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The Effects of Marginal Deviations on Behavioral Development

Gian Vittorio Caprara¹, Kenneth A. Dodge², Concetta Pastorelli¹, and Arnaldo Zelli³

¹ University of Rome “La Sapienza,” Italy

² Duke University, Durham, NC, USA

³ University of Movement and Sport Sciences of Rome (IUSM), Italy, and The Conduct Problems Prevention Research Group

Abstract

This investigation was conceptually framed within the theory of marginal deviations (Caprara & Zimbardo, 1996) and sought evidence for the general hypothesis that some children who initially show marginal behavioral problems may, over time, develop more serious problems depending partly on other personal and behavioral characteristics. To this end, the findings of two studies conducted, respectively, with American elementary school children and Italian middle school students are reviewed. These two studies show that hyperactivity, cognitive difficulties, low special preference, and lack of prosocial behavior increase a child's risk for growth in aggressive behavior over several school years. More importantly, they also show that equivalent levels of these risk factors have a greater impact on the development of children who, early on, were marginally aggressive.

Keywords

development; marginal deviations; aggression

Literature in psychology and natural sciences has pointed to small differences that become impressive when they hold under inauspicious circumstances (Prentice & Miller, 1992), small effects that lead to significant outcomes when accumulating over time (Abelson, 1985), and small shifts that initiate large changes (Prigogine & Nicolis, 1987).

In past years, these notions have found a fertile terrain in the theory of marginal deviations (Caprara, 1992; Caprara & Pastorelli, 1993; Caprara & Zimbardo, 1996). Overall, this theory focuses on the possible ways micro-elements may end up as macro-phenomena in a child's development and on the reciprocity of misunderstandings and misattributions between the marginally deviant child and the participants in that child's ecological systems. An important premise of the theory of marginal deviations is that these complex processes of effects are particularly marked among children who initially display behavioral signs that are only marginally deviant with respect to context-bound behavioral norms. The research described in this paper stems from this theoretical framework and examines the longitudinal effects of marginal deviations on children's behavioral development of aggression in two different school contexts, namely, among American elementary school children and Italian middle school adolescents.

Marginal Deviations

Aggression is one of the most stable personality characteristics (Olweus, 1979) that place individuals at risk for maladjustment. Nonetheless, a comprehensive theory of the development of aggressive behavior must account for not only the stability of aggression in an extreme group of aggressive children but also the growth of aggression in children who are initially only marginally deviant. A particular problem arises for children who are marginally aggressive, that is, children who initially display behaviors that may be categorized as aggressive or lead to aggressive trait dispositional judgments in others. Since raters tend to use categories rather than dimensions to evaluate others (Fiske, 1993), they try to decide whether the marginally aggressive child is truly aggressive or not. Among peers and adults, the same noxious behaviors may be appraised and treated differently when framed in different contexts or associated with other disturbing behaviors. This ambiguity of meaning is particularly true in the case of offensive behaviors that are at the limits of public recognition and tolerance such as name calling, teasing, yelling, or scolding. Whereas some children may benefit from benign attributional indulgence more than others (Ross & Nisbett, 1991), the accumulation of effects caused by various sources of annoyance may import the aggressive label just because of its higher accessibility.

Along the same line of reasoning, it has been speculated that microdeviations along a variety of dimensions of social interaction, none of which is significantly deviant, may, when repeated and aggregated over time, arouse feelings and reactions in others that eventually foster a career of rejection and deviancy (Caprara & Zimbardo, 1996). Marginal deviation is the term we have used to define the small degree of reliable variability in specific forms of behavioral functioning between one target group or a particular child and a normative baseline. Whereas the mean corresponds to the latitude of common behavior that serves as the standard of comparison or anchor, marginal deviations refer to hardly noticeable deviations from this mean. We hypothesized that the relation between the number or diversity of perturbations and their functional impact is nonlinear and accelerating. Thus, we assert that the value of any single perturbation changes depending on what it adds to the existing state of appraisal created by a sequence of analogous perturbations.

But what determines whether peers will categorize a marginally aggressive child as aggressive or not aggressive? We hypothesize that peer raters will evaluate a pattern of behaviors in related domains (e.g., hyperactivity, prosocial behavior) to determine what judgment to make. Peers, adults, and even the self operate with a construction of the world in which negative features are assumed to correlate and to indicate the underlying presence of even more negative features, as in a stereotype. When a child is marginally annoying across a variety of behavioral and relational dimensions, such as slightly socially unskilled, physically awkward, emotionally unstable, or occasionally aggressive, it may be parsimonious to subsume under one available type, the aggressive type, the multiple and often indistinguishable sources of aversive perturbation. The situation is aggravated when feelings, impressions, and judgments of another child accommodate into an implicit personality theory that dictates the appraiser's interactions with the child. The target child is put under closer evaluative scrutiny and any salient action will more likely be noticed and interpreted as relevant to the judgment being formed and in accordance with one's own theory.

The Behavioral Effects of Marginal Deviations

Thus, whereas some initially marginally aggressive children may develop more significant levels of aggression, others may not, and it is argued that the reasons for this difference in outcome can be sought, at least in part, in the unique and aggregated effects of particular individual differences.

