

Family Process and Peer Deviance Influences on Adolescent Aggression: Longitudinal Effects Across Early and Middle Adolescence

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This is the accepted version of the following article:

Benson, M. J., & Buehler, C. (2012). Family process and peer deviance influences on adolescent aggression: Longitudinal effects across early and middle adolescence. *Child Development*, 83(4), 1213-1228. doi: 10.1111/j.1467-8624.2012.01763.x,

which has been published in final form at <http://dx.doi.org/10.1111/j.1467-8624.2012.01763.x>.

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Abstract:

Beginning in sixth grade at an average age of 11.9 years, 416 adolescents and their parents participated in 4 waves of data collection involving family observations and multiple-reporter assessments. Ecological theory and the process-person-context-time (PPCT) model guided the hypotheses and analyses. Lagged, growth curve models revealed that family hostility and peer deviance affiliation predicted adolescent aggression in the subsequent year. Family warmth played only a minor role in protecting against adolescent aggression. In hostile or low-warmth families, peer deviance affiliation linked to a declining aggression trajectory consistent with the arena of comfort hypothesis. The longitudinal findings suggest a nonadditive, synergistic interplay between family and peer contexts across time in adding nuance to understanding the adolescent aggression.

Keywords: Adolescents | Family | Peer deviance | Behavior | Adolescent aggression

Article:

Common, everyday incidents of adolescent aggression create distress for victims, apprehension among observers, and mistrust in groups. For aggressive youth, development is compromised as evidenced by future aggression and lack of self-control in adulthood (Kokko, Pulkkinen, Huesmann, Dubow, & Boxer, 2009). Ecological theory underscores this detrimental influence for perpetrators, characterizing aggressive tendencies and behaviors in youth as “developmentally disruptive dispositions” (Bronfenbrenner & Morris, 1998, p. 1009). Understanding the contextual influences on aggression holds promise for reducing the harms to

individual development and relationship processes. Toward that end, this study examines the primary contexts of families and peers in explaining adolescent trajectories for aggression.

The aggression construct occupies a central role in understanding human development (Tremblay, Hartup, & Archer, 2005). Research reviews attest to the productivity of aggression research across childhood (Shaw, Dishion, Supplee, Gardner, & Arnds, 2006; Vaillancourt & Hymel, 2004). Adolescent research often refers to more serious violence and involves samples comprised of criminal reoffenders or residents of inner-city locations (Chung & Steinberg, 2006; Widome, Sieving, Harpin, & Hearst, 2008). Although serious violence merits such attention, adolescent aggression remains an important developmental issue beyond the confines of the inner city or reoffending populations. The current study supplements the adolescent violence literature by examining adolescent aggression from a developmental perspective.

Mesosystem Ecology of Aggression: Families and Peers

Bronfenbrenner's (2001) ecological theory of developmental processes provides a valuable lens for examining developmental changes in adolescent aggression. A recent examination of research in the ecological tradition advocates assessing specific aspects within Bronfenbrenner's process-person-context-time (PPCT) model when employing ecological theory (Tudge, Mokrova, Hatfield, & Karnik, 2009). The current study follows this model. Processes within the PPCT theory refer to interactions between the individual and the immediate environment, which constitute the "primary engines of development" (Bronfenbrenner & Morris, 1998, p. 996). Because family interactions are among the most enduring and central to the developing person, the current study focuses on two fundamental patterns of family interaction, warmth and hostility.

Family warmth serves a vital role in the parent-adolescent transmission process that facilitates adaptive development (Barber, Stolz, & Olsen, 2005). Warm family interactions involve mutual responsiveness, counteract mounting tensions, and foster conflict resolution. Research has confirmed positive effects of family warmth for specific outcomes in adolescence (Kim et al., 2003), including fewer criminal offences among inner-city males (Chung & Steinberg, 2006) and less aggression among adolescents in rural communities (Mazefsky & Farrell, 2005).

In contrast to warmth, hostile interactions in families have been conceptualized as undermining effective responsiveness to children's behavior (Patterson, Dishion, & Yoerger, 2000). In the context of family hostility, children generate fewer attempts at intentional behavior thereby undercutting their successful adaptation. Coercive interactions also inadvertently reinforce negative child behaviors, leading to escalating intensity and generalizing to child problems in other settings. These broader theoretical underpinnings are supported by specific research on largely Caucasian samples linking family hostility with both youth externalizing problems (Benson, Buehler, & Gerard, 2008) and youth aggression (Williams, Conger, & Blozis, 2007).

Further research is needed, however, to address the unique and combined contributions of family warmth and hostility.

In addition to these family processes, peer contexts in early adolescence have implications for adolescent aggression. Classic interpersonal theory (Sullivan, 1953) and conceptualizations of autonomy (Collins, 1991) highlight the ascendant role of peers during adolescence. Empirical evidence has documented links between peer processes and adolescent aggression (Fergusson, Swain-Campbell, & Horwood, 2002). In summary, both family process and peer relations are conceptualized in this study as broad contexts or settings, characterized by patterns of proximal processes, with potential to intensify or reduce the expression of aggression among early adolescents.

Moderating Influences of Family Interaction and Peer Deviance

Along with the independent influences of family and peer contexts, ecological theory also advances the importance of the interplay between contexts. Mesosystems constitute the “linkages between settings . . . in which the developing person participates” (Bronfenbrenner, 1979, p. 7). Early formulations of ecological theory emphasized the positive interplay within a mesosystem with a prototypic illustration of the benefits of home–school similarity (Bronfenbrenner, 1979). Later formulations of the ecological theory, however, suggest that system elements combine in “nonadditive, synergistic fashion” and “the importance of using research designs that permit the assessment of joint synergistic effects” (Bronfenbrenner & Ceci, 1994, p. 582). Observers of contemporary ecological research echo the importance of potential synergy in advocating at least two contexts in studies that involve ecological perspectives (Tudge et al., 2009).

One hypothesis, following from the previous theory exemplars, asserts that family interaction and peer processes exert catalytic effects, such that combining similar influences exacerbates effects. Consistent with ecological premises, the tenets of peer influence theory (Elliott, Huizinga, & Ageton, 1985) further emphasize the joint effects of family problems and peer deviance. The theory asserts that bonds within families and peer groups *combine* to channel adolescent behavior toward observing or defying conventional norms. As such, adolescents exposed to problematic family life and deviant peers experience a combination of risks that amplifies aggression (Dishion, Nelson, & Bullock, 2004).

