Parenting Predictors of Early-Adolescents’ Health Behaviors: Simultaneous Group Comparisons Across Sex and Ethnic Groups

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Abstract The purpose of this study was to evaluate the invariance of predictive relations across early-adolescent sex and ethnic groups regarding parenting factors and externalizing and internalizing problems and victimization. Data (n = 598; 54% female) from a triethnic (Hispanic, non-Hispanic white, and non-Hispanic black) probability sample of fifth graders collected from three sites (Birmingham, AL, Houston, TX, and Los Angeles, CA) were used in the analyses. Simultaneous group structural equation modeling supported the invariance of parenting-early adolescent outcomes across sex and ethnic groups. Parental monitoring and parental norms were relatively robust predictors of early-adolescent externalizing problems and victimization, and to a lesser extent, of internalizing problems. A maternal nurturance by parental monitoring interaction was statistically significant for all outcome behaviors, indicating that higher monitoring in conjunction with higher maternal nurturance was associated with lower levels of early-adolescent problem behaviors. The findings suggest that core parenting factors such as nurturance, monitoring, and normative expectations for early adolescent problem behaviors may serve as a foundation for parenting components of multi-component intervention studies.

The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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Introduction

Parenting variables are among the most commonly identified risk and protective factors for a range of outcomes related to child and adolescent problem behaviors and well-being (Amato and Fowler 2002; Fergus and Zimmerman 2005; Hill et al. 2003; Miller et al. 1999). Although there is no unitary model for describing all parenting factors, numerous research studies have identified several dimensions of parenting that have been associated with important child and adolescent behaviors (Barber et al. 2005; Chassin et al. 2005; Locke and Prinz 2002). In this study, we focused on three of the most commonly studied dimensions—parental monitoring, nurturance, and normative expectations for early adolescent problem behaviors (hereafter referred to as parental norms).

These three parenting dimensions have consistently been associated with multiple problem behaviors among children and adolescents. Monitoring includes parenting features such as knowing where your child is (e.g., after school and on the weekends), who they are with, and setting guidelines or rules (e.g., for curfew and performing household tasks). Pettit et al. (2001) reported that higher parental monitoring was associated with lower levels of child aggression and other problem behaviors. Barber et al. (2005) reported similar findings in their review and included monitoring and parental knowledge under a construct referred to as parental behavioral control. Parental nurturance, which includes the positive expression of support and warmth from parents to children, has also been associated with a range of child and adolescent risk behaviors (Locke and Prinz 2002). In a major review article, Loeber and Dishion (1983) reported that higher parental nurturance was significantly associated with lower delinquency. Parental norms for child and adolescent behaviors have been associated with lower engagement in risk behaviors (Jaccard and Dittus 2000; Wood et al. 2004). Parents who set clear standards for child and adolescent behavior and establish boundary conditions and contingencies (e.g., negative sanctions) for risk behaviors typically have children who are less likely to transgress with regard to problem behaviors. The literature strongly supports the finding that parenting factors, such as monitoring, nurturance, and norms, are consistent and critical resources for children (Barber et al. 2005; Fergus and Zimmerman 2005).

In addition to more “main effects” models of parenting factors on child and adolescent problems, there has also been interest in the joint, or interactive, contributions of parenting factors to these outcomes (Barber et al. 2005; Chassin et al. 2005). Part of the motivation for the role of the joint contributions of parenting factors stems from Baumrind’s model of parenting styles that has been used to identify four parenting styles, including uninvolved (low firmness and low warmth), permissive (low firmness and high warmth), authoritarian (high firmness and low warmth), and authoritative (high firmness and high warmth) (Baumrind 1991; Steinberg et al. 1994). Research findings on parenting styles have generally indicated that authoritative parenting in Western cultures is associated with fewer risk behaviors and better outcomes for children and adolescents (Baumrind 1991; Steinberg et al. 1994). More recent efforts in parenting research have tended to use continuous measures of parenting dimensions such as nurturance and monitoring and evaluated either main effects (Barber et al. 2005) or formed parenting style typologies based on median-splits (Chassin et al. 2005). In the current study, the possible joint (or moderating) contributions of continuous measures of parental monitoring and nurturance were evaluated via statistical models that included interaction terms. The interaction terms provided a method of analyzing conditional relationships between two variables (high monitoring and high nurturance) on levels of a third variable (e.g., internalizing and externalizing problems).