The above considerations suggest several hypotheses concerning the linkages among marginal aggression, risk factors for aggression, and growth in aggressive behavior. The first hypothesis is that negative behavioral characteristics such as hyperactivity, lack of prosocial behavior and poor academic performance will predict increases in aggressive behavior for both marginally aggressive and marginally nonaggressive children (i.e., main effects). The second hypothesis is that marginal aggression has a moderating effect on the relations linking these same risk factors, such that the effects are stronger for marginally aggressive than marginally nonaggressive children (i.e., an interactive effect). The third hypothesis is that the effect of risk factors on aggression growth accelerates at relatively high risk levels (i.e., when the child presents many risk factors). The fourth hypothesis is that this nonlinear effect is significantly more pronounced among marginally aggressive than marginally nonaggressive children (i.e., an interaction between aggression status and the nonlinear effect of risk on aggression).

The American Study

Methods

Sample—This study examined groups of marginally aggressive and marginally nonaggressive boys and girls who were selected from a population of nearly 12,000 American children in 55 elementary schools that were part of a large-scale intervention study of conduct problems (“Fast Track Project,” see Conduct Problems Prevention Research Group, 1992, 1999, 2002 for details). All children who entered first grade in 1991, 1992, or 1993 were assessed, and assessments were conducted yearly in the spring of 4 consecutive school years (from Grade 1 to Grade 4). Fifty percent of the participants were boys. Approximately 38% were African-Americans, nearly 56% were European-Americans, and the remainder came from other ethnic groups (e.g., Asian, Native American, Latino). Child ethnicity was examined by comparing African-American children to non-African-American children.

Behavioral Assessment and Classification of Marginal Deviations—Teacher ratings and sociometric peer interviews were collected during assessments held in the spring of each of 4 consecutive years.

The Teacher Observation of Classroom Adaptation-Revised (TOCA-R, Werthamer-Larsson, Kellam, & Wheeler, 1991) was administered to teachers to obtain behavioral ratings measuring, among other variables, students’ inattention or problems in cognitive concentration (e.g., distractible, poor concentration, mind wonders, poor effort). For each child, teachers responded using a 5-point frequency scale with response options ranging from *almost never* to *almost always*. The scale of cognitive concentration problems showed substantial internal consistency ($\alpha = .85$) and was used as a proxy for children’s academic problems.

At least 70% of the children in each class participated in individual sociometric interviews. Each child was presented with a list of all his/her classmates and asked to provide a series of peer and behavioral nominations. In particular, they were asked to indicate the classmates whom they liked the best, as well as those classmates whom they liked the least. Following Coie and Dodge’s procedure (1983), nomination scores were tallied and standardized within classrooms. The difference between these two standardized nomination scores was computed, standardized again, and used as an index of a child’s social preference. Grade 4 scores on children’s social preference were not available. For behavioral items, children nominated their classmates who were aggressive (“Some kids start fights, say mean things, and hit other kids”), hyperactive (“Some kids get out of their seat a lot, do strange things, and make a lot of noise”), prosocial (“Some kids cooperate a lot. They help others and share”), and shy/withdrawn (“Some kids are shy and play alone most of the time”). For each of the four behavioral dimensions, a child obtained a percentage nomination score (i.e., the raw number of nominations divided by the number of raters).

Grade 1 standardized aggression nomination scores were then used to classify as marginally aggressive all those children who received a z-score ranging between zero and 1 standard deviation above the classroom mean. Because boys would be over-represented by this criterion, this classification procedure was employed only after standardizing sociometric scores within gender as well (i.e., to minimize the chances that the group of marginally aggressive children included a disproportionate number of male students). Following this procedure, 1,429 first graders were classified as marginally aggressive (798 boys and 631 girls). Throughout the analyses, this marginally aggressive group was compared to a group of 4,567 first graders who were classified as marginally nonaggressive on the basis of aggression standardized nomination scores ranging between 0 and 1 standard deviation below the classroom/gender mean (2,246 boys and 2,321 girls). Positive skewness in scores was responsible for the larger number of marginally nonaggressive than aggressive children. As expected, a univariate analysis of variance revealed no statistically significant classification-by-gender differences in the average level of sociometric aggression; $F(1,5,992) = 1.67, p = .20$.

Results

Table 1 shows the means and standard deviations for all measures (all measures are unstandardized with the exception of social preference scores). Statistics are presented at each time point for the entire sample, the marginally aggressive group, and the marginally nonaggressive group. Marginally aggressive first graders were more aggressive than their control peers in each of the following years (i.e., Grade 2 through Grade 4). At each year, the marginally aggressive first-grade children also had more cognitive concentration problems, and were more hyperactive, less able to act prosocially, and relatively less accepted than their counterparts. Finally, individual differences in aggression appeared to be slightly more stable over time among marginally aggressive (from .40 to .63) than marginally nonaggressive children (from .34 to .57).