A second nonadditive synergist hypothesis, however, postulates the potential buffering role of one context on another. A conceptualization consistent with the ecological framework that reflects this hypothesized buffering process is *arena of comfort* (Call & Mortimer, 2001). The arena of comfort concept suggests that one context can provide a means to recover and renew from stresses in another context. Essentially, a synergistic mesosystem principle, arena of comfort suggests the potential that contexts can compensate in more dynamic ways. Research on peer relations evidences the dynamic, multiple roles of peers with several favorable traits and behaviors linked positively to time with peers outside of school (Borawski, Landis, Lovegreen,

& Trapl, 2003; Jacobs, Vernon, & Eccles, 2004). In examining peer relations, time with peers outside of school represents an important potential moderator in understanding the nature of adolescents' arenas of comfort.

In addition to context properties, ecological theorizing has emphasized the subjective environment with early allusions to "the primacy of the phenomenological" (Bronfenbrenner, 1979, p. 24) and recent formulations emphasizing the "loaded . . . realm of subjective feelings" as important in development (Bronfenbrenner, 2001). This ecological emphasis on subjective experience is consistent with Berkowitz's (1989) formulation that aggression results from perceptions and emotions in the situation. Emotional distress, in particular, has been suggested as taking precedence over other spheres (Tice, Bratslavsky, & Baumeister, 2001). Taken together, adolescent emotional distress could detract from the suppression of even minor aggressive reactions such as bitter sarcasm or personal insults.

Background Characteristics

In addition to process and contexts noted earlier, the PPCT ecological model has further emphasized the importance of person characteristics in understanding development, including demand and resource characteristics (Bronfenbrenner & Morris, 1998). Demand characteristics such as gender have the "capacity to invite or discourage reactions from the social environment" (p. 1011). Aggression by boys and girls invite different patterns of response that reflect differences in norms and behavior (Centers for Disease Control, 2008; Karriker-Jaffe, Foshee, Ennett, & Suchindran, 2008). The nature of these different patterns remains unclear. Although boys consistently perpetrate more physical aggression than girls (Karriker-Jaffe et al., 2008), similarities have been found between boys and girls regarding the predictors and patterns of aggression (Martino, Ellickson, Klein, McCaffrey, & Edelen, 2008). Such empirical evidence indicates the importance of moderation tests by gender to clarify the ways that family and peer contexts influence adolescent aggression.

Besides demand characteristics, resources such as economic resources are important aspects of the person in context (Bronfenbrenner & Morris, 1998). From an ecological view, family income is expected to relate to resource availability in the social niche. Conventional assumptions suggest that higher income yields access to resources, promoting favorable adaptation and positive outcomes. Research has shown, however, that youth from both affluent and poor backgrounds can experience their parents as unavailable with untoward ramifications such as externalizing behaviors (Luthar & Latendresse, 2005). Affluence fails to insure protection from risks, as evidenced in research showing positive associations of family income with rates of marijuana use and binge drinking among adolescents (Humensky, 2010). In a conceptualization of the problems of the middle class, Luthar (2003) argues that adolescents from middle- or upper-income families experience achievement pressures, perfectionist strivings, and deficits in supervision and closeness that compromise development. Such prior findings and

conceptualizations suggest that the income could play moderating roles in the ways that family or peer contexts influence adolescent aggression.

Summary and Research Plan

Change over time has also been identified as a crucial dimension of ecological theory and the PPCT model (Bronfenbrenner, 2001). The current study examines adolescent aggression over time using three waves of data. During this period, adolescents learn to increasingly inhibit aggressive impulses through increased cognitive control (Steinberg, 2007). Early adolescents also experience rapid hormonal changes and sensation seeking (DeRose & Brooks-Gunn, 2006), which suggest the potential for heightened sensitivity to social influences during early adolescence. The current study seeks to uncover the family and peer factors that maintain the persistence of aggression for some youth, in spite of the expected average decline in aggression during the first half of adolescence.

The theoretical rationale and indirect empirical evidence earlier argues for two sets of hypotheses. First, problematic family processes and deviant peer affiliation are expected to relate to increased adolescent aggression independently and when controlling for each other. Among sixth-grade youth, lower family warmth, higher family hostility, and higher peer deviance are expected to relate to increased adolescent aggression 1 year later. Second, two plausible hypotheses, amplification and peer buffering, are posited as ways that family and peer contexts might interact in nonadditive, synergist ways.

The longitudinal and moderation hypotheses advanced earlier require a study drawn from a sizable community sample, collected over multiple waves, and based on observations of family interaction. Collecting triadic observational data on mothers, fathers, and adolescents avoids the limitation of relying on single-responder, self-reported data. The observational data on families in this current study reduce method bias that can inflate estimates of covariation. Besides the use of observational data for families, the current study addresses predictive hypotheses by including longitudinal data across multiple waves.

Method

Research Design

This study utilized data from a four-wave longitudinal study of 416 two-parent families living in a large county in the Southeastern United States. The study began when youth were in the sixth grade and data were collected annually. Each year the focal adolescent, mother, and father completed a series of questionnaires and participated in a home visit that included several semistructured observations of family discussions. These observations were videotaped and later coded by trained raters. In general, most constructs in the study were measured with either multiple informants or multiple methods or both, which enabled robust construct assessment and minimized shared method bias.

Sampling Procedures and Characteristics

The data used for this study were drawn from a larger study of the effects of family life on the transition from childhood into adolescence. For the larger study, adolescents in 13 middle schools during the 2001 school year were invited to participate in a study of family life. Children in sixth grade were selected because they are beginning the transition from childhood into adolescence. This county included rural, suburban, and urban regions. Nearly all teachers (96%) participated. Adolescents received a letter during homeroom inviting their participation, and parents received two additional mailed invitations. About 71% of the parents returned the consent form and 80% of these provided permission to complete the questionnaire during school. The resulting base sample included 2,346 sixth graders, representing 57% of all sixth graders in the school district. To test whether this base sample departed from the population data, we compared the base sample statistics and the Census data for the county. The sample of adolescents mirrored the county Census data on race, parent marital status, and family poverty.

Sample for current study. The families in the present study were selected from the larger sample based on two criteria: (a) parents were married or long-term cohabitants and (b) no stepchildren were in or out of the home. Married or long-term cohabitants were examined because this current longitudinal study focused on the combined effects of mother, father, and adolescent interactions. Stepfamilies were omitted for two reasons: (a) the complex structures in stepfamilies require examinations that entail adequate sample sizes for each variation, and (b) precise interpretations require specific data for time since divorce, various residential statuses, and noncustodial parents' relations. Using these criteria, all eligible families were invited to join the two-parent study that entailed four annual home visits. At each home visit, the mother, father, and adolescent completed questionnaires and participated in videotaped, semistructured discussion activities. Of the 1,131 eligible families, 416 participated in Wave 1 (W1). The primary reasons for nonparticipation were time constraints and the requirement that all three family members participate. Thus, approximately 37% of the eligible families participated in this intensive study. Theoretically, the net family participation rate was 21% relative to the population of sixth graders in the district, as computed by the 37% participation among eligible families within the 57% participation of the base sample relative to the entire district population.