Studies have indicated that parenting practices for boys and girls differ, especially as children enter early adolescence. For example, differential sex role socialization theory and the gender intensification hypothesis (Block 1983; Hill and Lynch 1983) suggest that girls are more likely to adopt more nurturing, family-oriented attitudes and skills, whereas boys are more likely to be granted greater autonomy and time outside of the home to explore ways to function more competently in the world outside of the family. Similarly, during early adolescence higher levels of parental monitoring are maintained for girls relative to boys, and stronger emotional bonds are more likely to be formed between mothers and daughters than other parent—child dyads. With respect to problem behaviors, early-adolescent girls, relative to early-adolescent boys, are less likely to be physically aggressive and are more likely to report internalizing problems (Cicchetti and Toth 1998; Moffitt et al. 2001).

With regard to ethnic group differences, for the three groups focused on in this study (i.e., Hispanics, non-Hispanic whites, and non-Hispanic blacks), research findings regarding parenting-child problem behaviors have been mixed. For example, several studies have suggested quite minimal, if any, differences regarding the relationships between parenting practices and child-behavior outcomes. In a critical review of the literature, Rowe et al. (1994)
reported that there were mean differences among ethnic groups with regard to problem behaviors, but that the data did not support ethnic differences in developmental processes. Supportive of this review, Vazsonyi and Pickering (2003) used multisample structural equation modeling across white and black samples to support the similarity of regression coefficients for parenting factors in relation to problem behavior outcomes for samples of early adolescents. Similar findings were indicated by Barrera et al. (2001) with respect to American Indian, Hispanic, and white youth, and findings by Wang et al. (2005) indicated that family protective factors (e.g., family supervision and involvement) were equally strong predictors of lower substance use among minority youth (e.g., African-American, Latino, and Asian) as among white youth. By contrast, some studies have suggested that there are some similarities and some differences in parenting-child problem behavior outcomes across ethnic groups. For instance, Broman et al. (2006) reported that parental warmth was lower among African-American and Hispanic families and that this differential warmth was associated with different rates of early substance use among adolescents. Similarly, Szapocznik et al. (2007) have suggested that parent-child relations may be more integral to healthy functioning among black and Hispanic children because of the high value placed on “family” by these groups.

The study of similarities and differences in parenting-problem behavior relations across ethnic groups among early adolescents has been understudied relative to younger children and older adolescents. The understanding of developmental processes related to parent-child relations and problem behavior outcomes is of importance because many of our extant interventions are based on family- and parent-based theories, and include components focused on parenting (Szapocznik et al. 2007). The investigation of these relations during early adolescence is also important developmentally because during this phase in the lifespan children undergo many biological, psychological, and social changes that place high demands on adaptive functioning; parents are a strong resource for early adolescents confronting these changes (Windle et al. 2008). In addition, many intervention programs that include parent components have been developed with predominantly white samples that may not generalize to non-white populations; the demonstration of similarities in predictive relations among parenting factors and outcomes suggests that such interventions that include a parenting component may have applicability to nonwhite samples. A key contribution of this study was to examine the plausibility of the invariance of parenting-child outcome relationships across these three ethnic groups so as to provide one form of validity of parenting constructs commonly used in intervention studies that have not been adequately evaluated across ethnic or sex groups.

Hypotheses of Current Study

Based on previous research (Rowe et al. 1994; Vazsonyi and Pickering 2003), a major hypothesis for the study was that controlling for SES differences across ethnic groups, invariant relationships would be indicated for parenting-child outcome relationships across sex and ethnic groups. This hypothesis and secondary hypotheses (discussed subsequently) were investigated in this study using simultaneous group structural equation modeling procedures. Because socioeconomic factors (SES) such as parent’s educational level and family income have been significantly associated with internalizing and externalizing problems and victimization, as well as distributed differently across ethnic groups due to differences in rates of poverty and average levels of educational attainment (Blum et al. 2000; Wilson 1987), it was important that these variables were included in the study as control variables. Secondary hypothesis for the study pertained to specific relationships between parenting factors and outcome variables. On the basis of research summarized by Barber et al. (2005), it was hypothesized that higher parental monitoring (behavioral control) would significantly predict lower levels of externalizing problems. It was also hypothesized that higher parental norms would predict lower levels of externalizing problems (Wood et al. 2004). Similarly, it was hypothesized that lower maternal nurturance would significantly predict higher levels of internalizing problems (Cicchetti and Toth 1998). The literature has been limited and inconsistent with regard to predicted relationships between parenting factors and victimization and hence no hypotheses were specified (Veenstra et al. 2005). Similarly, the literature on sex as a moderator of the relationships between parenting factors and early adolescent problems has been inconsistent (Pettit et al. 2001; Goldstein et al. 2005) and no secondary hypotheses were specified.