Two of our hypotheses focused on the longitudinal relations between aggression growth and problems in other behavioral domains and on whether these relations varied significantly across marginally aggressive and nonaggressive children. Illustratively, we hypothesized that relatively hyperactive children would become more aggressive than would less hyperactive children, and that this hyperactivity effect would be significantly stronger in marginally aggressive children. For each group, Table 2 shows the six coefficients obtained by correlating both ethnicity and gender with the aggression scores in Grade 2 through Grade 4 and the twelve coefficients obtained by correlating hyperactivity, prosocial behavior, cognitive difficulties, and social preference at one school year to sociometric aggression in the following school year.

Compared to their respective counterparts, African-American children and boys, as well as children who early on were more hyperactive, who experienced more cognitive difficulties, who acted less prosocially, or who had lower social preference scores among peers, were significantly more aggressive in later school years. Furthermore, in line with the hypotheses, these longitudinal relations appeared to be somewhat higher among marginally aggressive than marginally nonaggressive children.

Thus, early behavioral problems predicted later aggression and this prediction appeared to be more pronounced among marginally aggressive than marginally nonaggressive children. We tested this pattern of results by performing a series of hierarchical regressions in which later aggression was predicted after controlling for initial levels of aggression. Interaction terms linking each behavioral predictor (e.g., early hyperactivity) to marginal aggression status were inserted to provide a statistical test of the differences in the longitudinal predictions across marginally aggressive and nonaggressive children, reported in Table 2.

In particular, aggression at a given year (i.e., Grade 2, Grade 3, or Grade 4 aggression) was regressed in five sequential steps onto, respectively, (1) the classification status of marginal aggression in first grade (0 = marginally nonaggressive, 1 = marginally aggressive) and the continuous aggression score obtained in the year prior to the aggression outcome (i.e., children's initial levels of aggression), (2) gender (0 = boys, 1 = girls) and ethnicity (0 = non-African-American children, 1 = African-American children), (3) the continuous scores of hyperactivity, prosocial behavior, social preference, and academic problems obtained in the year prior to the aggression outcome, (4) six two-way interaction scores created by multiplying each predictor in Step 2 and 3 by the marginal aggression status in Step 1 and 5) eight three-way interaction scores obtained by multiplying each of the predictors in Step 3 by classification status and by either gender or ethnicity.

Table 3 summarizes the results obtained in the three separate hierarchical regressions. For each analysis, the table shows the standardized β obtained for a predictor when it was first entered in the model (columns labeled "at entry"), its standardized β obtained at the end of the entire stepwise estimation (column labeled "last"), and the increment in explained variance associated with a statistically significant predictor (column labeled " R^2 increment").

Not surprisingly, there was clear evidence of temporal stability in aggression, over the elementary school years; that is, the more aggressive children were early on, the more aggressive they were rated by their peers a year later (i.e., from 12% to 39% of explained variance across the three regressions). More importantly, however, this stability did not completely account for the variation in children's aggression over time. Throughout the four school years, gender, ethnicity, hyperactivity, and cognitive difficulties in school predicted *change* in later aggression (i.e., the main effects modeled in Steps 2 and 3). Boys, African-American children, children who were more hyperactive, and children who had more cognitive difficulties early on became more aggressive than did their respective counterparts in the following years. Gender and hyperactivity exerted the strongest effects on children's aggression (respectively, $\beta = -.23$ and $\beta = .11$ for Grade 2 aggression growth, $\beta = -.12$ and $\beta = .14$ for Grade 3 aggression growth, and $\beta = -.12$ and $\beta = .07$ for Grade 4 aggression growth), and these main effects were associated with significant increments in explained variance in the aggression outcomes, especially in early years (13% and 3.2% of the variance in Grade 2 aggression growth were accounted for by gender and hyperactivity, respectively). Although statistically significant, the main effects and increments in explained variance associated with ethnicity and cognitive difficulties were much more modest in magnitude.

In line with our hypotheses, the prediction of aggression growth was significantly more pronounced among children who were marginally aggressive initially. In particular, marginally aggressive boys worsened behaviorally more than did marginally aggressive girls, and this gender difference was significantly larger than the difference between marginally nonaggressive boys and girls ($\beta = -.17$ and $\beta = -.10$ for the gender by status interaction predicting aggression growth in Grades 2 and 3, respectively). Likewise, children who in first grade were also more hyperactive worsened behaviorally more than did children who were less hyperactive, and the magnitude of this relation between hyperactivity and aggression growth was significantly greater among marginally aggressive children ($\beta = .07$). Finally, similar, albeit smaller, moderating effects on aggression growth emerged for ethnicity and cognitive difficulties. African-American second graders became more aggressive than European-American second graders, and this ethnicity difference was larger among marginally aggressive than marginally nonaggressive children ($\beta = .06$). Similarly, children who experienced more academic problems in Grade 3 became more aggressive within the following years, especially if they had shown marginally aggressive behaviors at the beginning of the school experience ($\beta = .10$).