To assess selection bias, participating and nonparticipating two-parent families were compared in several ways. First, there were no differences observed on two study variables that were collected during the base sample study, peer deviance ($t = -0.93, p > .05$) and aggression ($t = -0.49, p > .05$). Second, across 100 additional adolescent self-reported constructs, only two significant differences were found with participating adolescents having slightly higher general adjustment and grades ($p < .05$; see author for technical report). Third, no differences were found in comparisons of youth reports of economic status, use of free lunch, or youth race. Thus, there was little evidence of selection bias into the sample.

Sample characteristics. At W1 when adolescents were in the sixth grade, they ranged in age from 11 to 14 ($M = 11.90$, $SD = 0.42$). There were 211 daughters (51%). In terms of race, 91% of the families were European American and 3% were African American. This 3% is lower than the percentage of married African American couples with their own children younger than 18 in the county (5%) and in the United States (7.8%; U.S. Census Bureau, 2000, Table PCT27 of SF4). The average level of parents' education in this sample was an associate's degree (2 years of college). Parents' educational attainment was similar to that of European American adults in the county who were older than 24 (county mean category was some college, no degree; U.S. Census Bureau, 2000, Table P148A of SF4). The median level of 2001 household income for families in this study was about \$70,000, which was somewhat higher than the median 1999 income for married-couple families in the county (\$59,548, U.S. Census Bureau, 2000, Table PCT40 of SF3; \$64,689 inflation-adjusted dollars through 2001). Annual income for families in this study ranged from the category of \$5,000 to \$7,499 to the category of *more than \$100,000*.

Data Collection Procedures

Adolescents completed a questionnaire during school. They had as much time as needed to finish, and several trained assistants and the study director were available to answer questions. Family members (i.e., mothers, fathers, adolescent) were mailed a questionnaire and asked to complete it independently. Research staff collected the previously completed questionnaires and administered a second questionnaire during each home visit. The researcher's presence during this second administration ensured privacy for this questionnaire, which contained sensitive information such as peer deviance affiliation.

Family members also participated in four interaction tasks during the home visit. One task, the family problem solving task, was pertinent for the current study. This task involved the mother, father, and adolescent and focused on trying to solve issues of contention selected by family members. At the beginning of the home visit, each family member independently completed the 28-item Issues Checklist (Conger et al., 1992). Using these results from the checklists, the home visitors selected eight areas of disagreements from family members' reports, beginning first with issues identified by all three of the family members. During the 20-min discussion task, family members elaborated on each issue, identified who was involved, and suggested possible solutions. Participants were told they did not need to get through all of the issues. Coders with over 250 training hours rated the videotaped interactions using the Iowa Family Interaction Rating Scales (IFIRS; Melby & Conger, 2001). Coders passed an extensive written examination (90% correct criterion) and a viewing examination (criterion level 80% match with ratings by experienced Iowa State University coders). Each family member's behavior was coded during the task. The validity of the rating scales based on family discussions has been documented in a series of studies showing test-retest stability (Semenuk et al., 2010) and evidence of theoretical links to parent functioning (Conger et al., 1992) and adolescent outcomes (Melby, Conger, Fang, Wickrama, & Conger, 2008).

As part of the longitudinal research design, assessments (questionnaires and observations) were conducted again a year later (W2), 2 years later (W3), and 3 years later (W4). Most adolescents were in the seventh grade at W2 (mean age = 12.84), in the eighth grade at W3 (mean age = 13.83), and in the ninth grade at W4 (mean age = 14.84). Data collection procedures were identical for each wave, including mailed questionnaires, in-home questionnaires, and videotaped discussion tasks. As partial compensation for their involvement in the study, families received \$100 for participation in W1, \$120 for W2, \$135 for W3, and \$150 for W4. There were 366 participating families at W2, 340 families at W3, and 320 at W4 (77% retention of W1 families). Potential attrition bias was assessed by comparing families who did not participate in Wave 4 data collection with those who participated using Wave 1 data. Using *t* tests for independent samples, there were no differences for youth delinquency ($t = -1.17, p > .05$), peer deviance ($t = -0.06, p > .05$), family hostility ($t = .55, p > .05$), or family warmth ($t = -1.13, p > .05$). Youth who participated at W4 had higher aggression ($M = 8.00, SD = 4.83$) compared to nonparticipating youth ($M = 6.54, SD = 3.90; t = -3.03, p < .05$). Thus, there was little evidence of attrition bias, with the possible exception of slightly higher youth aggressive behavior for continuing participants.

Measurement: Central Constructs

Adolescent aggression. Aggression was measured using the 19-item subscale from the Youth Self-Report (Achenbach, 1991b). This measure consisted of a series of statements that might describe the adolescent during the previous 6 months. Each item had a 3-point response including: 0 (*not true*), 1 (*somewhat or sometimes true*), and 2 (*very true or often true*). Sample items included “I am mean to others,” “I argue a lot,” and “I get in many fights.” Items were summed and a higher score indicated greater aggressive behavior. Cronbach’s alphas were .86 or .87 for the W2 through W4 measures. Mothers and fathers also completed the parent version of this subscale using the Child Behavior Checklist (Achenbach, 1991a). Cronbach’s alpha was $> .86$ for mothers’ and fathers’ reports across time. An adolescent aggression summary composite was created for each year by averaging adolescent and parent scores. Correlations among reporters ranged from .30 ($p < .001$) to .68 ($p < .001$), with an average correlation of .48. Parent scores were created by averaging mother and father reports, then averaging youth and parent scores to yield a measure evenly weighted by youth and parent report. Cronbach’s alphas for the summary scores were .71 in W2, .75 in W3, and .72 in W4.