Method

Sample

During the phase I of Healthy Passages, cross-sectional data were collected on 650 fifth-grade children and on one of their primary caregivers from three different sites (see Windle et al. 2004 for a full description of the study). The three geographic areas included Birmingham (BHM), Alabama, Los Angeles County (LA), California, and Houston (HOU), Texas. Public schools were selected using a two-stage probability sampling procedure and all fifth-grade students in regular classrooms in sampled schools were invited to participate. A total of 871 families were
fully pursued during recruitment and 650 (75%) completed both primary caregiver and child interviews. The sample ($N = 650$) consisted of 236 non-Hispanic blacks, 205 Hispanics, 157 non-Hispanic whites, and 52 non-Hispanic others; 311 boys and 349 girls. These three ethnic groups were focused on in Healthy Passages because of their high representation in the U.S. and the feasibility of cost-effective sampling across the three sites. In this multigroup comparative study, we did not use the data from the non-Hispanic other group, resulting in a sample size of 598. Design weights were constructed to reflect different school selection probabilities based on ethnic composition (see Windle et al. 2004). All analyses included information that was relevant to the complex sample design and the final probability weights.

Measures

Externalizing Problems Manifest Indicators

Aggressive Behaviors. Five items that were developed by Little et al. (2003) were used to assess aggressive behaviors. Children rated each item along a four-point scale anchored by response options “Never true” to “True most of the time.” A sample item was “When someone makes you angry, you fight back.” Cronbach’s alpha for this scale was .63.

Problem Behaviors. Nineteen items were used to assess a broad range of physical and nonphysical aggressive acts with reference to the last 30 days (Farrell et al. 2000). Each item was rated by the child along a six-point scale, ranging from “never” to “20 or more times.” A sample item was “In the last 30 days, how many times have you picked on someone?” Cronbach’s alpha for this scale was .90.

Delinquency/Fighting Index. Six items were adapted from the Youth Risk Behavior Surveillance Survey (Brener et al. 2002) to form this composite index. Each item referred to ever having committed acts and response options were “Yes” and “No.” A sample item was “Have you ever been in a fight in which you were injured and had to be treated by a doctor or nurse?” Other items assessed more general aspects of delinquency, such as running away from home overnight and skipping school. We view this measure as the sum of chronic medical conditions (e.g., similar to the sum of chronic medical conditions) rather than an unobserved variable with an underlying true score and therefore rely more on test-retest consistency as a measure of reliability than internal consistency. Test-retest reliability estimates for survey items such as this one have typically been high (e.g., kappas in the .60–70 range; Brener et al. 2002). The measure of internal consistency for this six-item index was .48.

Victimization Manifest Indicators

Peer Victimization. An eight-item measure of peer victimization was assessed with the child-reported Peer Experience Questionnaire (Prinstein et al. 2001). The time referent for each item was the past 12 months and the five-point response options for each item ranged from “never” to “a few times a week.” A sample item was “How often do kids call you names?” Cronbach’s alpha for this scale was .89.

Victim of Violence. Five items were used to assess how often children were either threatened with, or the victim of, violence. The items were adapted from the Traumatic Events Screening Instrument for Children (TESI-C; Ribbe 1996) and were supplemented by survey items that are adapted from the Youth Risk Behavior Surveillance Survey (Brener et al. 2002). Each item was rated by children along a four-point scale, ranging from “never” to “lots of times.” A sample item was “How often over the past 12 months, has someone threatened or injured you with a gun?” Cronbach’s alpha for this scale was .59.

Bullied by Others. A single item was used to assess having been bullied by others (Nansel et al. 2001). The item that children responded to was “How often have you been bullied in the past 12 months?” and the five-point response option ranged from “never” to “a few times a week.” Test-retest reliability estimates for survey items such as this one have typically been high (e.g., kappas in the .60–70 range; Brener et al. 2002).

Internalizing Problems Manifest Indicators

Negative Affect. The 15-item negative affect subscale from the Positive and Negative Affect Scale for Children (PANAS-C) was used to assess the levels of distress or negative affect among children (Laurent et al. 1999). Children rated each of 15 negative affect descriptors (e.g., sad, scared, and gloomy) along a five-point scale, ranging from “very slightly or not at all” to “extremely,” with regard to how they felt during the past month. Cronbach’s alpha for this scale was .86.