It is important to point out that these statistically significant moderating effects were associated with quite modest increments in explained variance. Nonetheless, they provided the statistical evidence that the modeled effects linking early predictors and later aggression were more pronounced among children who early on were classified as marginally aggressive. These effects were not merely caused by a few children with extreme aggression scores. For many children, aggression worsened over time, and this trend particularly affected those children who were marginally aggressive during Grade 1. In particular, while nearly 24% of the marginally aggressive first graders obtained aggression standardized scores greater than 1 at each of the following three school years, only about 9% of the marginally nonaggressive first graders experienced the same sort of increase in aggression scores. Similar percentage differences were recorded when marginally aggressive and non-aggressive children were compared in terms of increase in aggression score of at least one standard score unit over the three school years (e.g., a child had a z-score of -0.5 in Grade 1 and obtained a z-score of $.5$ or higher in Grade 2). These nonparametric differences between marginally aggressive and marginally nonaggressive children were associated with statistically highly significant χ^2 -squares (all $ps < .001$).

Marginal Aggression Moderating the Relation Between Number of Risk Factors and Aggression—Finally, we examined whether marginal aggression also moderated a common finding in the aggression literature, namely, that childhood aggression tends to increase with the number of its risk factors (e.g., Deater-Deckard, Dodge, Bates, & Pettit, 1998). That is, we examined whether the positive relation between the number of risk factors and aggressive behavior would be statistically stronger among marginally aggressive than marginally nonaggressive children.

Being a boy, being African-American, experiencing hyperactivity problems, being relatively unpopular (i.e., a child with a low social preference score), lacking prosocial behavior skills, and experiencing cognitive difficulties in school represented six risk factors for later aggression problems. For each of the latter four variables, the presence of risk at each of the first three school years was determined if the child's score was situated above the median of the entire sample's distribution (i.e., 1 = presence of risk, 0 = absence of risk). For each school year, each child was then assigned an overall risk score indicating how many risk factors were present in the child (i.e., this risk score ranged from 0 to 6). Finally, separately for marginally aggressive and marginally nonaggressive children, Grade 1, Grade 2, and Grade 3 risk scores were correlated with the aggression scores computed in the following school year.

These yearly longitudinal risk-aggression correlations appeared to be slightly stronger among marginally aggressive children than among marginally nonaggressive children ($r = .45$, $r = .45$, and $r = .47$ vs. $r = .36$, $r = .36$, and $r = .38$, respectively). Graphically, this pattern can be illustrated by plotting the mean aggression scores for each level of risk (i.e., 7 levels, from 0 to 6), separately in the two marginal groups. These mean aggression scores are displayed in three panels presented in Figure 1.

In each panel, the groups' aggression scores increased with the risk levels measured a year earlier. Marginally aggressive children were more aggressive than marginally nonaggressive children at each risk level. Furthermore, the increase in mean aggression across risk levels appeared to be more substantial in marginally aggressive children, leading to a progressively larger gap between the two groups. Finally, aggression seemed to increase more rapidly at high levels of risk in both groups, although this nonlinear pattern appeared to be particularly pronounced among marginally aggressive children.

Accordingly, we statistically assessed whether the number of risk factors would predict change in later aggression, whether there were any nonlinear effects of risk, and whether any detectable

effect would be significantly stronger among marginally aggressive than nonaggressive children. To this end, we performed a series of hierarchical regressions in which aggression at one year was regressed onto a linear and a quadratic (i.e., squared) risk score measured one year earlier (Step 2) after controlling statistically for differences in aggression measured concurrently to risk and Grade 1 marginal aggression (Step 1). Furthermore, the linear and quadratic risk scores were separately multiplied by marginal aggression status and the two interaction scores were included in a final step (Step 3).

Risk factors at one year exerted significant quadratic effects on change in aggression a year later even after controlling statistically for its linear effects ($\beta = .13$, $\beta = .18$, and $\beta = .18$ for, respectively, Grade 1, Grade 2, and Grade 3 quadratic risk scores). Thus, aggression worsened more rapidly over time among children who presented a relatively high number of risk factors than among children who presented a relatively low number of risk factors. More importantly, as hypothesized, this acceleration of effects was significantly greater among marginally aggressive first graders than marginally nonaggressive first graders across the school years ($\beta = .16$, $\beta = .10$, and $\beta = .07$ for the product terms of marginal aggression with Grade 1, Grade 2, and Grade 3 quadratic risk scores, respectively). In essence, a marginally aggressive child who presented multiple risk factors was much more likely to become increasingly aggressive than a marginally nonaggressive child who presented the same risk factors.

The next goal of this investigation was to examine whether these findings might be independently replicated with a culturally different and slightly older sample of Italian children attending middle school.

The Italian Study

Methods

Sample—This study examined 1,224 boys and girls who were attending two middle schools located in a residential community near Rome (i.e., the town of Genzano), Italy. The children were participants in a 10-year longitudinal study of the personal and social determinants of maladjustment from childhood through early adolescence. The present study relied on child and school data collected annually in each of the three middle-school years (i.e., Grades 6 through 8). Although culturally homogeneous, the children's families varied widely in socioeconomic background (assessed by father's occupation). In particular, 15% of the families were in professional or managerial ranks, 38% were merchants or operators of other businesses, 16% were skilled workers, 30% were unskilled workers, and 1% were retired.

