and 42, the analyses of which revealed a strong relationship between male aggression at age 8 and aggression in adulthood. However, the coefficient for stability was much higher for males (.34) than for females (.06). There was a moderately stable indirect effect of aggression at age 8 on aggression at age 14, and then again from age 14 to aggression in adulthood. Consequently, as there was a highly significant correlation between aggression at ages 8 and 14, as well as at ages 36 and 42, latent measures of childhood and adult aggression were developed to evaluate stability in aggressive behavior across the life course. Results suggested high stability in aggressive behavior between these two latent constructs for both males and females, indicating that aggression is quite persistent from childhood to adulthood.

Similarly, Huesmann et al. (2009) explored the continuity of aggression among participants from the Columbia County Longitudinal Study, which followed the county's entire population of third grade students for forty years, with data collection at ages 8, 19, 30, and 48. Aggression was assessed via peer nominations at ages 8 and 19, while the participants provided self-reports in later waves. The results suggested a moderate degree of stability in severe physical aggression across the life course, which was especially characteristic of males. They also found that participants who exhibited low levels of aggression in childhood typically demonstrated low levels of aggression in adulthood as well. Equally, those with high levels of aggression in childhood also evidenced high levels of aggression in adulthood. Thus, aggression appeared to display a degree of both relative and absolute stability across the life course.

In another study, Siegel (2000) uncovered evidence of stability in aggression across the life span using data from the National Institute of Mental Health concerning the consequences of sexual assault.

These data consisted of official records on all female victims of sexual abuse in a major northeastern city between 1973 and 1975. Approximately 15 years after each attack was reported, the victims were located and contacted for additional interviews regarding their past and present aggressive behavior. Siegel's (2000) analysis indicated that similar percentages of women engaged in physical fights during adolescence and adulthood, indicating support for stability in aggression. Due to incomplete information, we were unable to determine if those who were aggressive in adolescence were the same women fighting in adulthood.

Molero et al. (2011) explored the stability of aggression by using trajectory modeling to examine the behavioral paths of individuals who were enrolled in a Swedish substance abuse clinic as children and adolescents (i.e., prior to age 20). Data were also available concerning participants' behavior post release from ages 21 to 50. The study offered support for the stability of aggression, showing that some individuals appeared to engage in aggressive behavior at a consistent rate throughout their lives. However, there was also evidence of desistance in aggression. Results pointed to another group of offenders who committed fewer aggressive acts during adulthood than in childhood and adolescence. These divergent groups are consistent with the life-course persistent and adolescence-limited typologies proposed by Moffitt (1993) and the early-/late-starter groups outlined by Patterson et al. (Patterson & Yoerger, 1997; Patterson et al., 1989).

#### 3.2. Instability of aggression across the life course

Consistent with the downward trajectory discovered in Molero et al.'s (2011) analysis, other studies have shown trends toward desistance of aggression in adulthood. In addition to studying offending trajectories, Odgers et al. (2008) explored the frequency of physical aggression across time among the 1037 members of the Dunedin Birth Cohort. Although not a central feature of their study, this particular examination allowed for the assessment of aggressive behavior in both men and women over a 25-year time period. Aggressive behavior was assessed every two years from age 7 to 15 and again at ages 18, 21, 26, and 32. Analyzing the average frequencies of aggression for each age group, the results indicated that aggressive behavior was reasonably stable until late adolescence when it tended to decrease. On the other hand, non-aggressive behaviors (such as stealing and lying) remained stable across time with no noticeable differences between ages 7 and 32. Overall, these results suggest that aggression is rather stable in childhood and throughout adolescence, but begins to taper off for most persons in early adulthood.

Of course, this does not imply that early aggression is unrelated to adult aggression. Widom, Schuck, and White (2006) uncovered evidence of an indirect effect of early aggression on violence in adulthood. Specifically, they explored the different pathways to adult violence and aggression using data from a cohort-based study that followed childhood victims of abuse and neglect from before age 12 to early adulthood (i.e., approximately 20 years later). The abused children were matched with other non-abused youth on relevant factors and later compared on patterns of aggression in adulthood. Early aggression was calculated via self-reports of behavior prior to age fifteen, while adult aggression was measured through official violent arrest records. Results indicated that there was no direct effect of early aggression on violence in adulthood. Moreover, they observed an indirect relationship between early aggression and adult violence through problematic alcohol use. However, the authors point out that this could be due to differences in measurement between early aggression and adult violence. Although this offers some evidence that early aggression influences aggression in adulthood (even indirectly), it also tenders a disruption in the continuity of aggression throughout the life course indicative of instability.