Loneliness. This six-item scale assesses children’s feelings of loneliness and social dissatisfaction in the school setting (Asher and Wheeler 1985). The children rated each item along a five-point scale, ranging from “always true about you” to “not true at all about you.” A sample item was “You don’t have anyone to play with at school.” Cronbach’s alpha for this scale was .77.

Fear of Negative Evaluation. A six-item subscale from the Social Anxiety Scale for Children (LaGreca et al. 1988; LaGreca and Lopez 1998) was used to assess fear of negative evaluation. Children rated each item along a five-point scale, ranging from “not at all true” to “true most of
the time.” A sample item was “You worry about what other kids say about you.” Cronbach’s alpha for this scale was .89.

Parenting Factors

Maternal Nurturance. Seven items were completed by children to assess maternal nurturance (Barnes and Windle 1987). Each item was rated along a four-point scale, ranging from “almost never” to “almost always.” A sample item was “How many of your friends do your parents know?” with a four-point response option, ranging from “all of them” to “none of them.” Other items focused on time spent at home alone (e.g., on weekends and after school) and parental knowledge about what the child is doing in his/her free time. Cronbach’s alpha for this scale was .76.

Parental Monitoring. Five items were completed by children to assess parental monitoring or behavioral control (Barber et al. 2005). One item was adapted from Jacobsen and Crockett (2000), and the other four items were developed specifically for this age group because prior parental monitoring items had been used with older age groups. A sample item was “How often does your mother give you praise or encouragement?” Cronbach’s alpha for this scale was .73.

Parental Norms for Problem Behaviors. Six items were developed for this study to be completed by the children regarding their perception of parents’ expectations or norms for problem behaviors. Each item was rated along a four-point scale, ranging from “not at all upset” to “very upset.” A sample item was “How upset would your parents feel if they found out you smoked cigarettes?” Other items identified expectations for other problems or unhealthy behaviors, including drinking alcohol, getting into fights, eating junk food, not exercising, and having a boyfriend or girlfriend. Cronbach’s alpha for this scale was .55.

Parental education level. This variable was measured by a response to the highest level of education that was completed by primary caregivers, with a seven-point scale of 1 “did not finish high school,” 2 “graduated from high school,” 3 “had some college but no degree,” 4 “received an associate degree,” 5 “graduated from college,” 6 “received a Master’s Degree,” and 7 “received a professional or doctoral degree.”

Family income. This variable was measured by the total combined income of all members of the family household who were 15 years of age or older during the last 12 months. Primary caregivers responded to a graduated series of questions (e.g., under $35,000 or $35,000 or more), with responses eventually used to form a 20-point scale, ranging from 1 “less than $5,000/year” to 20 “$250,000/year or more.” A Binary Income variable was also created and used in this study to address issues that are related to missing values (see section on Statistical Analyses).

Procedures

Fifth-grade students and one of their parents were recruited through school classrooms. In the recruitment materials, we requested consent and participation from the primary caregiver of the child. The vast majority of parents were the child’s biological mother (86%) and a much smaller portion the child’s biological father (8.8%); for this article, “parent” is used to refer to all adult respondents. Parents who gave their consent to be contacted were called to schedule a visit at home or at another preferred location. At the interview, the parent provided signed consent forms for him/herself and their child, and the child gave a signed assent. Interview and anthropometric data were collected by trained field staff. The parent and child interviews consisted of a computer-assisted personal interview (CAPI) and an audio-computer-assisted self-interview (A-CASI), with the latter used for more personally sensitive information. The parents and children completed their interviews separately in private spaces. For completing the interview, the parents were paid $50 and the children were given a store gift card worth $20. Additional information on procedures is provided by Windle et al. (2004).

Results

Statistical Analyses

Multiple group structural equation modeling using Mplus Version 3.0 (Muthen and Muthen 1998–2004) was used to test hypotheses about the full, partial, or non-equivalence (invariance) of predictive relations between parenting factors and problem behaviors across gender and ethnic groups. We used the Root Mean Square Error of Approximation (RMSEA; Browne and Cudeck 1993) as our primary index of model fit because some (Loehlin 1998) have suggested that it is currently the best model fit index, and it also may be advantageous with the robust maximum likelihood estimator used in this study. Close fit for the RMSEA index is indicated for values less-than .05, fair fit for values ranging from .05 to .08, and poor fit for values greater than .10. A secondary fit index, the Comparative Fit Index (CFI), was also reported. Because of the more complex nature of our specified models, we used a CFI criterion as greater than .90 as indicating good model fit and .80–.90 as indicating acceptable fit (Browne and Cudeck 1993). Note that Hu and Bentler (1999) proposed a
criterion of .95 for the CFI to indicate good fit; however, as noted by others (Marsh et al. 2004), this value may be too stringent for more complex models and may result in the rejection of well-fitting models. The complex sampling procedure was used in Mplus and included the specification of variables for strata (the three sites), clustering (for children within schools), and sampling weights (for differential school selection probabilities based on ethnic composition and nonresponse weights). Maximum likelihood (ML) estimates that were robust (MLR) to nonnormality and nonindependence of observations were used in the multiple group analyses.

