

## Developmental trajectories of physical aggression: prediction of overt and covert antisocial behaviors from self- and mothers' reports

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Running head: TRAJECTORIES OF PHYSICAL AGGRESSION: COMPARING SELF AND  
MOTHER

Developmental Trajectories Of Physical Aggression: Prediction Of Overt And Covert  
Antisocial Behaviors From Self And Mothers' Reports

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## ABSTRACT

Physical aggression declines for the majority of children from preschool to elementary school. Although this desistance generally continues during adolescence and early adulthood, a small group of children maintains a high level of physical aggression over time and develops other serious overt and covert antisocial behaviors. Typically, researchers have examined relations of developmental changes in physical aggression to later violence with teachers' or mothers' reports on surveys. Little is known about the degree to which children's self-reported physical aggression predicts later antisocial behavior.

The longitudinal study in this article had a staggered, multiple cohort design. Measures of physical aggression were collected through self and mother reports from age 11 to 14, which were used to construct trajectory groups (attrition was 6% and 14% from age 11 to 14, respectively, for self- and mother-reports). Overt and covert antisocial behaviors were self-reported at age 18-19 (attrition was 36% from age 11 to 18-19). Four trajectory groups (low stable, 11%; moderate-low declining, 34%; moderate declining, 39%; high stable, 16%) were identified from self reports, whereas three trajectories (low declining, 33%; moderate declining, 49%; high stable, 18%) were identified from mothers' ratings. We examined the prediction of overt and covert antisocial behaviors in early adulthood from the high stable and the moderate declining trajectories. According to both informants, higher probability of belonging to the high stable group was associated with higher overt and covert antisocial behavior, whereas higher probability of belonging to the moderate declining group was associated with higher covert antisocial behavior. Our results support the value of children's as well as mothers' reports of children's aggression for predicting different types of serious antisocial behavior in adulthood.

**KEYWORDS:** aggression, multiple informants, longitudinal analysis, overt antisocial behavior, covert antisocial behavior.

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## INTRODUCTION

A number of researchers have argued that it is important to differentiate physical aggression from other types of aggression [40]. In recent decades, children's physical aggression (*PA*) has received more empirical attention than other modes of aggressive behavior, likely because it is the most predictive of risk for the development of maladjustment during childhood, adolescence, and early adulthood [3, 5, 6, 39]. Similar trajectories of *PA* typically have been identified in samples of elementary school aged children and pre-adolescents; these are a group with low stable aggression over time, a group (to which the majority of children belong) exhibiting a moderate level of aggression that declines over time, and a group with high stable aggression over time [3, 5, 12, 31]. It has been found that aggressive children are prone to develop an overt antisocial pathway characterized by an escalation from minor aggressive (e.g., bullying, annoying others) to serious violent behaviors (e.g., gang fighting, physical assault) [14]. However, the frequency of reported overt forms of antisocial behavior generally decreases during the emergence of adulthood [14]. In addition, aggressive children can also develop a covert antisocial pathway (that is stable during childhood and increases from early adolescence to adulthood) characterized by minor covert antisocial behaviors (e.g. shoplifting, lying), followed by property damage (e.g. fire setting, vandalism), and finally by serious types of thefts [14]. In particular, an increased risk for violent and nonviolent offending in adolescence has been noted for those individuals, mainly boys, who belong to the high stable *PA* trajectory throughout childhood and pre-adolescence [3, 5, 31].

Accordingly, effective prevention strategies of antisocial behavior have been implemented in early phase of development [15, 41], targeting multiple risk factors both at the individual and contextual level (school, peer, family, and community) [11, 15, 16, 18, 37]. However, further research efforts on aggressive behaviors within a developmental trajectory framework can be useful

to identify subgroups of children who are the best candidates to behave antisocially over time and, thus, are most likely in need of intervention.

Initial information of relevance to planning interventions is available from the impressive findings in existing longitudinal research on children's *PA*. However, there are some significant limitations in this body of work. To our knowledge, researchers previously have not examined if specific developmental pathways of *PA* are linked with specific antisocial pathways (i.e., overt and covert antisocial pathways) in young adulthood. In addition, investigations of developmental trajectories for nonaggregated types of aggressive behaviors (e.g., *PA* separated from other types of aggression) usually have not involved multiple raters. The majority of these studies have relied on teachers' or mothers' reports [5, 31], whereas relatively little is known about *PA* trajectories based on self reports. To our knowledge, the only exception is the study of Martino and colleagues [26], who identified *PA* trajectories from adolescents' reports.

Beyond the three typical physical aggression trajectories (low stable, desisting, high stable), Martino et al. [26] identified a trajectory that started low but increased throughout adolescence and then declined in late adolescence. This result is in agreement with what has been suggested in other studies that not all individuals who become delinquent or violent have a history of early aggression [3, 25, 35]. Moreover, Martino et al. [26] found that several self-reported indicators measured at Grade 7 (e.g., parental supervision, deviant peer association, academic orientation, impulsivity, and emotional distress) were all strongly associated with trajectory class membership, with higher maladjustment indicators being positively associated with the more problematic developmental pathways. However, Martino et al. [26] did not examine the predictive validity of *PA* trajectories respect to adult outcomes. Moreover, these authors underlined the importance of determining whether their findings based on self-reports would replicate using data that incorporates different informants.