Family hostility. Hostility was measured using 12 observer ratings from the IFIRS. The three content ratings were hostility, angry coercion, and antisocial behavior. Each content rating was scored for behavior from mother to adolescent, adolescent to mother, father to adolescent, and adolescent to father. In the IFIRS (Melby et al., 1990), hostile behavior is defined as displays of hostile, angry, critical, disapproving, or rejecting behavior from one family member to another. Angry coercion is defined as verbally or physically hostile behaviors expressed by one family member to another that (a) are aimed at changing the other’s behavior or beliefs or (b) are used to get the focal family member’s way. Antisocial behavior is defined as displays of behavior that

are insensitive, obnoxious, rude, uncooperative, or unsociable. The response format for the rating scale ranged from 1 (*not characteristic*) to 9 (*mainly characteristic*). The hostility measure for this study was created by averaging 12 observer ratings: (a) the 4 ratings of hostility from youth to each parent and each parent to the youth, (b) the 4 ratings of angry coercion, and (c) the 4 ratings of antisocial behavior. Consistency across dyads was reflected in the Cronbach's alpha for the composite measure, .87. Twenty percent of the interaction tasks were coded by two coders. The average level of agreement was 71%, and the average intraclass correlation was .50 (calculated by averaging scores across individual rating scales).

Family warmth. Warmth was measured using 12 observer ratings from the IFIRS. The three content ratings were warmth, listener responsiveness, and prosocial behavior. As with hostility, each content rating was scored for behavior from mother to adolescent, adolescent to mother, father to adolescent, and adolescent to father. Warm behavior is defined as expressions of liking, appreciation, and praise from one family member to another (Melby et al., 1990). Listener responsiveness is defined as the focal family member's behaviors that show attention toward and interest in the recipient family member, as well as acknowledging and validating behaviors. Prosocial behavior is defined as displays of cooperation, sensitivity, and helpfulness toward the recipient family member. The response format for the rating scale ranged from 1 (*not characteristic*) to 9 (*mainly characteristic*). Cronbach's alpha was .85. The average level of interrater agreement was 78%, and the average intraclass correlation was .52 (calculated by averaging scores across individual rating scales).

Affiliation with deviant peers. Adolescents completed the 19-item measure developed by Elliott et al. (1985) and designed to assess social control in the peer environment across a range of delinquent-related behaviors. Sample items included: "purposely damaged or destroyed property" and "used marijuana," and response choices ranged from 0 (*none*) to 4 (*all*). A summary score was created by averaging responses to individual items. Cronbach's alpha for this measure was high, .91. Because these deviance behaviors are nonnormative in sixth grade, the initial distribution for peer deviance was positively skewed as expected. Thus, the variable was transformed to the base log distribution.

Measurement: Moderating Variables

The moderating variables were created using W1 data. This approach simplified the moderating analyses and clarified interpretations for interactions involving the intercepts of the primary predictors.

Youth gender. Daughters were coded 0 and sons were coded 1.

Household income. Household income was measured using 41 census categories that ranged from 1 (*under \$2,500*) to 41 (*\$100,000 or more*). For this study, both mothers' and fathers' reports of household income were used to minimize reporting bias, and the two reports were averaged.

Time spent with friends. Youth responded to a single questionnaire item that asked about how many times a week they did things with friends outside of school or work (work less applicable for sixth graders). The response format ranged from 1 (*less than once a week*) to 4 (*5 or more times a week*).

Youth emotional distress. Youth emotional distress was a composite average of the standardized scores of measures of loneliness, anxiety, and depressive symptoms. The specific measures were the UCLA Loneliness Scale (Russell, Peplau, & Ferguson, 1978), the Social Anxiety Scale for Children–Revised (La Greca & Stone, 1993), and the Anxiety–Depression subscale of the Youth Self-Report (Achenbach, 1991b). Cronbach’s alphas for the constituent subscales ranged from .83 to .89, and an exploratory principal components analysis indicated one general factor.

Analytic Procedures

Hypotheses were tested using structural equation modeling (SEM; AMOS 7.0, SPSS, Chicago, IL). SEM was well suited to test the proposed hypotheses because it controls for random measurement error and because it can integrate the estimation of growth trajectories with both manifest and latent predictors (Bollen & Curran, 2005). The adequacy of each SEM model was evaluated using the chi-square statistic and two fit indices. A nonsignificant chi-square indicated a good model fit. However, because of the relatively large sample size, a significant chi-square was expected for most models and two additional fit indices were also examined (Byrne, 2001). The comparative fit index (CFI; Bollen & Long, 1993) is based on a comparison of the hypothesized model and the independence model (e.g., there are no relations between the variables in the model). The CFI ranges from 0 to 1.00 with a cutoff of .90 indicating an adequate fit (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA) compares the model with the projected population covariance matrix, and thresholds below .08 suggest an adequate fit (Browne & Cudeck, 1993). There were few missing data within each wave (< 3%). Missing data were addressed using full information maximum likelihood (FIML) estimation methods. FIML was used because it produces less biased estimates than other methods such as imputing the sample mean or dropping cases for data missing within and across waves (Acock, 2005).

Moderation estimation procedures. Moderating effects were estimated differently depending on whether the proposed moderator was continuous or categorical. For continuous moderators (e.g., family income), an interaction term was created by multiplying a centered predictor (sixth-grade score) and a centered moderator (sixth-grade score). This interaction term was entered into the SEM model as a manifest predictor of the aggression intercept and slope, along with the constituent main effects. Significant interactions were probed using multiple-group SEM analyses to describe the nature of the moderating effects. This analytic procedure was used because the continuous nature of the moderator was retained when determining the presence of moderation, maximizing variance and statistical power. For categorical moderators, two models

were estimated. First, a model was estimated in which all of the parameters (both measurement and structural) were constrained to be equal across the two groups. A second model was then estimated in which the structural parameters were allowed to vary across the two groups. The resulting chi-squares were compared using a chi-square difference test. Significant chi-square tests were probed by comparing individual parameters across groups using the critical ratio statistics that is distributed as a Z score (i.e., values > 1.96 significant at $p > .05$).

Results

The descriptive statistics for Wave 1 and the aggression variables appear in Table 1. Each variable had adequate variance, and most correlations were small to moderate in strength.