Missing values, while a relatively small percentage (1.2%) in this study, were estimated at two different stages of data processing. First, for item-level data associated with scale scores, a single imputation method was used with SAS (2004) to estimate missing values under the assumption of ignorability. For missing values associated with scale scores and other variables (e.g., family income) used in this study, the EM algorithm was used to estimate missing values. This ML approach also assumes that missing data mechanism is ignorable. Because the missing value mechanism for family income may be nonignorable and because the percentage missing was higher than any other variable (7%), we created a dummy variable with “0,” indicating that a response for family income had been provided, and “1,” indicating that a response had not been provided (but had been estimated). We included this binary income variable in specified models as a covariate to control for this potential source of nonignorability.

Comparisons of Gender and Ethnic Groups on Parenting and Outcome Variables

Although the principal focus of this study was on systems of relationships (or covariance structure relations) between parenting factors and early-adolescent outcomes, for completeness, we also evaluated mean level differences. One-way analysis of variance models were conducted to compare means with regard to sex and to ethnic group, respectively. Table 1 summarizes the findings for sex difference comparisons. Boys reported significantly higher levels of aggression, problem behaviors, and delinquency/fighting than girls, as well as higher levels of violent victimization. Girls reported a higher level of fear of negative evaluation than boys, although no gender differences were indicated for negative affect or loneliness. With regard to parenting factors, girls reported higher levels of maternal nurturance, parental monitoring, and parental norms than boys. In comparisons among ethnic groups (see Table 2), non-Hispanic blacks reported the highest levels of aggression, problem behaviors, and delinquency/fighting and had higher levels of violent victimization than Hispanics. Non-Hispanic whites had lower levels of negative affect than either Hispanic or non-Hispanic black youth. Hispanics had the highest fear of negative evaluation relative to non-Hispanic white and black youth. Regarding parenting factors, non-Hispanic blacks reported the highest levels of maternal nurturance; Hispanic youth reported the highest levels of parental norms. The highest average level of parental education was among non-Hispanic whites.

Multiple Group Model for Gender Group Comparisons

The metric invariance of the three latent variables of internalizing problems, externalizing problems and victimization was first established by testing and finding support for the invariance of factor loadings across males and females, and then across the three ethnic groups (Vandenberg and Lance 2000); then the full SEM was specified and tested. Figure 1 summarizes the findings for comparisons of the boys and girls with regard to parental associations on early-adolescent behaviors. The model is specified such that there are three latent variables (externalizing problems, victimization, and internalizing problems), each with three manifest variables (e.g., aggression, problem behaviors, and delinquency/fighting). The model specified included the following 11 predictors: maternal nurturance, parental monitoring, parental norms, parental education level, family income, binary family income, two dummy site variables, and the three parenting interaction variables.
As noted previously, two models were compared to evaluate the hypothesis that the relationships among the system of variables specified in Fig. 1 were invariant across boys and girls. In the models specified and evaluated, all exogenous variables were allowed to predict each of the three latent variables. For ease of presentation, only statistically significant parameter estimates are displayed.