There is some disagreement among researchers about the validity of self report of *PA*. Some investigators have argued that self reports are advantageous because children can report episodes

that mothers do not know about [24] and that teachers may underestimate [26]. Others have argued that self reports are problematic because children may not recognize their own behavior as aggressive or are less willing than parents to report their aggressive behaviors [13].

However, the use of multiple-informant strategies frequently has been recommended to improve the study of aggression [2, 33]. Some investigators have followed this advice in studies of either aggregated forms of children's aggression [9, 24, 25, 32, 43] or nonaggregated forms of adolescents' aggression [34]. Others have used repeated measurements, relying on different informants over many years, to obtain information on either inter-individual [7] or intra-individual change in aggression [6, 39]. Overall, moderate inter-informant agreement has been found for externalizing behaviors because they are directly observable by different informants [2, 43]; however, relatively low adult-youth agreement on reports of child psychopathology is typical [2, 13].

Because of the need to better understand the validity of preadolescents' self-reported *PA* and the predictive relation of *PA* to serious externalizing problems in adulthood, the goals of the present study were (1) to determine the similarity of the developmental trajectories of *PA* during pre-adolescence using self-reports and mothers' reports; (2) to examine the predictive validity of the identified trajectories based on both informants in respect to overt and covert antisocial behaviors in early adulthood. This study goes beyond the study of Martino et al. [26] by replicating similar *PA* pathways with data that incorporated multiple reporters' perspectives and validating the usefulness of self reports in identifying children with chronic physical aggression and in predicting antisocial tendencies in early adulthood. Such results would be helpful for practitioners working in prevention programs with limited resources.

## METHODS

### *Participants and Procedure*

Participants were 439 children (55% boys) from a longitudinal study on social adjustment. Children were drawn from two regular public schools in Genzano, a residential community located

30 km far from Rome, Italy. The community of Genzano represents a socioeconomic microcosm of the larger society, composed of families of skilled workers, farmers, professionals, local merchants and their service staff. In particular, the occupational socio-economic distribution of the children's families matched the Italian national profile [21]. Families with different socioeconomic status are integrated within this community in terms of both residence in which they live and schools that their children attend. The socioeconomic diversity of the sample and high residential integration adds to the generalizability of the findings. Consistent with national statistics, most subjects were from intact families (94%) and two-children families (64%).

The longitudinal project followed a staggered, multiple cohort design, with four cohorts assessed initially at age 11 in 1992, 1993, 1994, and 1995. They were reassessed yearly at ages 12, 13, and 14. All of the children enrolled in these grades participated in the study unless they happened to be absent from school when the measures were administered (on average 11% at age 11). Finally, due to funding limitations, the last follow-up took place in two different years (2000 and 2002) and included most of the original sample at the age of 18 (cohorts that started in 1993 and 1995) and 19 (cohorts that started in 1992 and 1994). Data collections' schema differentiated by cohort is reported in Table 1; the sample size over time is reported in Table 2.

Insert Table 1 here
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Participants attended 6<sup>th</sup> grade at age 11 and junior high school between ages 12 and 14. At age 18, 81% of the participants attended high school, 11% were college students, and 8% were workers; at age 19, 66% of the participants attended high school, 16% were college students, and 18% were workers (mostly unskilled).

Preliminary analyses indicated that children who participated all four time lags were rated as no different in aggression and in demographic variables than children who missed either one, or two data collections. Children who missed more than two data collections were not included in the present paper. Of the 439 children who participated in the present study, 294 of their mothers agreed to participate. Mothers provided yearly ratings when children were between the ages of 11

and 14. Those mothers who did not participate in the research (30%) were traced by the researchers, they said they would participate in the research but never did so.

Those mothers who did not participate in the research did not differ in marital status, occupation, or years of education from those mothers who participated (respectively,  $\chi^2(3) = 1.027$ ,  $p = .79$ ;  $\chi^2(8) = 13.274$ ,  $p = .10$ ;  $\chi^2(3) = 1.027$ ,  $p = .79$ ;  $\chi^2(4) = 5.089$ ,  $p = .28$ ). In addition, children whose mothers participated did not differ in self-reported aggression from children whose mothers did not participate, *PA* at age 11:  $F(1,437) = .096$ ,  $p = .76$ ; at age 12:  $F(1,400) = 3.173$ ,  $p = .076$ ; at age 13:  $F(1,429) = 3.267$ ,  $p = .071$ ; and at age 14  $F(1,401) = 2.259$ ,  $p = .134$ . Children whose mothers participated at all four assessments were rated as more aggressive at 11 years old than children whose mothers missed one of the four assessments, whereas there were no significant differences at 12, 13, and 14 years old (*PA* at age 11:  $F(1,216) = 4.25$ ,  $p = .040$ ; *PA* at age 12:  $F(1,245) = .238$ ,  $p = .626$ ; *PA* at age 13:  $F(1,252) = .016$ ,  $p = .899$ ; *PA* at age 14:  $F(1,149) = .804$ ,  $p = .371$ ). Attrition of children and mothers from age 11 to 14 was 6% and 14%, respectively, and was mainly due to relocation from the area or absence from school at the time of the assessments.