Other studies have suggested that long-term marriages lead to desistance in aggressive behavior among married partners (Fritz & O'Leary, 2004; Vickermann & Margolin, 2008). Using data from a longitudinal study that evaluated children's responsiveness to family conflict and community violence, Vickermann and Margolin (2008) assessed aggressive behavior in married couples across three sequential years. They found that within a sample of 118 couples, there was a significant decrease in acts of physical aggression over time. Specifically, there was a decrease of about 43% of aggressive incidents per year. Overall, longer marriages were associated with lower rates of physical aggression, the findings of which are consistent with those in the criminological literature with respect to temporary periods of desistance from crime and sorting out termination from aggression vis-à-vis maintenance of aggression.

Likewise, Fritz and O'Leary (2004) examined spousal physical aggression in a sample of 203 wives from Suffolk County, New York. The researchers obtained these data from a 10-year longitudinal study of marriage in which couples were recruited through various media announcements. Couples were interviewed one month before they were married and again 6, 18, 30, and 120 months after marriage. At each interview, respondents were asked if they or their partners had engaged in any acts of physical aggression against one another at any point within the past year. Results revealed that married men and women tended to engage in fewer acts of physical aggression as time progressed. The study reported that 48% of men and 35% of women were physically aggressive prior to getting married, but only 13% of men and 10% of women remained aggressive after ten years. In summary, as is true for criminal offending, many individuals begin desisting from aggression once they enter and progress through adulthood.

### 3.3. Adult-onset aggression

Although adult-onset offending (and aggression) is believed to be relatively rare, the lack of research suggests that it is worth consideration (see Molero et al., 2011). Mata and van Dulmen (2011) assessed the stability of aggression using data from the National Longitudinal Study of Adolescent Health (Add Health), a large nationally-representative longitudinal study of American adolescents designed to examine how social contexts influence health and risk behaviors. The researchers were able to identify four trajectories of aggressive behavior: abstainers, adolescent-limited, adult-onset, and chronic offenders. The majority of individuals were classified as abstainers (60%), but a respectable proportion was categorized as adolescent-limited (20.3%). Interestingly, adult-onset was the next largest group, consisting of 13% of the sample, while the high stable group accounted for only about 7% of the sample. In all, this study highlights sizable (absolute) stability at both the high and low ends of aggression. Additionally, it points to a non-negligible amount of instability across the lifespan.

### 3.4. Summary

The studies reviewed in this section on the stability of aggression across the life course offer empirical support for both stability and change in aggression throughout various life stages. Many individuals never display high, or even moderate, levels of aggression. Some people exhibit physical aggression during childhood and adolescence, but eventually desist upon entering adulthood. Others may espouse aggressive behaviors only as adults. And still further, there appears a small yet sizable and stable group of individuals who display aggression in childhood, adolescence, and adulthood (Mata & van Dulmen, 2011). Still, given the small set of studies on which these conclusions rest, further research is needed to fully understand aggressive trajectories throughout the life course.

## 4. Discussion

The topic of aggression has been of long-standing interest among social scientists. Given the range of work conducted on aggression, our review sought to provide some statements with respect to specific aspects of the patterning of (direct, physical) aggression in various developmental periods, as well as over the life course. Our review of studies published in four leading journals generated four summary conclusions.

First, there is a significant amount of instability in aggression, especially early in childhood. Yet, at the same time, there remains a small group of stable aggressive individuals, especially in adolescence. Second, these patterns notwithstanding, a low-aggressive pathway comprises most and perhaps the largest part of most study samples. Third, females tend to occupy low aggression trajectories. However, there still emerges a very small but highly aggressive group of female aggressives that warrant attention. Fourth, some studies indicate stable paths of aggression from childhood into adulthood, while others illustrate patterns of desistance from early adulthood onward and even some non-negligible amount of adult-onset aggression—a topic that has received scant research attention. In total, these findings suggest that continuity and change are both important and underscore the difficulty associated with predicting those who will continue to be highly aggressive vis-à-vis those whose flirtation with aggression is short-lived.