Table 1. Correlation Matrix, Means, and Standard Deviations Across Wave 1 Variables and Adolescent Aggression (Waves 2, 3, 4; n = 416)

Variables	W2 adolescent aggression	W3 adolescent aggression	W4 adolescent aggression	W1 family hostility	W1 family warmth	W1 peer deviance	W1 household income
W2 adolescent aggression							
W3 adolescent aggression	.83						
W4 adolescent aggression	.77	.83					
W1 family hostility	.27	.28	.29				
W1 family warmth	-.13	-.13	-.17	-.36			
W1 peer deviance	.25	.26	.28	.03	-.05		
W1 household	-.09	-.10	-.10	-.02	.08	-.11	

income							
<i>M</i>	5.31	5.10	4.87	2.93	4.31	1.17	28.95
<i>SD</i>	.19	.21	.22	.06	.05	.02	.48
Range	0–28	0–27.25	0–19.75	1–7.08	1.83– 7.17	0–1.61 ^a	3.5–41 ^b
<p><i>Note.</i> Coefficients significant at $p < .05$ are indicated in bold. The W2 and W3 parameters for family hostility, family warmth, and peer deviance are available upon request. ^aLog transformation. ^bIncome categories.</p>							

The first step in the hypothesis testing was to estimate an unconditional growth trajectory for adolescents' aggression. Using SEM, the analyses modeled aggression data from W2 through W4 (seventh through ninth grades). The intercept was set at W2 so that the associations between the predictor intercepts (set at sixth grade) and the aggression intercept (seventh grade) in subsequent analyses were time lagged. The predicted mean of the intercept (i.e., W2 aggression) was 5.71 ($p < .001$), which is lower than average means (9–10) for comparable age groups in the norm sample (Achenbach, Howell, Quay, & Conners, 1991). The predicted variance around this mean was 11.85 ($p < .001$), indicating significant individual variability around the starting point of the youth aggression trajectory. The predicted mean of the slope (i.e., change in aggression over 3 years) was -0.28 ($p = .048$), indicating declining aggression as youth matured. There was also significant individual variability in this trajectory (variance = 0.56, $p = .002$). Overall, the preliminary analyses indicated a significant variance in both seventh-grade aggression and change in aggression over time. The remaining analyses tested our hypotheses that focused on explaining these significant individual differences in aggression among early adolescents.

Individual Predictors of Adolescent Aggression

To examine the first hypotheses that family processes and affiliation with deviant peers relate to continuing or increasing adolescent aggression, each predictor was initially examined separately. The general analytic strategy was correlating lagged growth curves (Cui, Conger, & Lorenz, 2005). For each analysis, two growth trajectories were estimated, one for adolescent aggression and one for family interaction or peer deviance. This analysis resulted in the estimation of four latent variables: the aggression intercept, the aggression slope, the predictor intercept, and the predictor slope. The hypothesis predicting future adolescent aggression was tested by the path from the predictor intercept (sixth grade) to the aggression intercept (seventh grade). The hypothesis predicting changes in adolescent aggression was tested in two paths: (a) the path from the predictor intercept to the aggression slope (seventh through ninth grades) and (b) the path from the predictor slope to the aggression slope (i.e., lagged growth curves).

Observed family hostility. W1 family hostility was associated positively with W2 adolescent aggression ($\beta = .50, p < .001$), but not with changes in aggression across time ($\beta = .04, ns$). Changes in family hostility across W1 through W3 (i.e., slope) were not associated with changes in aggression. The model fit was adequate ($\chi^2 = 37.75, df = 10, p < .01$; CFI = .97, RMSEA = .08). The moderating effects of the background variables (i.e., youth gender and family income) revealed no significant moderating effects. As such, these predictive effects from family hostility characterized daughters and sons, and youth with varying levels of family economic conditions.

Observed family warmth. Family warmth was associated with lower W2 aggression ($\beta = -.30, p < .001$), but not with changes in adolescent aggression across time ($\beta = -.10, ns$). The model fit was good ($\chi^2 = 18.16, df = 11, p > .05$; CFI = .99, RMSEA = .04). Because adjusting or equating the manifest error variances failed to provide adequate slope estimation, the warmth slope was omitted in subsequent analyses. None of the moderating analyses revealed significant interaction effects. Thus, the predictive effect from lower levels of family warmth characterized youth across varying characteristics and circumstances.

Peer deviance. W1 peer deviance was associated positively with W2 adolescent aggression ($\beta = .55, p < .001$) and with changes in aggression across time ($\beta = -.33, p < .01$). Changes in peer deviance across W1 through W3 were not associated with changes in aggression across W2 through W4. Because the slope of peer deviance was unrelated to the aggression slope, follow-up analyses were conducted using the W1 manifest measure of peer deviance. With the simplified model using the W1 manifest measure of peer deviance, a significant relation remained with the youth aggression intercept ($\beta = .31, p < .001$), but not with the change in youth aggression over time ($\beta = -.11, p = .30$).

W1 family income moderated the effects of youths' W1 affiliation with deviant peer on youths' aggression. The interaction between peer deviance and family income was associated significantly with both the aggression intercept ($\beta = .16, p < .01$) and slope ($\beta = -.33, p < .001$). Although significant for both groups, the positive association between sixth-grade peer deviance and seventh-grade youth aggression was stronger for youth living in families with higher incomes ($b = 8.23, p < .001$) than for youth with lower incomes ($b = 4.83, p < .001$). The association between sixth-grade peer deviance and youths' aggression through ninth grade was not significant for youth living in families with lower incomes ($b = 0.12, p = .85$), but was significant and negative for youth living in families with higher incomes ($b = -2.35, p < .001$).

Multivariate Predictors of Adolescent Aggression: The Importance of Both Parents and Peers

Based on the results from the univariate prediction models, the analytic model for the multivariate prediction of adolescents' aggression included the parental hostility intercept (set at W1), changes in parental hostility over time (W1–W3), W1 parental warmth, and W1 affiliation

with deviant peers (Figure 1), The model fit was adequate ($\chi^2 = 63.66, df = 16, p < .001$; CFI = .95). Future adolescent aggression (i.e., the seventh-grade intercept) was explained uniquely by W1 family hostility ($\beta = .48, p < .001$), and by W1 peer deviance ($\beta = .26, p < .001$). Higher levels of family hostility and affiliation with deviant peers while youth were in sixth grade were associated with higher aggressive behavior while in seventh grade. Significant cross-sectional associations were observed among the pairs of intercept predictors including hostility–warmth, $r = -.57$; hostility–peer deviance, $r = .16$; and warmth–peer deviance, $r = -.17$.