Participants were administered the measures by three female researchers during specially scheduled sessions in a school. Mothers completed the questionnaire at their child's school in a group setting. After junior high school, youths were invited to participate in the study by phone and they received paper versions of the questionnaires via mail to complete at home. They were asked to return the completed questionnaires to the researchers during specially scheduled sessions at a school. They received a small payment for their participation in the research (about 25 €).

During the entire research project, consents/assents were obtained, experimenters offered explanations as needed, and confidentiality was guaranteed for all participants. The entire study was approved by Sapienza University of Rome's Human Subjects Institutional Review Board.

### *Measures*

*Physical aggression (PA)*. Items pertaining to *PA* (6 for children, 5 for mothers) from the Physical and Verbal Aggression Scale<sup>1</sup> (*PVA*) [9] were rated by children and mothers (1= *never*; 3



= often; e.g., *I kick and hit or punch; items were in the third person for mothers*; mean alphas for self- and mother reports of *PA* from age 11 to 14 = .80 and .81, respectively).

*Overt antisocial behavior (OAB)*. *OAB* was assessed with self ratings (1 = never, 5 = often) on 4 items of the Violence Scale [8] (i.e., Have you participated in violent gangs actions?; Have you participated in violent actions of supporters groups?; Have you been involved in fights between people or rival groups?; Have you ever used violence during a quarrel?; mean alpha across ages 14, 18, and 19 =.78).

*Covert antisocial behavior (CAB)*. *CAB* was assessed with self ratings (0 = not true, 2 = very true or often true) on 5 items from the Youth Self-Report (YSR) [1] (I lie or cheat; I set fires; I steal things at home; I steal things from places other than home; I use alcohol or drugs other than for medical conditions; mean alpha at ages 14, 18, and 19 =.70).

#### *Analytic Approach*

To explore if the frame of reference of *PA* for each reporter was stable over time [42], the longitudinal factorial invariance of the *PA* factor structure was analyzed separately for self and mother reports. The *PA* items were considered ordered categorical variables because of their three-point response format. With categorical data, two models are recommended [28]: the unconstrained model (i.e., thresholds and factor loadings are freed across groups) and the constrained model (i.e., thresholds and factor loadings are constrained to be equal across groups). Evidence for longitudinal invariance was examined by comparing the overall fit of the models and testing for the significance of difference in the  $\chi^2$  value, based on *WLSMV*  $\chi^2$  (i.e., weighted least square mean- and variance-adjusted  $\chi^2$ ), using Mplus 4.21 [28]. Partial longitudinal invariance occurs when significant difference in the  $\chi^2$  value between unconstrained and constrained models occurs [28]. Evaluation of the goodness of fit was based on indices that are less sensitive to sample size. Comparative Fit Index (*CFI*) values of at least .95 [20] and Root-Mean-Square Error of Approximation (*RMSEA*) values lower than .05 are considered good [20], whereas *RMSEA* values between .05 and .08, reflect an acceptable error of approximation [4].

In order to identify distinct developmental patterns of *PA*, we used the group-based semi-parametric approach recommended by Nagin [29, 30] with SAS Proc-Traj [22]. For each participant, Proc Traj produces an explicit metric (i.e., the posterior probability of group membership in each trajectory group) for evaluating the accuracy of group assignments [29]. The term *trajectory probability* is used when referring to the probability of an individual's membership in each of the trajectory groups (continuously distributed probabilities). In addition, Proc Traj assigns a categorical score based on each individual's highest trajectory probability. When referring to the categorical group score that is assigned to each participant, the term *trajectory membership* is used.

We conducted analyses to identify the best fitting trajectory models (censored normal models using continuous variables) for self or mother reports, including sex as a time independent covariate [22]. We report the results of the multivariate logit regressions used to examine if sex affected the trajectory membership. Then we investigated inter-informant agreement of the trajectory groups by performing cross-tabulations between the trajectory membership related to the trajectories modeled from self and mothers' reports of *PA* using a  $\chi^2$  test and estimates of the standardized residuals. In addition, correlations across reporters were computed for yearly *PA* scores. Children who missed more than two data collections were not included in the aforementioned longitudinal analyses.

Finally, in order to explore the association of mother- and self-reported *PA* trajectories with *OAB* and *CAB* in young adulthood, a path analysis was used to test *PA* predicting age 18-19 *OAB* and *CAB*. Specifically, due to the longitudinal design of our study, part of our sample was followed up at age 18 (for those who were 11 years old in 1993 and in 1995), part was followed up at age 19 (for those who were 11 years old in 1992 and in 1994). We computed two new variables called *OAB at age 18-19* and *CAB at age 18-19* by collapsing into a single variable the data from the corresponding variables at ages 18 or 19. Then we created a control variable, called *age 18-19*, to take into account the age at which *OAB* and *CAB* were assessed.