Our assessment of the research base leads to identification of several under-studied topics and research questions. Below, we provide some thoughts on these issues as a guide for subsequent research. First, as individuals “move out” of relatively high or low positions in specific aggression trajectories, exploring the factors accounting for this instability is critically important for subsequent research. Given the moderate to potentially strong genetic heritability of aggression (Miles & Carey, 1997) along with the tendency for cross-generational behavioral modeling and social transmission of aggressiveness (Dubow, Huesmann, & Boxer, 2003), the factors accounting for changes in individuals' aggressive propensities are likely to pre-suppose environmental characteristics. Further investigation of the genetic/social interaction with respect to aggression across developmental life stages is important in order to better understand when in the life course genetics plays a more dominant or subservient role to social contexts and vice versa. It is also important to study the factors that prevent an initially high-aggressive individual to move toward desistance from aggression.

Second, research has shown that average aggressiveness declines over the life course. It will be important for future research to examine social experiences or individual liabilities accounting for the emergence of high levels of aggression in early adulthood as has been previously reported. There is some degree of late onset of anti-social/criminal behavior (Eggleston & Laub, 2002; Gomez-Smith & Piquero, 2004; McGee & Farrington, 2010), and some of this adult-onset is aggressive in nature (Huesmann et al., 2009).

Third, exploration into and across distinct types of aggression, to include both indirect and direct forms of aggression, will be important. In this regard, studies should consider exploring whether similar findings hold for aggression stability, across gender and especially across race/ethnicity—which has not been investigated in great detail. In one study, Huesmann et al. (2009) observed that women do not stay in the high/chronic aggression category over time (p.144), but males and females stay in the low category at equal rates. Yet, an analysis of members of the Dunedin Birth Cohort revealed that more women than men were physically violent toward a partner (Magdol, Moffitt, Caspi, Newman, & Fagan, 1997). Understanding women's movement away from high aggression is especially important not only theoretically, but also with respect to policy as it may offer some insight and potential relevance for males' aggression.

Fourth, it would be good to examine how aggressive individuals translate their aggression into other life domains, such as poor health

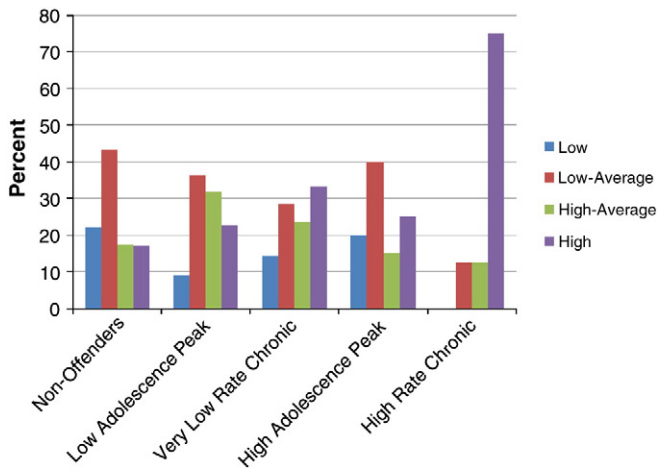


Fig. 1. Relationship between trajectory group and teacher aggression ratings age 12.

outcomes (see Odgers et al., 2007; Piquero et al., 2010). Does the aggression that these individuals espouse permeate across life domains and also influence their decision-making in certain situations? Consideration of how aggressive individuals react to negative events provides a nice linkage to Agnew's (1992) general strain theory, which considers how individuals emotionally react to strainful events and then how they behave as a result of these emotions. Further consideration of aggression not only as a trait but also as a state would be useful (see Mazerolle, Capowich, & Piquero, 2003).

Fifth, our review was concentrated on direct, physical forms of aggression. It is important to consider stability and instability of different types of aggression, especially because some of these other forms of aggression may manifest differently at different periods of the life course and across demographic groups (see Björkqvist, Lagerspetz, & Kaukiainen, 1992; Card, Stucky, Sawalani, & Little, 2008). Another potentially interesting investigation would examine contextually appropriate aggression (e.g., aggression that is permissible, if not expected, in some social contexts, but not accepted in others).