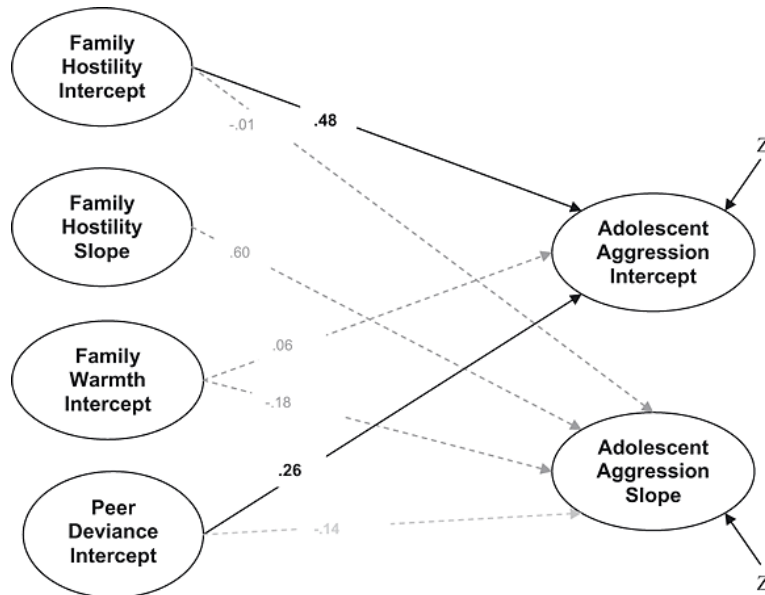


Figure 1. Family processes and peer deviance predicting adolescent aggression.

The significant effect of W1 family warmth from the univariate analysis was absent when family hostility and peer deviance were added to the model. Consistent with the univariate analyses, W1 family income moderated links between sixth grade peer deviance and youth aggression over time. Controlling for family hostility and lower family warmth, the positive, unstandardized association between sixth-grade peer deviance and seventh-grade youth aggression was 3.85 ($p < .001$) for youth with lower family incomes and 7.06 ($p < .001$) for youth with higher family incomes. The association between sixth-grade peer deviance and youth aggression through ninth grade was nonsignificant for youth with lower family income ($b = 0.118, p = .853$), and inverse for youth with higher family income ($b = -2.31, p < .001$),

Given the theoretical importance of person characteristics regarding subjective feelings, youth emotional distress was examined as a moderator of family and peer contexts in relation to aggression. Although no significant interactions were observed with family warmth or family hostility, the interaction between emotional distress and peer deviance was associated significantly with both the aggression intercept ($\beta = -.21, p < .01$) and slope ($\beta = .30, p < .001$). Follow-up analysis with a tripartite split indicated a slightly larger effect of peer deviance on aggression in the next year for the high-distress group ($b = 18.55, p < .001$) compared to the low-

distress group ($b = 17.95, p < .001$). Follow-up on the significant slope finding indicated a disordinal effect with an increasing slope in the low-distress group ($b = 2.98, p = .03$) and a decreasing aggression slope in the high-distress group ($b = -3.46, p = .01$).

Moderating Effects Between Family Interaction and Peer Deviance

In examining the second hypothesis that family process and peer deviance interact to predict adolescent aggression, the dependent variables were the intercept and slope for adolescent aggression. Again, the interaction variables were created using continuous, centered constituent variables to maximize statistical power and minimize multicollinearity. The first analysis examined the interaction between W1 family warmth and W1 peer deviance. The interaction between family warmth and peer deviance was not associated with the youth aggression intercept ($\beta = .01, ns$) but was marginally associated with changes in aggression over time ($\beta = .22, p = .052$). The association between sixth-grade peer deviance and changes in youth aggression was significant for youth with lower family warmth ($b = -1.833, p < .01$), but not for youth with higher family warmth ($b = 0.97, p = .17$).

The second analysis examined the interaction between W1 family hostility and peer deviance (Figure 2). Although not associated with W2 aggression ($\beta = .05, ns$), the interaction term was significantly related to changes in aggression ($\beta = -.29, p < .05$). The significant interaction was probed with a tripartite split. The association between sixth-grade peer deviance and changes in youth aggression was significant for youth with higher family hostility ($b = -1.97, p < .001$), but not for youth with lower family hostility ($b = -.11, p = .08$). As such, sixth-grade peer deviance was associated with declining aggression through ninth grade for youth with higher family hostility, controlling for W1 family warmth.

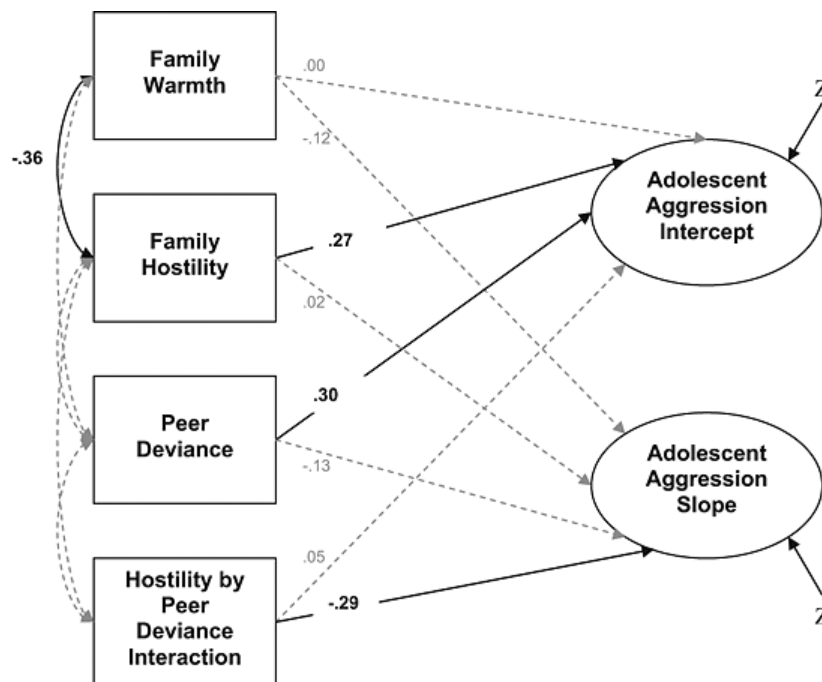


Figure 2. Interaction between W1 family hostility and W1 peer deviance.

Post hoc follow-up analyses. The unexpected interaction involving peer deviance noted earlier led to follow-up moderating analyses on specific aspects of peer relations. Several variables showed no significant effects (e.g., peer susceptibility, number of close friends, and family disagreements about friends). A significant interaction was found, however, between family hostility and the amount of time youth spend with friends outside of school. The greatest level of decreased aggression over time ($b = -4.45$) was found for adolescents exposed to high family hostility who spent more time with friends outside of school (3+ times/week). In this condition, the association between affiliation with deviant peers and the aggression slope reduced to nonsignificance ($b = -1.51, p > .05$).

Discussion

Both family and peer contexts play important roles in adolescent aggression. The findings highlight the dominant roles of family hostility and peer deviance in explaining how these contexts maintain, aggravate, and dampen adolescent aggression. The course of adolescent aggression is described next, followed by results relating family processes, peer deviance, and their interactions to adolescent aggression. These considerations are then expanded with respect to study caveats, theoretical extensions, and implications for future intervention research.