We computed a multigroup path analysis (the self-reported and mother-reported information were the two levels of the group variable) in which the trajectory probabilities were the potential predictors of long-term *OAB* and *CAB*, while controlling for sex, the initial level of both antisocial behaviors (age 14) <sup>2</sup>, and the age 18-19 covariate.

To examine differences in the estimated parameters based on self and mother reports, we constrained all parameters to be equal across groups and used the  $\chi^2$  difference test to compare nested models [28]. The model fit was assessed with the same indices discussed previously in relation to longitudinal invariance.

Maximum likelihood estimation under missing at random assumption was specified in order to optimally take into account the available data [28].

## RESULTS

Means and standard deviations for the major variables are presented in Table 2.

Insert Table 2 here
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### *Longitudinal invariance*

For self reports, the  $\chi^2$  difference test did not support the viability of the full longitudinal invariance hypothesis. Inspection of the modification indices suggested that one item, and its corresponding threshold, was not invariant across time points. In the partially constrained model, beyond the significant  $\chi^2$ , all the fit indices satisfied the recommended criteria and the difference in  $\chi^2$  test supported partial longitudinal invariance,  $\chi^2 (n = 439 ; df = 76) = 102.222, p = .024; CFI = .991; RMSEA = .031, \Delta\chi^2 (\Delta df = 22) = 31.166, p = .093$ . According to Steenkamp and Baumgartner [38], the comparison of factor means (computed with all the *PA* items) across time points may be considered meaningful because at least one item besides the marker item had invariant intercepts in the *PA* dimension. In our case, longitudinal invariance of the *PA* dimension for self report supported the invariance of 5 out of 6 items across the four examined time lags; thus, we kept the one item that was not invariant in the composite score of *PA*.

For mother reports,  $\chi^2$  difference test supported full longitudinal invariance,  $\chi^2 (n = 294; df = 30) = 26.619, p = .485; CFI = 1.00; RMSEA = 0.00, \Delta\chi^2 (\Delta df = 15) = 12.123, p = .670$

### *Trajectory Models for PA.*

For self reports, the 4-group model comprised of two stable trajectory groups and two linear trajectory groups was the ideal solution. The average group assignment probabilities were between .80 and .87. For mothers' reports, the 4-group model was the ideal solution, but the smallest group had only 7 individuals (2.5% of sample); thus, the 3 group model with two linear and one stable trajectory was selected based on parsimony [30]. The average group assignment probabilities were between .84 and .89 (see Figure 1 for models).

Insert  
Figure 1 here

Table 3 presents the results of the multivariate logit regression examining the capacity of sex to distinguish membership in the trajectories membership. For self reports, relative to the low/moderate declining group, children either in the moderate declining group or in the high stable group were more likely to be boys. For mothers' reports, relative to the moderate declining group, children in the low stable group were less likely to be boys, whereas children in the high stable group were more likely to be boys.

Insert Table 3  
here

### *Inter-informant Agreement*

Table 4 presents the cross-tabulation between trajectory membership based on self and mother reports,  $\chi^2(6) = 128.583, p < .001$ . Children assigned on the basis of self-ratings to the low stable group were significantly more likely than expected by chance to be assigned to the low declining group based on mothers' reports and less likely to be assigned to the mother-reported moderate declining and high stable groups. Children assigned on the basis of self-ratings to the low/moderate declining group were more likely than expected by chance to be assigned to the mother-reported low declining group and also less likely to be assigned to the mother-reported high stable group. Children assigned to the self-reported moderate declining group were more likely to be assigned to the mother-reported moderate declining group and the low declining group. Finally, children assigned to the self-reported high stable group were less likely to be assigned to the mother-reported low declining group and more likely to be assigned to the high stable group.

Insert Table 4  
here

For both self and mother reports, longitudinal correlations from age 11 to 14 (i.e., within and across time) attested to moderate stability, with lower correlations the longer the distance of time. The zero-order correlations were all significant and ranged from .23 (across 4 years) to .49 (all but 2 of 16 across-reporter within- and across-time correlations were above .33, and the mean across-reporter correlation was .37).

### *Path analyses*

We computed a multi-group path analysis in which we included as potential predictors of long-term *OAB* and *CAB* the trajectory probabilities of belonging to the moderate declining group and to the high stable group. We create a “stacked” data file in which each case had two records, one for each informant. Due to the nonnormality of the *OAB* and *CAB* measures (the skewness varied from 2.25 to 3.12, the kurtosis varied from 5.11 to 9.90), the path model was estimated in MPlus using the multiple linear regression (MLR) estimator setting (maximum likelihood parameter estimates with standard errors that are robust to nonnormality and nonindependence of observations) [28].

The equivalence between the multiple groups was evaluated by constraining the estimates for the model’s parameters to be the same for self and mother reports. Both the unconstrained and the constrained models represented a good model-data fit,  $\chi^2(4) = 1.116, p = .89, CFI = 1.00, RMSEA < .001$  for the unconstrained model;  $\chi^2(15) = 5.917, p = .98, CFI = 1.00, RMSEA < .001$ , for the constrained model. Also, the  $\chi^2$  difference test,  $\Delta\chi^2(11) = .912, p = .99$ , supported the viability of an invariant association between the trajectory probabilities of belonging to both moderate declining and high stable developmental pathways with long-term *OAB* and *CAB* when assessed with self versus mother reports.