### Table 2 Comparison of ethnic groups on parenting and outcome variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1) Hispanic 205</th>
<th>(2) Non-Hispanic white 157</th>
<th>(3) Non-Hispanic black 236</th>
<th>F-test</th>
<th>Post-hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
<td>SD</td>
<td>X</td>
</tr>
<tr>
<td>Aggression</td>
<td>7.39</td>
<td>2.94</td>
<td>6.79</td>
<td>2.48</td>
<td>8.57</td>
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<tr>
<td>Problem behaviors</td>
<td>22.90</td>
<td>5.06</td>
<td>23.17</td>
<td>5.72</td>
<td>25.84</td>
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<tr>
<td>Delinquency/fighting</td>
<td>0.76</td>
<td>1.13</td>
<td>0.89</td>
<td>1.20</td>
<td>1.55</td>
</tr>
<tr>
<td>Peer victimization</td>
<td>13.92</td>
<td>5.78</td>
<td>14.33</td>
<td>6.94</td>
<td>15.41</td>
</tr>
<tr>
<td>Victim of violence</td>
<td>4.99</td>
<td>1.54</td>
<td>5.26</td>
<td>1.71</td>
<td>5.65</td>
</tr>
<tr>
<td>Bullied by others</td>
<td>1.69</td>
<td>1.06</td>
<td>1.60</td>
<td>1.05</td>
<td>1.68</td>
</tr>
<tr>
<td>Negative affect</td>
<td>2.09</td>
<td>0.69</td>
<td>1.84</td>
<td>0.63</td>
<td>2.14</td>
</tr>
<tr>
<td>Loneliness</td>
<td>10.03</td>
<td>4.45</td>
<td>9.94</td>
<td>4.09</td>
<td>9.91</td>
</tr>
<tr>
<td>Fear of negative evaluation</td>
<td>18.71</td>
<td>7.92</td>
<td>16.55</td>
<td>6.96</td>
<td>16.84</td>
</tr>
<tr>
<td>Maternal nurturance</td>
<td>21.07</td>
<td>4.41</td>
<td>20.95</td>
<td>3.95</td>
<td>22.08</td>
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<tr>
<td>Parental monitoring</td>
<td>19.21</td>
<td>2.45</td>
<td>19.32</td>
<td>2.25</td>
<td>19.28</td>
</tr>
<tr>
<td>Parental norms</td>
<td>19.32</td>
<td>2.80</td>
<td>18.38</td>
<td>2.61</td>
<td>17.86</td>
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<tr>
<td>Parental education level</td>
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<tr>
<td>Family income</td>
<td>5.28</td>
<td>3.35</td>
<td>11.89</td>
<td>5.16</td>
<td>5.69</td>
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</table>

SD standard deviation
* p < .05; ** p < .01; *** p < .001

**Fig. 1** Simultaneous group analyses of parental influences on early-adolescent behaviors across gender groups. Ordering of coefficients is for males and then females. Note that the following five covariates (predictors) were included in the model specified and estimated but were not statistically significant at conventional levels of significance (p < .05): two site variables (The University of Alabama, Birmingham, and The University of Texas, Houston), maternal nurturance, and the two interaction terms of parental monitoring × parental norms and maternal nurturance × parental norms. Note that significance levels indicated by asterisk apply to both boys and girls.

The unconstrained model permitted each of the parameters for boys and girls to be freely estimated; therefore, for example, the path (structural) coefficient from parental monitoring to externalizing problems assumed whatever numerical value optimized the maximum likelihood estimation procedure used and these values could differ for boys and girls. The statistical fit of this unconstrained terms.
model was fair ($\chi^2 = 350.66; df = 186; p < .001; \text{RMSEA} = .05; \text{CFI} = .90$), suggesting that the specified model adequately reproduced the observed covariance matrix. Unlike the unconstrained model, the constrained model imposed equality constraints across boys and girls such that the estimated numerical value of estimated parameters (e.g., the path coefficient from parental monitoring to externalizing problems) had to be identical for both boys and girls. This resulted in 33 equality constraints. The statistical fit of this constrained model was also fair ($\chi^2 = 391.04; df = 219; p < .001; \text{RMSEA} = .05; \text{CFI} = .90$), suggesting that this specified model also adequately reproduced the observed covariance matrix.

To examine the hypothesis that the constrained (invariant) model provided an equally good fit to the data as the unconstrained model, a difference test was conducted by using the rescaled Satorra—Bentler procedure (Satorra and Bentler 1999). The result yielded a $\chi^2 = 41.85; df = 33; p = .14$, thereby indicating that the imposition of the 33 equality constraints did not result in a poorer fitting model. That is, the more parsimonious constrained model, with fewer parameters estimated, provided an equally good fit to the data as the unconstrained model. The parameter estimates reported in Fig. 1 were derived from the constrained model. Parenthetically, the numerical values shown in Fig. 1 are standardized values; the equality constraints are imposed on the unstandardized values. The differences in variances among boys and girls account for the different standardized values provided in the figure.

Substantively, the model indicated that the parameter estimates associated with the three manifest indicators for each of the three latent variables were statistically significant and of moderately high value. Higher levels of externalizing problems were significantly predicted by lower parental monitoring, lower parental norms, and lower family income. These predictors accounted for 20% of the variance in externalizing problems for boys and 29% for girls. Higher levels of victimization were predicted by lower levels of parental norms, lower family income, and the maternal nurturance by parental monitoring interaction. These predictors accounted for 13% of the variance in victimization for boys and 9% for girls. Higher levels of internalizing problems were predicted by lower levels of parental education and the maternal nurturance by parental monitoring interaction. These predictors accounted for 13% of the variance in internalizing problems for boys and 14% for girls.