Sixth, the stability of aggression, both relative and absolute, also raises some measurement issues. For example, researchers have assessed relative stability using correlations between scores at different ages but it is not commonly agreed upon what values of  $r$  (or, better, the rank correlation rho) indicate stability versus change. No doubt, while most researchers would agree that a correlation of  $r = .9$  indicates relative stability and  $r = .1$  indicates relative change, what about the values that fall in-between (i.e., is the glass half-full or half-empty)? Further, what amount or level of absolute change in mean aggression scores is needed to conclude that there is absolute change? Although this is less problematic than relative change, it is still an important question.

Finally, much of the prior knowledge base has focused on the continuity in the behavior of highly aggressive individuals. Although this continues to be an important area of inquiry, Huesmann et al. (2009) have also pointed to the usefulness of exploring the continuity of aggression within the consistently low aggression trajectory. Understanding how those individuals began at this low point and why they continue to be low in aggression may provide clues on protective factors that could inform the mode and timing of intervention/prevention for high-aggressive individuals.

Before we close our review, we present a brief analysis linking childhood and adolescent ratings of aggression and membership in distinct offending trajectories in mid-adulthood using data from the Cambridge Study in Delinquent Development, a longitudinal study of 411 South London males first observed at age 8/10 and followed into mid-adulthood (Farrington, 2003; Farrington, Coid, & West, 2009; Farrington et al., 2006). Such an investigation is of interest

because it: (a) permits consideration of how teacher-reported ratings of aggression relate to official-reports of offending via conviction records across a forty-year time period and (b) the extent to which distinct offending trajectories assessed by age 40 differ on aggression ratings many years earlier.

To conduct this analysis, two types of data are necessary. The first is an independent (of the subject) measure of aggression in childhood/adolescence. The CSDD contains such a set of measures that are based on teacher assessments of the males at ages 12 and 14. At both ages, teachers were asked to rate each subject on six separate items: (1) disobedient, (2) difficult to discipline, (3) unduly rough during playtime, (4) over-competitive with other children, (5) quarrelsome/aggressive, and (6) unduly resentful to criticism or punishment (see Farrington, 1977, p.76). Each item was scored '1' (timid), '2' (average), or '3' (quarrelsome/aggressive) and summarized and codified as '6–9' (least aggressive), '10', '11', and '12 or more' (most aggressive). Higher values signify more aggression. The second set of data includes official conviction records from the CSDD from ages 10 to 40, which were used to form the offending trajectories described in Piquero, Farrington, and Blumstein (2007). Their findings showed that a five-trajectory solution provided the best fit: (1) non-offenders, (2) low-adolescence peaked, (3) very low rate chronics, (4) high adolescence peaked, and (5) high rate chronics. Not surprisingly, the high-rate chronic offenders, of which there were only eight males, exhibited the most offending over the life course.

With these two data strands in hand, we tabulated the bivariate relation between the summated teacher ratings of aggression at both ages 12 and 14 and membership in the distinct offending trajectories to age 40 to examine patterns of concordance and disassociation in stability. Results of these analyses provide confirmation of the link between childhood and adolescent aggression as rated by teachers to distinct offending trajectories to age 40 as measured in official records. As can be seen from Fig. 1 (age 12,  $\chi^2 = 32.80$ ,  $p < .05$ ) and 2 (age 14,  $\chi^2 = 63.71$ ,  $p < .05$ ), there is an overall significant relationship between teacher aggression ratings and distinct offender trajectories.

Several other features of these figures are worth highlighting. At age 12, high-rate chronic offenders were more likely to evince higher scores on the more aggressive portion of teacher ratings than the other trajectory groups (and not surprisingly, the non-offenders). For example, none of the high-rate chronics were listed as timid (least aggressive) at any age, whereas 75% of the high-rate chronics (6 of 8 males) scored as quarrelsome/aggressive on the summated teacher aggression rating measure. Turning to the age 14 analysis (in Fig. 2), there is a substantively similar pattern of findings. One particularly striking finding emerges from the distribution of trajectory membership in the high-end aggression category: while about 13%