Figure 2 presents a diagrammatic representation of the constrained model and the path coefficients only for significant paths. In addition to the contribution either of sex to *OAB at age 18-19* (being male was associated with higher *OAB*) or of earlier *OAB* to *OAB at age 18-19*, the trajectory probability for belonging to the high stable group, based on both self and mother reports, significantly predicted *OAB* and *CAB* in early adulthood. The probability of being in the moderate

declining group, based on both self and mother reports, was positively related to only *CAB* at age 18-19. Finally, the significant path of the age covariate on both outcomes reflected higher values of both *OAB* and *CAB* at age 19 than at age 18.

Insert  
Figure 2 here

## DISCUSSION

Several investigators have argued that in order to better understand aggression, researchers need to investigate nonaggregated forms of aggressive behavior [40] and use multiple informant strategies [2, 13]. Historically, investigators focusing on *PA* have not relied on multiple informants, whereas those who have used different informants typically have examined aggregates of aggression [9, 13, 32].

Taking into account the distinct role of *PA* as a risk factor for later violence [5], we investigated the specific construct of *PA* from late childhood to adolescence according to two privileged points of view: the self and mothers. As a prerequisite to modelling change over time with latent growth curve analysis, we established partial longitudinal invariance of self-reported *PA* from age 11 to 14 and full longitudinal invariance for mothers' reports (i.e., we established that the frame of reference of *PA* for each reporter was stable over time).

In addition, consistent with previous studies [5, 31], four trajectory groups were identified for self reports of *PA* (high stable, moderate declining, low/moderate declining, and low stable), whereas three trajectories were identified for mothers' reports (high stable, moderate declining, low declining). This is the first study of *PA* trajectories in Italy and the similarities in the development of *PA* with other samples are notable.

The fact that more developmental trends were identified by self reports than by mothers' reports can be attributed to a greater ability of children, compared to mothers, either to be aware of their own behavior or to better discriminate the severity of their own behavior. Furthermore, this difference may be connected to the fact that in community samples, children tend to report more problematic behaviors than do parents [45].

Similar to Card et al. [10], according to both informants, girls were more likely to be assigned to the trajectory groups characterized by the lowest levels of *PA* over time, whereas boys were more likely to be assigned to groups displaying higher levels of *PA*. Moreover, in accordance with others' findings [13], we found a moderate level of agreement between raters on *PA*. Importantly, these findings support the validity of children's self-reported *PA* in childhood and early adolescence.

Consistent with other previous studies in which aggression was disaggregated [3, 5, 31], those who belonged to the high stable trajectory based on either self- or mothers' reports were more likely to be at risk for both *OAB* and *CAB* later in development. Moreover, as discussed by different authors [14], our results are consistent with findings that *OAB* and *CAB* may have a diametrically opposite development cycle. In fact, those who belonged to the moderate declining physically aggressive group, as assessed by both self and mother reports, tended not to be significantly related to *OAB* but were significantly related to *CAB*.

Finally, consistent with others who have not found the so-called "late onset" group [5, 31], we did not find evidence of a group of preadolescents who increased their level of aggression over time in our identified trajectories based on both informants. This is in contrast with Martino et al. [26] who examined self-reported *PA* trajectories and found an increasing trend. This may be due to the fact that their trajectories did not end at 14 years old as did ours and those as in other studies [5, 31]. Or it may be due to the fact that the construct of *PA* they referred to focused not only on physically aggressive behavior as in this study, but also on threats of physical aggression. However, we did find some support for the existence of young adults who behave antisocially even though they did not belong to an increasing pathway of *PA* during adolescence. In fact, we found a significant association between the moderate decreasing *PA* pathway (based on both informants) and *CAB* at age 18-19. This result is in agreement with Brame et al. [3] who did not examine the trajectories of *PA* with self-reports and did not find an increasing trajectory for *PA*, but did find a significant association between belonging to a desisting *PA* pathway from 6 to 13 years old and belonging to an increasing delinquency pathway from 13 to 17 years old.

Moreover, our results may indirectly support the declining developmental pathway of *OAB* and the increasing developmental pathway of *CAB* from adolescence until adulthood [14].

The use of self-reports in our study can be viewed as a limitation if we consider the fact that self-reports can be biased due to imperfect memory and to socially desirable responding [26]. However, mother/teacher-reported aggression can be similarly susceptible to such distortions and the continuity and the predictive validity of self-reported violent and delinquent offences have been supported [19]. Thus, overall, the resemblance between the trajectories we identified based on self-reports and mothers' reports and their similar predictive validity in respect to antisocial behavior in early adulthood gives us confidence in the veracity of our participants' reports and, more generally, provide additional support for the validity for self-reports.