Multiple Group Model for Ethnic Group Comparisons

A similar multiple group application as was used for gender groups was specified for the three ethnic groups of Hispanics, non-Hispanic whites, and non-Hispanic blacks.

![Simultaneous group analyses of parental influences on early-adolescent behaviors across ethnic groups.](image)
Figure 2 summarizes the findings for comparisons across the three ethnic groups with regard to parental influences on early-adolescent behaviors. Only statistically significant parameter estimates are shown in Fig. 2. Similar to the application with sex groups, both unconstrained and constrained models were specified and estimated, using a three-group model for ethnic group comparisons.

The statistical fit of this unconstrained model was fair ($x^2 = 530.81; df = 282; p < .001; \text{RMSEA} = .07; \text{CFI} = .88$), suggesting that the specified model adequately reproduced the observed covariance matrix. The constrained model imposed equality constraints across the three ethnic groups, such that that the estimated numerical value of the estimated parameters (e.g., the path coefficient from parental monitoring to externalizing problems) had to be identical for Hispanics, non-Hispanic whites, and non-Hispanic blacks. This resulted in 66 equality constraints. The statistical fit of this constrained model was fair ($x^2 = 589.60; df = 348; p < .001; \text{RMSEA} = .06; \text{CFI} = .89$). Of importance, the difference test using the rescaled (adjusted) Satorra—Bentler procedure (Satorra and Bentler 1999) yielded a $x^2 = 62.01; df = 66; p = .60$, thereby indicating that the imposition of the 66 equality constraints did not result in a poorer fitting model. The parameter estimates reported in Fig. 2 were derived from the constrained model.

Substantively, the model indicated that the parameter estimates associated with the three manifest indicators for each of the three latent variables were statistically significant and of moderately high value for each of the three ethnic groups. Higher levels of externalizing problems were significantly predicted by lower parental monitoring, lower parental norms, lower parental education levels, and the maternal nurturance by parental monitoring interaction. These predictors accounted for 29% of the variance in externalizing problems for Hispanics, 23% for non-Hispanic whites, and 22% for non-Hispanic blacks. Higher levels of victimization were predicted by lower levels of parental norms, by the binary income variable, and by the maternal nurturance by parental monitoring interaction. Unique to this model, higher family income predicted lower victimization, perhaps functioning as a proxy for safer neighborhood and school contexts. These predictors accounted for 13% of the variance in victimization for Hispanics, 9% for non-Hispanic whites, and 11% for non-Hispanic blacks. Higher levels of internalizing problems were predicted by lower parental norms, lower parental education levels, and the maternal nurturance by parental monitoring interaction. These predictors accounted for 13% of the variance in internalizing problems for Hispanics, 8% for non-Hispanic whites, and 13% for non-Hispanic blacks.

Because the two-way interaction of maternal nurturance by parental monitoring was statistically significant for two of the three latent-dependent variables for sex groups and for all three latent-dependent variables for ethnic groups, interactions were further investigated. Using SPSS Version 13.0 (2004), linear regression models were analyzed using the same predictors as were used in the multiple group structural equation models, and summed $z$-scores for each manifest indicator was used to derive the scores of the dependent variables. Following procedures described by Aiken and West (1991) and Preacher et al. (2006), variables (maternal nurturance by parental monitoring) used in the interaction terms were centered prior to the creation of the product interaction term to reduce collinearity problems. Tests of simple slopes were conducted by creating new variables for maternal nurturance that were one standard deviation above and below the mean. These new variables were used in separate regression equations to evaluate the statistical significance of the slopes and to provide plots of the interactions. Analyses for the statistical interactions and simple slopes were statistically significant for externalizing problems, victimization, and internalizing problems. Figure 3 was plotted for externalizing problems using the software program of Preacher et al. (2006) and indicated that higher levels of maternal nurturance in conjunction with higher levels of parental monitoring were associated with significantly lower levels of early-adolescent externalizing problems. Similar findings were indicated for the interactions of maternal nurturance and parental monitoring with regard to victimization and internalizing problems (figures not shown).
Discussion