Aggression Trajectories

As shown here, aggressive behavior remains fairly stable from early to middle adolescence. The stability of aggression from seventh through ninth grades observed in this study extends prior short-term evidence of aggression stability (Ellis & Zbaratany, 2007). The observed slight declines in aggression continue the gradually declining aggression trend found throughout childhood (Joussemet et al., 2008). Explanations for the slight declines in adolescent aggression include increased self-regulatory processes, expanded impulse control, and advancing cognitive control (Steinberg, 2007). In addition, frontal lobe functioning, which is implicated in aggressive control (Brower & Price, 2001), continues to develop throughout adolescence (Romine & Reynolds, 2005).

The aggression findings in this study have bearing on the overlap and distinctiveness with the violence construct. Unlike common aggression, the incidence of criminal violence is primarily due to a relatively small portion of the population (Tolan & Gorman-Smith, 1998). This small group of violent offenders is primarily responsible for the peaking of violent behaviors in late adolescence and early adulthood known as the age-crime curve (Blonigen, 2010; Hansen, 2003). In contrast to a rising violence slope for some adolescents, the data here show that most adolescents decrease aggression. Nevertheless, aggression remains an important problem because of the harmful effects in close relationships, compromised development for aggressive perpetrators (Card, Stucky, Sawalani, & Little, 2008), and future violence potential for aggressive individuals (Loeber, Lacourse, & Hornish, 2005).

Family Processes: Hostility and Warmth

Among family and peer characteristics, family hostility has the most consistent, deleterious effect on adolescent aggression. Regardless of gender, income, or family warmth, hostility in families predicted higher aggression in the subsequent year. The current findings based on family observation and multiple aggression reports confirm prior findings that linked family hostility to single-reporter aggression (Williams et al., 2007). In comparison to hostility, family warmth shows comparatively less effect on protecting against adolescent aggression. Family warmth only predicts subsequent adolescent aggression when examined in isolation. When family hostility is accounted for, the effects of family warmth on adolescent aggression are negligible. Viewed as an indirect path, family warmth relates to lower hostility, which in turn links to less aggression. Even with this view of indirect influence, the ultimate contribution of family hostility is more related to adolescent aggression than any conjoint influences of family warmth. The findings emphasize the potential for reducing adolescent aggression through family interventions that parallel successful hostility management approaches developed for individuals (Belacchi & Farina, 2010).

Peer Deviance Affiliation

In addition to family, peer processes evidence an important and complex role in explaining adolescent aggression. Departing from sixth-grade norms, affiliating with deviant peers at this age predicts increased adolescent aggression in the subsequent year. The findings drawn from multiple reporters of aggression parallel prior research findings based on adolescent self-reports of physical aggression (Fergusson et al., 2002). The findings here also show that the pattern of peer deviance affiliation with subsequent aggression holds for both boys and girls. The literature suggests two potential explanations for this consistent pattern between peer deviance and adolescent aggression. One mechanism, deviant talk among adolescent peers, has been linked to future problem behavior in general (Piehler & Dishion, 2007). A second mechanism, moral disengagement, has been shown to relate specifically to physical aggression during adolescence (Paciello, Fida, Tramontano, Lupinetti, & Caprara, 2008). Such processes in deviant peer relations can be expected to undermine competing norms that function to sanction harm to others, retaliation disputes, or emotional reactivity.

The current longitudinal analysis extends prior findings by documenting the nuanced role of peer affiliation in early to middle adolescence. A series of interaction findings show a pattern of peer deviance playing a nonadditive, synergistic role with family warmth, family hostility, and emotional distress. This pattern of nonadditive, synergistic processes is consistent with tenets of later formulations ecological theory (Bronfenbrenner, 2001; Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998). The next section specifies the interaction findings and elaborates the trajectories of adolescent aggression as a function of peer deviance and the contextual factors of family hostility and family income.

Family Process and Peer Deviance

Although family processes and peer deviance show no interaction influence on aggression 1 year later, interaction effects emerge for the aggression trajectory across seventh, eighth, and ninth grades. In families with less warmth or more hostility, peer deviance affiliations link to a trajectory of declining aggression behaviors. In contrast to peer influence theory (Elliott et al., 1985), which implies additive combinations of peer and family factors, the findings here parallel the concept of arena of comfort (Call & Mortimer, 2001). With an arena of comfort interpretation, peer contexts, even when deviant, can serve some adaptive goals that compensate for the tension or disregard in a family. The findings further indicate that time with peers is a central moderator of salutatory effects of affiliating with peers, even if deviant, in conditions of high family hostility.

The interaction findings exemplify the contextual synergy posited in ecological theory (Bronfenbrenner & Morris, 1998). From a mesosystem view, hostile or nonwarm family contexts fail to provide corrective opportunities over time to foster the normative declines in adolescents' aggression trajectories. The inability to generate corrective experiences is consistent with findings showing the self-reinforcing feedback loops of coercive processes (Patterson et al., 2000). Peer deviance affiliations may offer an arena of comfort from the entrenched family dynamics as adolescents explore the complex balance between self-assertion and submission that ultimately reduces aggression.

Although this finding departs from the putative unqualified direness of peer deviance, prior research already has undermined a solely bleak view of deviant friendships. Laboratory research on peers has evidenced, for example, similar levels of prosocial talk between normative and deviant peer friendships (Piehler & Dishion, 2007). In the same study, deviant peer friends showed normal levels of mutuality skills characterized by turn taking, inviting responses, attentiveness, and cooperation. The interaction findings here suggest that lack of warmth or family hostility compromise adolescents' capacity to quell aggression, but that peer relations, even if deviant, provide alternative socialization avenues for reducing aggression. Because the community sample characteristics qualify this finding, it should be noted that affiliation with seriously deviant peers could totally eclipse the benefits of relationships with peers in risk samples.

Emotional Distress and Peer Deviance

The earlier interpretations parallel the study findings regarding emotional distress and peer deviance. For adolescents experiencing emotional turmoil, affiliation with deviant peers shows links to a declining trajectory of aggression. The arena of comfort interpretation suggests that for emotionally distressed adolescents, these friendships, even when deviant, provide the common covariates of friendship found in prior research, which include reduced anxiety, depression, and loneliness (Nangle, Erdley, Newman, Mason, & Carpenter, 2003). Ironically, nondistressed

youth who engage in early peer deviance represent the most worrisome group. As shown here, youth who experience lower emotional distress yet affiliate with deviant peers constitute the only subsample that increased aggressive behaviors over time. The lack of emotional distress and aggression are a troubling combination, as prior research indicates that unemotional and callous behavior predicts future antisocial behavior (Loeber, Burke, & Lahey, 2002). In addition, prior research adds that greater involvement with deviant peers further differentiates adolescents at risk for persistent antisocial behavior (Taylor, Elkins, Legrand, Peuschold, & Iacono, 2007). The findings and prior research suggest the importance of attention to adolescents in deviant peer groups, particularly when the signs of overt emotional distress are absent.