A limitation of this study is that, although we did look at sex differences in the identified models (accounting for sex as a covariate), we did not identify *PA* trajectories using separate samples for boys and girls as in some previous studies [17, 29]. This was due to our smaller sample size in comparison to other studies relying upon growth mixture modeling approaches. Moreover, caution should be used in generalizing results from the present study to other populations because participants in this study were Italians, predominantly middle-class, educated, and from two-parent families.

## CONCLUSION

Most of what is known about children's *PA* is what children's teachers or mothers report on questionnaires. In our study, we clearly found that what children report, as well as mother report, is useful when studying the relation between disaggregated forms of aggressive behaviors and the risk for later *OAB* and *CAB*. This suggests that additional information is needed before drawing the conclusion that self-reported *PA* is not very reliable prior to adolescence [13]. The findings suggest preadolescents' self-reported *PA* may be useful in identifying children at-risk for *OAB* and *CAB* who are candidates for intervention programs. Finally, in line with our findings, practitioners should focus their attention not only on those children who are chronically aggressive, but also on those



who exhibit an initial moderate level of *PA* that decreases over time. The latter can be candidates for endorsing more *CAB* (rather than *OAB*).

#### FOOTNOTES

<sup>1</sup> Previous psychometric studies on the *PVA* scale have not explored its multidimensionality but sustained its monolithic dimensionality based on exploratory factor analyses [9, 32]. In order to update these results, confirmatory factor analyses were conducted to examine the factor structure of the *PVA* scale for self and mother reports, accounting for the order categorical nature of its items. A two-factor model provided a better fit to the *PVA* scale for both self and mother reports: one factor for physical aggression and another one for verbal aggression. Details on these analyses are available from the first author upon request. Only *PA* was used in this study.

<sup>2</sup> In each model, the initial level of the outcome referred to the unique contribution of the outcome at age 14 that was not shared with *PA* at age 14. Thus, we obtained residual variables by regressing *PA* at age 14 based on self report onto *OAB* and *CAB* at age 14 (explained variances were, respectively, 38% and 15%).

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Table 1. Data Collections' Schema Differentiated by Cohort

	Cohort 1	Cohort 2	Cohort 3	Cohort 4
1992	11 years			
1993	12 years	11 years		
1994	13 years	12 years	11 years	
1995	14 years	13 years	12 years	11 years
1996		14 years	13 years	12 years
1997			14 years	13 years
1998				14 years
1999				
2000	19 years	18 years		
2001				
2002			19 years	18 years

Table 2. Descriptive Statistics of the Measures

PHYSICAL AGGRESSION		
	Self-Report	Mother Report
AGE	N (% boys)	N (% boys)
11	439 (55%)	219 (53%)
12	397 (55%)	248 (52%)
13	426 (55%)	291 (58%)
14	399 (55%)	188 (62%)
OVERT BEHAVIOR		
	Children sample of Physical Aggression	Mother Sample of Physical Aggression
	N (% boys)	N (% boys)
14	398 (55%)	277 (58%)
18 -19	282 (54%)	208 (57%)
COVERT BEHAVIOR		
	Children sample of Physical Aggression	Mother Sample of Physical Aggression
	N (%boys)	N (%boys)
14	400 (55%)	279 (58%)
18-19	283 (54%)	209 (57%)

Table 3. The Relation of Sex to Group Membership Probabilities, Separately for Self and Mother Reports

	SELF REPORT				MOTHER REPORT		
	LOW	LOW/MODERATE	MODERATE	HIGH	LOW	MODERATE	HIGH
	STABLE	DECLINING	DECLINING	STABLE	DECLINING	DECLINING	STABLE
CON	-.83*	-	-1.18**	-	.501	-	-2.32**
STANT				2.79**			
SEX	-3.09	-	2.43**	3.24**	-2.12**	-	1.67*