Behavioral Assessment and Classification of Marginal Deviations—Sociometric peer measures were collected during assessments held in the late winter of each school year. At least 90% of the children in each class were present during the collection of peer sociometric data. The sociometric measures were virtually identical to the sociometric measures used in the American study. In particular, each child obtained a sociometric nomination score for each of three behavioral dimensions, namely, aggression ("Some kids start fights, say mean things, and hit other kids"), hyperactivity ("Some kids get out of their seat a lot"), and prosocial behavior ("Some kids cooperate a lot. They help others and share"). Each child also received a social preference score, that is, a measure of his or her relative acceptance or status among classroom peers. Similarly to the American study, most of the analyses of the behavioral measures reported in this study used percentage nomination scores (i.e., the raw number of nominations received divided by the number of raters).

At the end of each school year, teachers graded their students' achievement in each of six academic courses using a five-level scale of attainment. This academic achievement measure

corresponds to the National Education Evaluation format used throughout Italy and is gathered from school archival records.

The definition and classification of marginally aggressive children followed closely the procedure implemented with the American elementary school children. In particular, Grade 6 aggression scores were first standardized within classroom and gender and then used to classify as marginally aggressive all those children who received a nomination z-score ranging between zero and 1 standard deviation above the classroom gender mean. Following this procedure, 238 sixth graders were classified as marginally aggressive (129 boys and 109 girls). A group of 805 sixth graders were classified as marginally nonaggressive on the basis of standardized scores ranging between 0 and 1 standard deviation below the classroom/gender mean (419 boys and 396 girls).

Results

Table 4 shows means and standard deviations for all measures (all measures are unstandardized with the exception of social preference scores). Descriptively, the data were very consistent with the data collected from the American children. Marginally aggressive sixth graders were more aggressive than their marginally nonaggressive counterparts in Grades 7 and 8. At each year, marginally aggressive sixth graders also experienced more problems at school, were more hyperactive, were less able to act prosocially, and relatively less liked by peers. Finally, the stability of sociometric aggression was somewhat higher among marginally aggressive children (i.e., .59 from Grade 6 to 7, and .77 from Grade 7 to 8) than among marginally nonaggressive children (i.e., .52 from Grade 6 to 7, and .61 from Grade 7 to 8).

Like in the American study, a key hypothesis was that the longitudinal relations between aggression and its early predictors would be stronger among marginally aggressive than marginally nonaggressive children. For both groups, Table 5 shows bivariate correlations between gender and aggression scores in Grades 7 and 8, as well as the correlations of these two aggression scores with, respectively, the Grade 6 and Grade 7 scores of hyperactivity, prosocial behavior, academic achievement, and social preference.

Italian boys and children who early on were more hyperactive, experienced more academic difficulties, were less prosocial, or were relatively more disliked by their peers, were rated as more aggressive in the following school years. The magnitude of these relations appeared somewhat larger among marginally aggressive than marginally nonaggressive children. Boys were more aggressive than girls throughout school, and this gender difference was particularly evident among marginally aggressive ($r = -.59$ and $r = -.51$ for the relations between gender and Grade 7 and Grade 8 aggression, respectively) than marginally nonaggressive ($r = -.35$ and $r = -.30$) students. Likewise, students who early on were more hyperactive were more aggressive a year later, and this prediction appeared substantially stronger among marginally aggressive ($r = .32$ and $r = .24$) than marginally nonaggressive ($r = .15$ and $r = .05$) students. In contrast, the longitudinal relations linking Grade 6 prosocial behavior, social preference, or academic achievement to later aggression did not vary noticeably across the two marginal aggression groups.

Following the same analysis plan we adopted in the American study, these correlation patterns were tested more formally in two five-step hierarchical regressions across adjacent school years (i.e., Grade 6 to 7, Grade 7 to 8). As in the prior study, these regression analyses tested whether predictors such as hyperactivity or academic problems could longitudinally predict aggression growth and whether this prediction would be significantly more pronounced among marginally aggressive students. Table 6 summarizes the results of these hierarchical regressions and is formatted like Table 3.

Among Italian middle school students, being a boy, being hyperactive, or being less accepted by peers contributed to some extent to growth in aggression over time (i.e., predicted *changes* in aggression). More importantly, there was partial evidence of the hypothesis that this prediction was more pronounced among marginally aggressive than marginally non-aggressive students (see Step 4 results in Table 6). In particular, marginally aggressive boys and girls differed on later aggression more than did boys and girls who were classified as marginally nonaggressive in Grade 6 ($\beta = -.07$ and $\beta = -.19$ for the gender by status interaction term predicting Grade 7 to 8 aggression growth, respectively). Likewise, school problems experienced at Grade 6 contributed to increases in aggression a year later, especially among students who showed marginally aggressive behaviors in sixth grade ($\beta = .46$). Finally, this latter effect also varied with gender, indicating that marginally aggressive boys who experienced academic problems were at greatest risk for increases in aggression ($\beta = -.52$ for the three-way interaction between achievement, classification on marginal aggression, and gender).

Again, these findings did not seem to be the result of a few children with extreme aggression scores. During Grades 7 and 8, nearly 19% of marginally aggressive sixth graders scored 1 standard deviation above the classroom aggression mean, thus moving from marginal aggression to a more significant level of behavioral problems. In contrast, only 3% of marginally nonaggressive children met this criterion. Likewise, for 11% and 8% of the marginally aggressive children, aggression increased at least one standardized unit from one year to the next in Grades 7 and 8, respectively, whereas a similar increase only occurred for 7% and 4% of the marginally nonaggressive children, respectively, χ -square tests of these nonparametric differences across marginal aggression groups were statistically significant (all $ps < .05$).