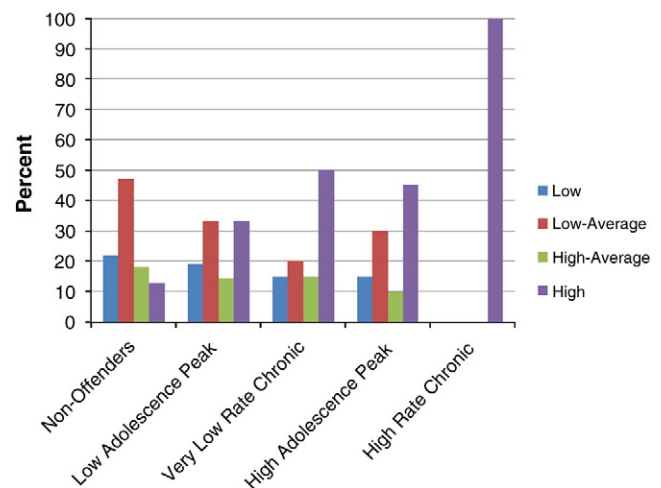


Fig. 2. Relationship between trajectory group and teacher aggression ratings age 14.

of non-offenders were classified in this category, every single high-rate chronic offender (100%) was scored in this high-end aggression category. This finding suggests a great deal of continuity in aggression in this small group of high-rate chronic offenders. As before, very low rate chronic offenders followed their high-rate chronic counterparts with respect to high teacher nominated aggression ratings on the summated teacher aggression scale.

In short, these findings indicate strong (absolute) stability and continuity between aggression early in life and chronic offending in mid-adulthood, and offers support for using teacher-based ratings of aggression to identify potential points of intervention—especially among the most highly aggressive children. Analyses such as these would be especially interesting going forward as researchers attempt to link different manifestations of aggression and antisocial behavior over the life course. More extensive analyses of this nature are needed to contrast the predictive validity of various methods of measurement of aggressive behavior (e.g., teacher reports versus parent, peer, and self-reports).