*Note.* Males were coded as 1, females as 0. P-value <.01\*\* <.05\*



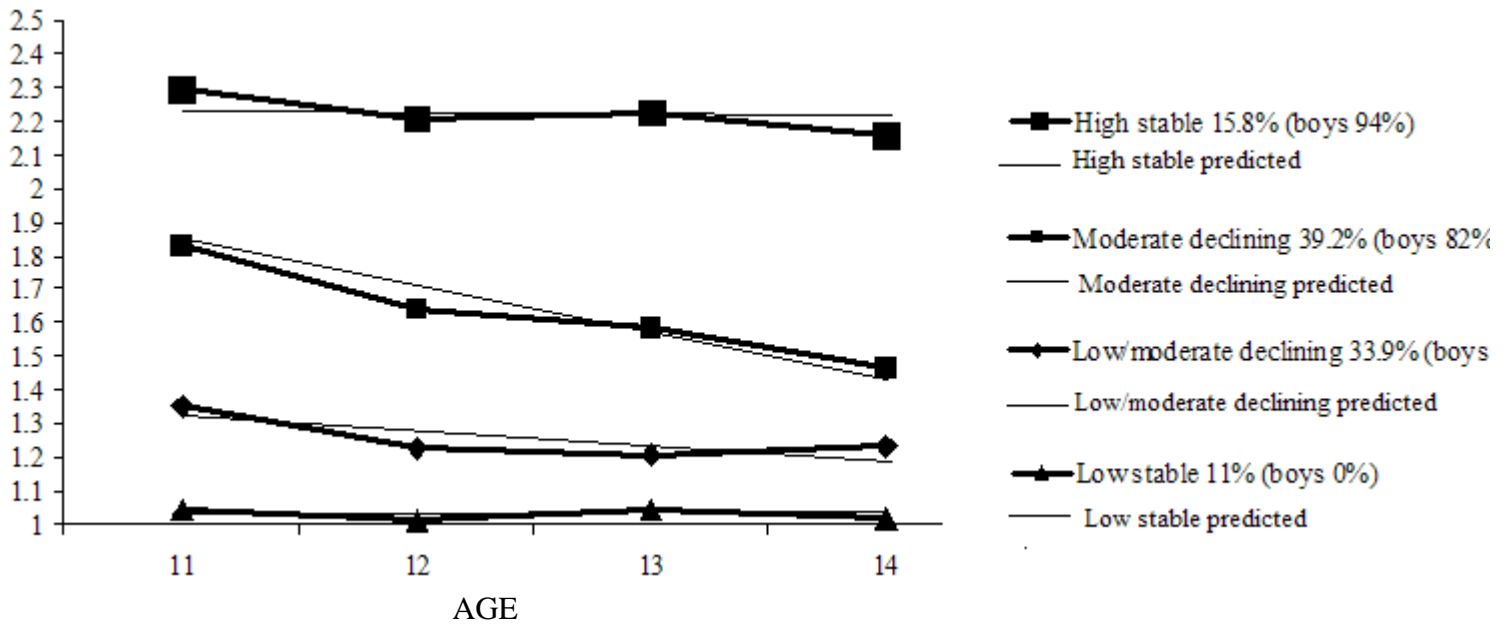
Table 4. Cross-Tabulations of Trajectories Based on Self and Mother Reports

		MOTHER-REPORTS				
		LOW DECLINING	MODERATE DECLINING	HIGH STABLE	TOTAL	
SELF-REPORTS	LOW STABLE	Count	29	7	1	37
		Std. Residual	4.99	-2.57	-2.33	
	LOW/MODERATE DECLINING	Count	50	44	2	96
		Std. Residual	3.48	-0.35	-3.89	
SELF-REPORTS	MODERATE DECLINING	Count	14	74	31	119
		Std. Residual	-3.90	2.18	1.55	
	HIGH STABLE	Count	1	17	24	42
		Std. Residual	-3.39	-0.73	5.46	
	TOTAL	Count	94	142	58	294

Figure 1. Physical Aggression Trajectories Based on Self and Mothers' Reports From Age 11 To 14