Marginal Aggression Moderating the Relation Between Number of Risk Factors and Aggression—Finally, we examined again whether marginal aggression status would moderate the relations between number of risk factors and later aggression. We defined risk scores following the same procedures we adopted with the American data. That is, we considered being a boy, being hyperactive, being unpopular, lacking prosocial behavior skills, and having academic problems as five separate risk conditions and, after categorizing risk according to a median-split of the dimensional scores (i.e., 0 or 1), we calculated for each student an overall risk score that, separately for Grade 6 and Grade 7 data, counted the number of risk factors. For each year, this overall risk score was then correlated with the aggression score from the following school year.

Again, the correlations between number of risk factors at one year and aggression in the following year were substantially larger among marginally aggressive than among marginally nonaggressive children ($r = .40$ and $r = .36$, vs. $r = .25$ and $r = .22$, respectively). As in Figure 1, this pattern is illustrated in the two panels reported in Figure 2. Separately for Grade 7 and Grade 8, aggression scores are plotted for each risk level measured a year earlier (i.e., six levels, from 0 to 5) and separately for marginally aggressive and nonaggressive children. Aggression increased cumulatively with risk levels in both groups. Furthermore, as hypothesized, there seemed to be a nonlinear trend, especially for marginally aggressive students. That is, whereas the effect of number of risk factors on aggression appears negligibly different across the two marginal aggression groups at low levels of risk, such an effect seems to be substantially greater in marginally aggressive than nonaggressive students at a relatively high number of risk factors.

As in the American study, these differences in risk-accelerated effects were tested in hierarchical regressions that controlled statistically for initial differences in aggression and for risk's linear and quadratic effects, and included product terms of the linear and quadratic risk scores with marginal aggression status. The accelerated effect of risk on Grade-7 aggression

was significantly greater in marginally aggressive students than marginally nonaggressive students ($\beta = .10$). For Grade-8 aggression, the statistically significant interaction effect emerged for the linear, and not the quadratic, risk score ($\beta = .12$).

General Discussion

This article is among the first ever to report the factors that may account for developmental growth vs. diminution in aggressive behavior among a group of children who are initially marginally aggressive. Marginal deviations had been neglected in past research, which had focused on either extreme groups or continuous dimensions of behavior, but the empirical findings reported here indicate that the marginally deviant group performs in lawful ways that merit further inquiry.

In both a four-site American sample and an Italian sample, hyperactivity, cognitive difficulties, low social preference, and lack of prosocial behavior increased a child's risk for an increase in aggressive behavior. Furthermore, equivalent levels of these risk factors had a greater impact on the development of marginally aggressive than marginally nonaggressive children. Third, there was some evidence that the risk associated with these factors accelerated as the number of risk factors accumulated, but only or especially among marginally aggressive children.

Thus, the findings provide some support to the general view that during childhood years, nonlinear processes may propel some marginally aggressive children toward a state of extreme aggressive behavior and, in contrast, other children back into the main stream. Which outcome will emerge seems largely to depend upon the type and number of additional personal features and behavioral signs that might characterize a marginally aggressive child. In general, being a boy or African-American, as well as being hyperactive or experiencing academic problems may uniquely contribute to aggregating effects on children's aggressive behavior over time. For some children, these characteristics may combine with marginal aggression and increasingly exacerbate such effects, possibly catapulting the initially marginally aggressive child into severe forms of behavioral problems.

Not all marginally deviant children become highly deviant, however, and not all marginally nonaggressive children are saved from future aggression. The empirical findings reported here indicate that for a marginally nonaggressive child, when multiple risk factors are present, they do accumulate to have a negative impact on development. Also, when the marginally aggressive child behaves in ways that are perfectly inconsistent with the stereotype of an aggressive child (i.e., no hyperactivity or academic difficulties but high levels of prosocial behavior and peer social preference), that child becomes less aggressive over time.

In both samples, marginally aggressive boys were more readily ensnared in aggressive growth than were marginally aggressive girls. In the American sample, African-American children who were initially marginally aggressive had a more difficult time shedding this label than did white children. These findings are consistent with stereotypes of the African-American boy as an aggressive child. Furthermore, these findings are consistent with a variety of other studies that describe the difficulties of African-American boys in American culture. Although differences across ethnic groups in the probability of an initial arrest are small, once initially arrested, African-American boys are far more likely than white boys and girls to be arrested a second time (Elliott & Ageton, 1980). Once placed into special education classes for serious emotional disturbance, African-American boys have a more difficult time than white boys and girls in returning to the regular classroom. These difficulties are captured in a process of stereotype confirmation that exacerbates initially small differences between gender and ethnic groups into major differences in outcomes. The findings of the studies reported here are consistent with a general model of marginal deviation as a state of developmental dynamical

disequilibrium. According to this model, child actors and raters perceive marginal deviation as an unstable transitional state between the two more stable states of nonaggressiveness and aggressiveness. In this investigation, however, the social processes through which cognitive stereotypes are transformed into social self-perpetuating stereotypes were neither fully analyzed nor described. The guiding hypothesis would be that cognitive stereotypes presumably lead others to act in ways that indirectly lead the stereotyped individual to behave in accord with the expectation, but this interpersonal process has not been captured well. These differing possibilities remain to be ascertained in the future through a combination of experimental and field studies.