There are two important findings in this study of a culturally and geographic diverse sample of fifth graders. The first is with regard to the invariance of the predictive relations between multiple parenting factors and early adolescent problem behaviors across sex and ethnic groups. The second was with respect to the specificity of prediction for particular parenting factors and early adolescent problem behaviors. The major hypothesis of this study investigated whether the system of interrelationships among parenting factors and multiple problem behaviors was invariant (the same) across sex groups and ethnic groups or whether these interrelationships appeared to vary contingent on subgroups (e.g., boys or girls, blacks or whites). Our findings strongly supported the invariance of the parenting-problem behavior relationships across both sex and ethnic groups. That is, maternal nurturance, parental monitoring, parental norms, and the three interaction terms (associated with two-way parenting interactions) were all related to internalizing and externalizing problems and victimization in highly similar ways for boys and girls and across the three ethnic groups. These findings parallel and extend those reported in prior research regarding ethnic groups. That is, maternal nurturance were associated with lower levels of internalizing problems across sex and ethnic groups. This finding supports the notion that parental expectations conveyed to early adolescents may be internalized to assist in reducing levels of early adolescent problem behaviors (Jacard and Dittus 2000; Wood et al. 2004).

The third (secondary) hypothesis was supported to the extent that maternal nurturance was significantly associated with internalizing problems via an interaction with parental monitoring. The interaction term was invariant across sex and ethnic groups and suggested that higher levels of monitoring in conjunction with higher levels of maternal nurturance were associated with lower levels of internalizing problems. Using arguably a stronger analytic approach with continuous variables, these findings are consistent with, but not necessarily identical to, Baumrind's notion of authoritative parenting (Baumrind 1991; Chassin et al. 2005). That is, high levels of parental monitoring/behavioral control (firmness) and high levels of maternal nurturance were associated with lower levels of internalizing problems, as well as lower levels of externalizing problems and victimization across both sex groups and all three ethnic groups. These findings suggest that it would be of benefit in designing parenting interventions to focus on multiple aspects of parenting and to try to achieve high levels of both monitoring and nurturance, as well as communicating clearly about norms and expectations for early-adolescent behaviors.

Regarding the strength of predictive relations across the three early-adolescent risk behaviors, the highest portion of variance accounted for by the predictor variables was for externalizing problems, which ranged from 22 to 29% across sex and ethnic groups. Although statistically significant, the predictor variables accounted for between 9 and 13% of the variance of victimization and between 8 and 13% of the variance for internalizing problems across sex and ethnic groups. These are respectable portions of variance to be accounted for, but nevertheless suggest that additional predictor variables are required to provide a more complete accounting of variation for each of these three problem variables. Nevertheless, these findings are consistent with the literature in supporting the importance of
parenting factors as key elements in understanding the development and expression of early-adolescent problem behaviors and to be identified as targets for intervention studies (Amato and Fowler 2002; Fergus and Zimmerman 2005).

This study has several limitations that merit consideration when interpreting the findings. The study was cross-sectional and hence the relationships between parenting factors and early-adolescent risk behaviors reflect associations and cannot be construed as directional with regard to casual—explanatory processes. There is little question that parent—child relationships are bidirectional (Barber et al. 2005; Stice and Barrera 1995) and that repeated measures across time are required to more adequately capture the dynamic, unfolding parent—child processes that contribute to early-adolescent risk outcomes. There were also methodological limitations in this study in that most of the measures relied on the self-reporting by early adolescents and some of the associations may contain portions of shared method variance. For some of the measures used in this study, such as centralizing symptoms and victimization, it is difficult to rely on external observers (e.g., parents and teachers) to report on internal feeling states of children or on behaviors that they do not observe (e.g., fear of negative evaluation) or were not told about (e.g., victimization at school or in the neighborhood). Nevertheless, a multi-informant approach may increase the validity of the proposed parent—child outcome relationships supported in this study. There was also relatively low reliability for some of the measures and hence the statistical tests for some of the relationships among measures is conservative (i.e., more highly reliable measures may have yielded more, or stronger, predictive relations).

Despite these limitations, the findings of the study were consistent with some prior research (Barrera et al. 2001; Rowe et al. 1994; Vazsonyi and Pickering 2003) in supporting invariant relationships for parenting factors and early-adolescent risk behaviors across males and females and across three ethnic groups. These findings for early adolescents are important developmentally because of the many changes and transitional events encountered during this phase in the lifespan, including the onset and escalation of many problem behaviors that necessitate strong guidance and emotional support sources such as that provided by parents (Windle et al. 2008). These core parenting factors, supplemented by culturally specific parenting and family practices, may serve as a strong foundation for components of larger multicomponent intervention studies that also include other salient general and specific domains (e.g., peers, school, and neighborhood influences).

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References


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