Years

SELF REPORT



MOTHERS' REPORT

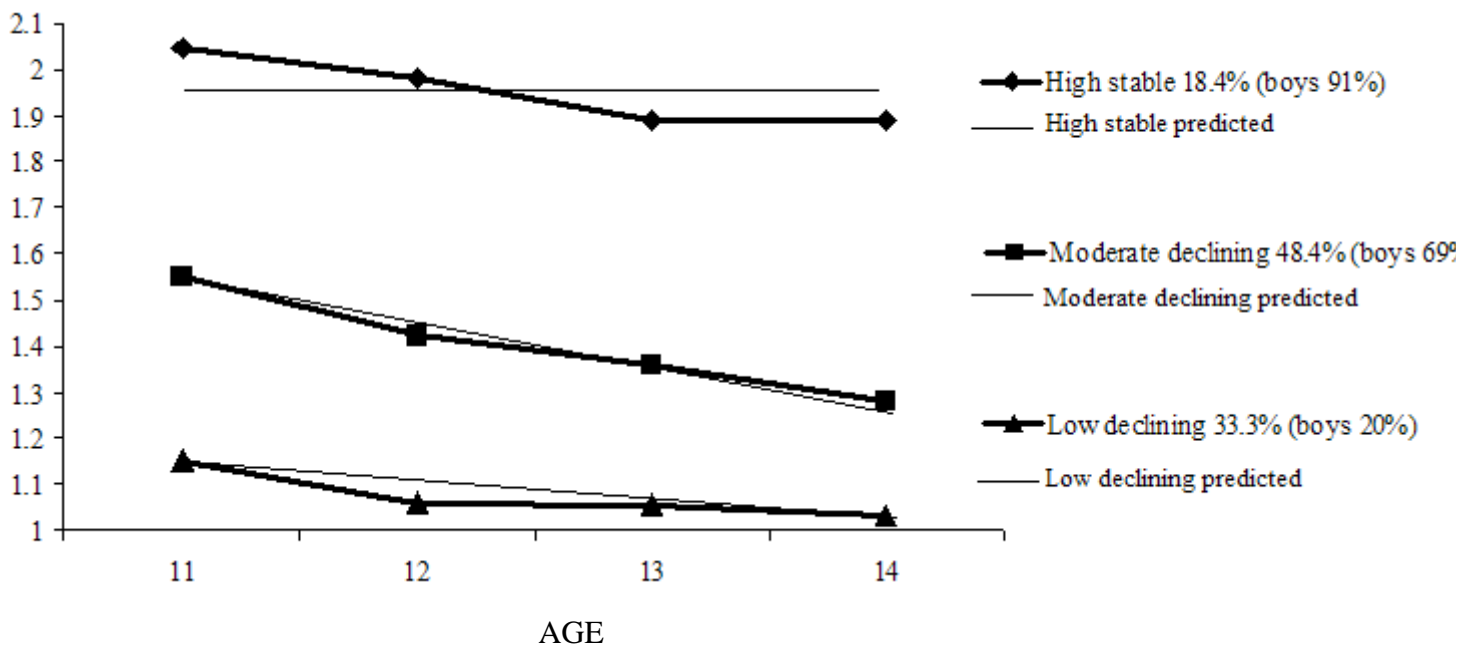
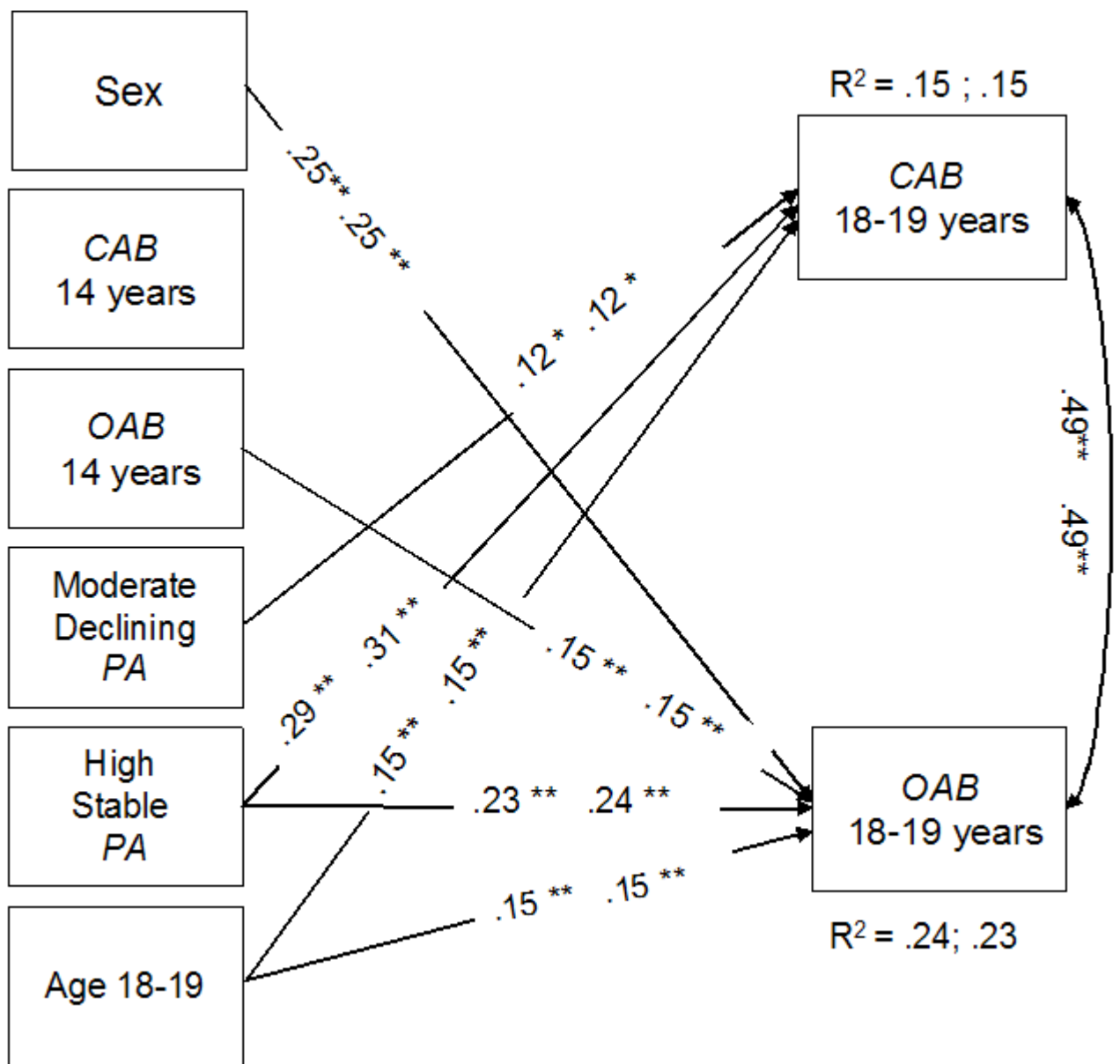


Figure 2. Multiple-Group Path Analysis of Physical Aggression Trajectory Probabilities Predicting *OAB* and *CAB*.



*Note.* *OAB* stands for overt antisocial behavior. *CAB* stands for covert antisocial behavior. *PA* stands for physical aggression. Significant standardized estimates of the constrained model (i.e., all the path are constrained to be equal across groups) are reported. The estimates refer to, first, the group in which the trajectory probabilities were based on self report and, second, to the group in which the trajectory probabilities were based on mothers' reports. Males were coded as 1, females as 0.