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Biographies

Gian Vittorio Caprara is full Professor of Personality Psychology and Director of the Interuniversity Center for the Study of the Genesis and Development of Antisocial and Prosocial Motivations. His primary research interests focus on personality development and assessment and psychosocial adjustment.

Kenneth Dodge is full Professor of Developmental Psychology and Director of the Duke University Center of Child and Family Policy. His particular area of scholarship has addressed the development and prevention of chronic violence in children and adolescents.

Concetta Pastorelli is Associate Professor of Psychology and faculty member of the Interuniversity Center for the Study of the Genesis and Development of Antisocial and Prosocial Motivations. Her research interests focus on the determinants of and personality factors influencing children's and adolescents' maladjustment.

Arnaldo Zelli is Associate Professor of Psychology and faculty member of the Interuniversity Center for the Study of the Genesis and Development of Antisocial and Prosocial Motivations. His research interests focus on the social-cognitive factors and processes characterizing personality and behavioral development.

The CPPGR comprises scholars who are the principal investigators of a 10-year-long comprehensive, multisite intervention designed to prevent serious and chronic antisocial behavior in a sample of high-risk children (Fast-Track project). The intervention is guided by a developmental theory positing the interaction of multiple influences on the development of antisocial behavior.

Figure 1.
American study: 1-year longitudinal relations between number of risk factors and aggression in marginally aggressive (MA) and marginally nonaggressive (MNA) American elementary school children.

Figure 2.
Italian study: 1-year longitudinal relations between number of risk factors and aggression in marginally aggressive (MA) and marginally nonaggressive (MNA) Italian middle school children.

Table 1American study: Means (*SD*) for outcome and predictor variables

	Complete sample	Marginally nonaggressive	Marginally aggressive
<i>Grade 1</i>			
Aggression	.12 (.17)	.03 (.06)	.20 (.13)
Academic problems	1.65(1.22)	1.43 (1.15)	1.94 (1.22)
Hyperactivity	.11 (.16)	.06 (.09)	.17 (.16)
Prosocial behavior	.16 (.15)	.18 (.16)	.14 (.14)
Social preference	.012(1.0)	.25 (.86)	−0.22 (1.01)
<i>Grade 2</i>			
Aggression	.12 (.18)	.07 (.12)	.18 (.20)
Academic problems	1.71(1.19)	1.48 (1.15)	1.94(1.16)
Hyperactivity	.12 (.17)	.08 (.13)	.17 (.20)
Prosocial behavior	.17 (.17)	.20 (.18)	.15 (.15)
Social preference	.00(1.0)	.24 (.89)	−0.15 (1.06)
<i>Grade 3</i>			
Aggression	.12 (.18)	.08 (.13)	.18 (.21)
Academic problems	1.69(1.19)	1.41 (1.11)	1.91 (1.22)
Hyperactivity	.12 (.18)	.08 (.14)	.17 (.20)
Prosocial behavior	.19 (.18)	.22 (.19)	.15 (.16)
Social preference	.00(1.0)	.22 (.93)	−0.16 (1.03)
<i>Grade 4</i>			
Aggression	.12 (.19)	.08 (.13)	.17 (.21)
Academic problems	1.94(1.20)	1.75 (1.22)	2.17 (1.21)
Hyperactivity	.13 (.18)	.09 (.15)	.17 (.21)
Prosocial behavior	.20(19)	.23 (.20)	.16 (.17)

Table 2

American study: Longitudinal relations of risk factors at one year and aggression in the following year

	Marginally nonaggressive	Marginally aggressive
<i>Correlations with G2 aggression</i>		
Gender	-.34	-.48
Ethnicity	.13	.16
G1 Hyperactivity	.28	.43
G1 Academic problems	.24	.28
G1 Prosocial behavior	-.20	-.20
G1 Social preference	-.19	-.25
<i>Correlations with G3 aggression</i>		
Gender	-.33	-.50
Ethnicity	.14	.19
G2 Hyperactivity	.44	.51
G2 Academic problems	.26	.32
G2 Prosocial behavior	-.22	-.24
G2 Social preference	-.22	-.26
<i>Correlations with G4 aggression</i>		
Gender	-.33	-.42
Ethnicity	.15	.20
G3 Hyperactivity	.47	.49
G3 Academic problems	.28	.37
G3 Prosocial behavior	-.21	-.29
G3 Social preference	-.21	-.26

Note: All correlation coefficients were statistically highly significant. G1–G4 refer to first through fourth elementary school grades, respectively.