Income and Peer Deviance

Although peer deviance links to higher aggression in the subsequent year for the whole sample, the effects of peer deviance differ for low- and high-income groups. These differences should be understood with respect to sample features that show slightly higher than average income and slightly higher academic indicators for the participating sample. For youth from lower- and middle-income families, the connection between peer deviance and subsequent aggression is relatively weak and shows no relation to their future aggression. For youth from higher income families, however, deviant peer affiliations link strongly to higher aggression the following year. Higher income youth who become involved with deviant peers depart from common perfectionist norms in upper-income families (Luthar, 2003). Such departures coincide with incidents of rebellious behavior or supervision deficits common in some upper-income families (Ansary & Luthar, 2009). In any case, the effect is short lived. Peer deviance among youth from these higher income families ultimately shows a declining trajectory for aggression. For many youth, social controls and consequences subsequently constrain blatantly aggressive actions.

Limitations

The empirical findings presented earlier are best understood with cognizance of several study features. First, the sample represents a portion of the eligible families and levels of aggression are lower than in the norm sample (Achenbach et al., 1991). As such, the current study may underestimate the effect sizes that could be expected in samples with a wider range of aggression. Second, the study included mostly White families with slightly higher than average mean income level. Because prior research indicates higher family effects in White subsamples than in Black subsamples (Wickrama, Noh, & Bryant, 2005), the current findings might overestimate family effects and underestimate peer effects in more diverse samples. Third, as with any study, this research combines relevant constructs. For example, genetic factors have been found to contribute to children's aggression (Brendgen et al., 2008), and family assessments in this study reflect both genetic and environmental family influences. Fourth, the family and peer constructs in this study reflect broad characteristics and processes. Like the family constructs, the peer deviance affiliation reflects broad socialization processes (Brown & Klute, 2003). Narrower measures such as instances of peer or family aggression would be expected to

show more direct, imitative connections to adolescent aggression. Despite these interpretive caveats, the salience of the current findings is bolstered by the solid methodology of the current study that includes reliance on a community sample, longitudinal assessment, family observations, and multiple reporters.

Implications for Theory and Intervention

The findings confirm propositions in ecological theory advancing the importance of both parents and peers in developmental outcomes (Bronfenbrenner, 1979, 1986). The findings also qualify an early proposition in ecological theory that primarily extolled the benefits of context similarity (Bronfenbrenner, 1979). The current study adds that differences between contexts can also have positive socialization benefits. The study illustrates multiple, nonadditive influences of contexts on development. Future research that continues to use a multicontext model and relies on all components of the PPCT model as shown in this study hold additional potential for advancing ecological theory (cf. Tudge et al., 2009) and effective interventions.

In addition to theory extensions, the findings imply explanations for prior intervention successes and suggest new strategies for extending interventions. The observed association between broadly measured family and peer contexts and specific aggressive behaviors suggests a novel lens for interpreting successful cognitive-behavioral interventions that intervene with individual youth (Guerra & Huesmann, 2004). Although the unit of intervention is the individual, the findings here imply the possibility that individual-level changes stimulate context changes in family and peer relations. Training an individual's interpretation of cues, generation of responses, and assessment of consequences usually occur with realistic scenarios or role plays that are connected to everyday examples in peer and family contexts. The findings here suggest that such simulations operate not only through internal cognitive techniques themselves, but also through shifts in the perceptions about contexts and changes in responses elicited in peer and family interactions. An adolescent who develops empathy for a hostile parent or judiciousness about deviant peer's behavior makes cognitive changes that potentially bring forth changes from parents and peer contexts. The findings suggest that interventions focused on cognitive-behavioral interventions can be further enhanced by involving parents and peers in recognizing and reinforcing changes that reduce aggressive conditions and dampen aggressive responses.

The moderation effects observed between peer and family contexts in the current study also have implications for intervention. The moderation effects emphasize the importance of coordinated approaches across contexts. Individually tailored family interventions involving multiple contexts exploit the synergistic potential of parent and peer contexts found in this study. Such synergy provides a partial explanation for the success of the *multisystemic therapy* (MST; Henggeler & Borduin, 1990), which focuses on intensive family and community-based treatment. The tailored intervention strategies in MST and its focus on multiple contexts capitalize on cross-contextual synergy found in this study. The findings here bolster the case for

incorporating multiple layers of contexts in ways that reflect the diverse range of family functioning and peer processes.

The interaction findings also have implications for primary prevention interventions. In a prior review of 41 aggression-reduction intervention studies, primary prevention was less effective than secondary or tertiary prevention (Limbos et al., 2007). Primary prevention studies typically focus on a universal approach whereas tertiary prevention often reflects a theme of the current study findings, tailoring interventions to address differences in specific contexts of an individual's life. Across the study variables, enhancement of family warmth holds potential as a primary prevention approach as it linked to less hostility and indirectly to lower aggression in all subgroups. Primary prevention approaches that foster family listening, responsiveness, and prosocial exchange can be achieved through techniques ranging from engaging public service announcements to community- or faith-based family programs. Across all levels of family intervention, the processes studied here undoubtedly have roots prior to sixth grade, suggesting the advantage of intervention before adolescence. Empirical support for early intervention to prevent aggression derives from research documenting significant reduction in aggression using programs that are implemented before children reach age 12 (Rodney, Johnson, & Srivastava, 2005).

Summary

Overall, the study findings clarify the family process and peer deviance influences on adolescent aggression. Family hostility and peer deviance at the start of adolescence predict increased aggression in boys and girls. Family warmth can serve to lessen the effects of family hostility but remains overshadowed by the presence of family hostility. Affiliation with deviant peers provides a context that buffers the influence of family hostility, lower warmth, and emotional distress on the trajectory of aggression. The subsample of adolescents who engage in peer deviance without emotional distress is identified as a population of particular concern for increased aggression that warrants attention among youth professionals and in future research. For families that lack warmth or exhibit hostility, interventions that directly reduce hostility or foster positive peer connections hold promise for reducing the trajectory for aggression for adolescents, their community, and the broader society.

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