## References

- Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, 30, 47–87.
- Björkqvist, K., Lagerspetz, K. M. J., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior*, 18, 117–127.
- Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development*, 79(5), 1185–1229.
- Côté, S. M., Vaillancourt, T., Barker, E. D., Nagin, D. S., & Tremblay, R. E. (2007). The joint development of physical and indirect aggression: Predictors of continuity and change during childhood. *Development and Psychopathology*, 19, 37–55.
- D'Unger, A. V., Land, K. C., & McCall, P. L. (2002). Sex differences in age patterns of delinquent/criminal careers: Results from Poisson latent class analyses of the Philadelphia cohort study. *Journal of Quantitative Criminology*, 18, 349–375.
- Dubow, E. F., Huesmann, L. R., & Boxer, P. (2003). Theoretical and methodological considerations in cross-generational research on parenting and child aggressive behavior. *Journal of Abnormal Child Psychology*, 31(2), 185–192.
- Eggleston, E., & Laub, J. H. (2002). The onset of adult offending: A neglected dimension of the criminal career. *Journal of Criminal Justice*, 30, 603–622.
- Farrington, D. P. (1977). The family backgrounds of aggressive youths. In L. A. Hersov, M. Berger, & D. Shaffer (Eds.), *Aggression and anti-social behaviour in childhood and adolescence* (pp. 73–93). Oxford, UK: Pergamon Press.
- Farrington, D. P. (2003). Key results from the first 40 years of the Cambridge Study in Delinquent Development. In T. P. Thornberry, & M. D. Krohn (Eds.), *Taking stock of delinquency: An overview of findings from contemporary longitudinal studies* (pp. 137–183). New York: Kluwer/Plenum.
- Farrington, D. P., Coid, J. W., Harnett, L., Jolliffe, D., Soteriou, N., Turner, R., et al. (2006). *Criminal careers up to age 50 and life success up to age 48: New findings from the Cambridge Study in Delinquent Development*. London: Home Office (Research Study No. 299).
- Farrington, D. P., Coid, J. W., & West, D. J. (2009). The development of offending from age 8 to age 50: Recent results from the Cambridge Study in Delinquent Development. *Monatsschrift für Kriminologie und Strafrechtsreform Journal of Criminology and Penal Reform*, 92, 160–173.
- Fritz, P. A. T., & O'Leary, K. D. (2004). Physical and psychological partner aggression across a decade: A growth curve analysis. *Violence and Victims*, 19, 3–16.
- Gomez-Smith, Z., & Piquero, A. R. (2004). An examination of adult onset offending. *Journal of Criminal Justice*, 33(6), 515–525.
- Harachi, T. W., Fleming, C. B., White, H. R., Ensminger, M. E., Abbott, R. D., Catalano, R. F., et al. (2006). Aggressive behavior among girls and boys during middle childhood: Predictors and sequelae of trajectory group membership. *Aggressive Behavior*, 32, 279–293.
- Herrenkohl, T. I., Catalano, R. F., Hemphill, S. A., & Toumbourou, J. W. (2009). Longitudinal examination of physical and relational aggression as precursors to later problem behaviors in adolescents. *Violence and Victims*, 24, 3–19.
- Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior*, 35, 136–149.
- Huesmann, L. R., & Moise, J. F. (1998). Stability and continuity of aggression from early childhood to young adulthood. In D. J. Flannery, & C. R. Huff (Eds.), *Youth violence: Prevention, intervention, and social policy*. Washington, D.C.: American Psychiatric Press.
- Jester, J. M., Nigg, J. T., Adams, K., Fitzgerald, H. E., Pottler, L. I., Wong, M. M., et al. (2005). Inattention/hyperactivity and aggression from early childhood to adolescence: Heterogeneity of trajectories and differential influence of family environment characteristics. *Development and Psychopathology*, 17, 99–125.
- Juon, H. S., Doherty, E. E., & Ensminger, M. E. (2006). Childhood behavior and adult criminality: Cluster analysis in prospective study of African Americans. *Journal of Quantitative Criminology*, 38, 553–563.
- Keltikangas-Järvinen, L., & Pakaslahti, L. (1999). Development of social problem-solving strategies and changes in aggressive behavior: A 7-year follow-up from childhood to late adolescence. *Aggressive Behavior*, 25, 269–279.
- Kokko, K., & Pulkkinen, L. (2005). Stability of aggressive behavior from childhood to middle age in women and men. *Aggressive Behavior*, 31, 485–497.
- Le Blanc, M., Côté, G., & Loeber, R. (1991). Temporal paths in delinquency: Stability, regression and progression analyzed with panel data from an adolescent and a delinquency sample. *Canadian Journal of Criminology*, 33, 23–44.
- Loeber, R. (1982). The stability of antisocial and delinquent child behavior. *Child Development*, 53, 1431–1446.
- Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual Review of Psychology*, 48, 371–410.
- Loeber, R., & Stouthamer-Loeber, M. (1998). Development of juvenile aggression and violence: Some common misconceptions and controversies. *The American Psychologist*, 53(2), 242–259.
- Lynne-Landsman, S. D., Graber, J. A., Nichols, T. R., & Botvin, G. J. (2011). Trajectories of aggression, delinquency and substance use across middle school among urban, minority adolescents. *Aggressive Behavior*, 37, 161–176.
- Magdol, L., Moffitt, T. E., Caspi, A., Newman, D. L., & Fagan, J. (1997). Gender differences in partner violence in a birth cohort of 21-year-olds: Bridging the gap between clinical and epidemiological approaches. *Journal of Consulting and Clinical Psychology*, 65, 68–78.