Table 3

American study: Longitudinal hierarchical regressions predicting aggression growth

Model	G2 Aggression "at entry"	"Last"	R ²	G3 Aggression "at entry"	"Last"	R ²	G4 Aggression "at entry"	"Last"	R ²
Step 1									
Agg (t-1)	.35	.21	.12	.60	.37	.36	.62	.45	.39
G1 Status	.07	.09	.001	.09	.14	.01	.07	.02	.005
Step 2									
Gender	-.36	-.23	.13	-.18	-.12	.03	-.15	-.12	.02
Ethnicity	.14	.10	.02	.09	.06	.01	.10	.08	.01
Step 3 (t-1)									
Hyper	.21	.11	.03	.16	.14	.01	.09	.07	.004
Soc Pref	-.04	.04	.002						
Pros Beh									
Acad Prob	.10	.07	.01	.06	.06	.002	.10	.07	.01
Step 4 (P × S)									
Gender	-.20	-.17	.02	-.12	-.10	.01			
Ethnicity	.04		.001	.06	.06	.002			
Hyper	.08	.07	.002						
Soc Pref									
Pros Beh									
Acad Prob							.07	.10	.001
Step 5 (P × S × G)									
Hyper				-.04	-.04	.001	.05	.05	.002
Soc Pref									
Pros Beh									
Acad Prob							-.05	-.08	.002
Step 5 (P × S × R)									
Hyper									
Soc Pref									
Pros Beh									
Acad Prob	.07		.001						

Notes: (1–1) refers to predictor scores calculated from the year prior to the measurement of criterion aggression. G1 Status and S refer to marginal aggression categorical status calculated in grade 1. Prefers to the predictors in step 2. G refers to gender, and R refers to race. For steps 4 and 5, the results refer to the interaction terms at each step that separately implicated hyperactivity (hyper), social preference (soc pref), prosocial behavior (pros beh) and academic problems (acad prob). Step 5 appears twice in the table because the three-way interactions were computed and modeled first with gender (G) and then with ethnicity (R).

Table 4Italian study: Means (*SD*) for outcome and predictor variables

	Complete Sample	Marginally nonaggressive	Marginally nonaggressive
<i>Grade 6</i>			
Aggression	.07 (.09)	.04 (.04)	.18 (.11)
Academic problems	3.36 (.81)	3.42 (.80)	3.15 (.81)
Hyperactivity	.11 (.15)	.09 (.14)	.15 (.18)
Prosocial behavior	.14 (.13)	.15 (.13)	.12 (.11)
Social preference	.04 (.18)	.06 (.17)	−0.02 (.21)
<i>Grade 7</i>			
Aggression	.10 (.13)	.07 (.10)	.19 (.18)
Academic problems	3.17 (.89)	3.23 (.89)	2.93 (.86)
Hyperactivity	.13 (.18)	.13 (.17)	.15 (.21)
Prosocial behavior	.15 (.12)	.16 (.13)	.13 (.11)
Social preference	.03 (.21)	.04 (.20)	−0.02 (.23)
<i>Grade 8</i>			
Aggression	.10 (.14)	.07 (.11)	.18 (.21)
Academic problems	3.03 (.92)	3.10 (.91)	2.79 (.92)
Hyperactivity	.14 (.18)	.15 (.18)	.12 (.17)
Prosocial behavior	.15 (.13)	.15 (.13)	.14 (.14)
Social preference	.02 (.21)	.04 (.21)	−0.01 (.21)

Table 5

Italian study: Longitudinal relations of risk factors at one year and aggression in the following year

	Marginally nonaggressive	Marginally aggressive
<i>Correlations with G7 Aggression</i>		
Gender	-.35**	-.59**
G6 Hyperactivity	.15**	.32**
G6 Academic problems	-.18**	-.24**
G6 Prosocial behavior	-.21**	-.27**
G6 Social preference	-.28**	-.27**
<i>Correlations with G8 Aggression</i>		
Gender	-.30**	-.51**
G7 Hyperactivity	.05	.24**
G7 Academic problems	-.14**	-.20**
G7 Prosocial behavior	-.13**	-.17*
G7 Social preference	-.13*	-.14*

* Note: $p < .05$;

** $p < .01$.

Table 6
Italian study: Longitudinal hierarchical regressions predicting aggression growth

Model	G7 Aggression		G8 Aggression	
	"at entry"	"Last"	"at entry"	"Last"
Step1				
Agg (t-1)	.43	.49	.70	.63
G6 Status			.08	.27
Step 2				
Gender	-.43	-.31	-.09	-.06
Step 3 (t-1)				
Hyper	.11	.09		
Soc Pref			.06	.08
Pros Beh				
Acad Prob	-.09	-.11	-.06	-.06
Step 4 (P × S)				
Gender	-.22	-.07		-.19
Hyper				
Soc Pref				
Pros Beh				
Acad Prob	.30	.46		
Step 5 (P × S × G)				
Hyper				
Soc Pref		-.08		
Pros Beh				
Acad Prob	-.35	-.52		

Notes: (t-1) refers to predictor scores calculated from the year prior to the measurement of criterion aggression. G6 Status and S refer to marginal aggression categorical status calculated in grade 6. P refers to the predictors in step 2, and G refers to gender. For steps 4 and 5, the results refer to the interaction terms that separately implicated hyperactivity (hyper), social preference (soc pref), prosocial behavior (pros beh) and academic problems (acad prob).