- Martino, S. C., Ellickson, P. L., Klein, D. J., McCaffrey, D., & Edelen, M. O. (2008). Multiple trajectories of physical aggression among adolescent boys and girls. *Aggressive Behavior*, 34, 61–75.
- Mata, A. D., & van Dulmen, M. H. M. (2011). Adult-onset antisocial behavior trajectories: Associations with adolescent family processes and emerging adulthood functioning. *Journal of Interpersonal Violence*, 30, 1–17.
- Mazerolle, P., Capowich, G., & Piquero, A. R. (2003). Examining the links between strain, situational and dispositional anger, and crime. *Youth & Society*, 35, 131–158.
- McGee, T. R., & Farrington, D. P. (2010). Are there any true adult-onset offenders? *British Journal of Criminology*, 50, 530–549.
- Miles, D. R., & Carey, G. (1997). Genetic and environmental architecture of human aggression. *Journal of Personality and Social Psychology*, 72(1), 207–217.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Bulletin*, 100, 674–701.
- Moffitt, T. E., Caspi, A., Rutter, M., & Silva, P. A. (2001). *Sex differences in antisocial behavior: Conduct disorder, delinquency, and violence in the Dunedin Longitudinal Study*. New York: Cambridge University Press.
- Molero, Y., Larsson, A., Larm, P., Eklund, J., & Tengstrom, A. (2011). Violent, nonviolent and substance-related offending over the life course in a cohort of males and females treated for substance misuse as youths. *Aggressive Behavior*, 37, 338–348.
- Ogden, C. L., Caspi, A., Poulton, R., Harrington, H., Thompson, M., Broadbent, J. M., et al. (2007). Prediction of differential adult health burden by conduct problem subtypes in males. *Archives of General Psychiatry*, 64, 476–484.
- Ogden, C. L., Moffitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., et al. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, 20, 673–716.
- Olweus, D. (1979). Stability of aggressive reaction patterns in males: A review. *Psychological Bulletin*, 86, 852–857.
- Paternoster, R., Dean, C., Piquero, A., Mazerolle, P., & Brame, R. (1997). Generality, continuity and change in offending careers. *Journal of Quantitative Criminology*, 13, 231–266.
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *The American Psychologist*, 44, 329–335.
- Patterson, G. R., & Yoerger, K. (1997). A developmental model for late-onset delinquency. In D. W. Osgood (Ed.), *Motivation and delinquency. Nebraska symposium on motivation*, 44. (pp. 119–177) Lincoln, NE: University of Nebraska Press.
- Piquero, A. R. (2011). James Joyce, Alice in Wonderland, the Rolling Stones, and Criminal Careers. *Journal of Youth and Adolescence*, 40, 761–775.
- Piquero, A. R., Brame, R., & Moffitt, T. E. (2005). Extending the study of continuity and change: Gender differences in adolescent and adulthood offending. *Journal of Quantitative Criminology*, 21, 219–243.
- Piquero, A. R., Farrington, D. P., & Blumstein, A. (2003). The criminal career paradigm. In M. Tonry (Ed.), *Crime and justice: A review of research*, Vol. 30. (pp. 359–506) Chicago: University of Chicago Press.
- Piquero, A. R., Farrington, D. P., & Blumstein, A. (2007). *Key issues in criminal career research: New analyses of the Cambridge study in delinquent development*. New York: Cambridge University Press.
- Piquero, A. R., Farrington, D. P., Nagin, D. S., & Moffitt, T. E. (2010). Trajectories of offending and their relation to life failure in late middle age: Findings from the Cambridge Study in Delinquent Development. *Journal of Research in Crime & Delinquency*, 47, 151–173.
- Piquero, A. R., Shepherd, I., Shepherd, J., & Farrington, D. P. (2011). Impact of offender trajectories on health: Disability, hospitalization, and death by middle age in the Cambridge Study in Delinquent Development. *Criminal Behaviour and Mental Health*, 21, 189–201.
- Siegel, J. A. (2000). Aggressive behavior among women sexually abused as children. *Violence and Victims*, 15, 235–255.
- Silverthorn, P., & Frick, P. J. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. *Development and Psychopathology*, 11, 101–126.
- Tremblay, R. E. (2000). Origins of youth violence. *Canadian Journal of Policy Research*, 1, 19–24.

- Tuvblad, C., Raine, A., Zheng, M., & Baker, L. A. (2009). Genetic and environmental stability differs in reactive and proactive aggression. *Aggressive Behavior*, 35, 437–452.
- Underwood, M. K., Beron, K. J., & Rosen, L. H. (2009). Continuity and change in social and physical aggression from middle childhood through early adolescence. *Aggressive Behavior*, 35, 357–375.
- Vickermann, K. A., & Margolin, G. (2008). Trajectories of physical and emotional marital aggression in midlife couples. *Violence and Victims*, 23, 18–34.
- White, N. A., & Piquero, A. R. (2004). An empirical test of Silverthorn and Frick's challenge to Moffitt's developmental taxonomy. *Criminal Behaviour and Mental Health*, 14, 291–309.
- Widom, C. S., Schuck, A. M., & White, H. R. (2006). An examination of pathways from childhood victimization to violence: The role of early aggression and problematic alcohol use. *Violence and Victims*, 21, 675–689.
- Xie, H., Drabick, D. A. G., & Chen, D. (2011). Developmental trajectories of aggression from late childhood through adolescence: Similarities and differences across gender. *Aggressive Behavior*, 37, 387–404.