GENDER DIFFERENCES IN RISK/PROTECTION PROFILES FOR LOW ACADEMIC PERFORMANCE

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Abstract

Using holistic-interactionistic theory, the simultaneous nature of risk and protection factors for both males and females (age 6–11 in Wave 1) is examined using Latent Profile Analysis (LPA). Risk/protection classes are estimated using multiple risk factor variables (e.g., physical child abuse) and multiple protective factors (e.g., extracurricular activities). These risk/protection classes were used to predict low academic performance. For both males and females, high risk, low protection individuals were significantly more likely to experience low academic performance than low risk, high protection cases. Gender differences emerged in a class for females that included the importance of parental/peer disapproval of anti-social behavior as a protective factor that was not present for males. Findings support elements of the holistic-interactionistic theory for human development and suggest the need to examine risk and protective factors in combination to account for their shared influences on developmental outcomes. Implications for youths underperforming academically are discussed.

The majority of research examining why children and adolescents do not achieve up to their potential in educational settings focuses on variable-centered research as opposed to person-centered research (Bauer, & Shanahan, 2007; Block, 1971). Variable-centered research methods have examined a number of important significant relationships between risk factors such as child maltreatment (Eckenrode, Laird, & Doris, 1993; Jimerson, Egeland, Sroufe, & Carlson, 2000; Kinard, 1999), intimate partner violence (Dawud-Noursi, Lamb, & Sternberg, 1998), and low socioeconomic status levels (Bradley & Corwyn, 2002; D'Angiulli, Siegel, & Hertzman, 2004; Greenberg, Lengua, Coie, & Pinderhughes, 1999; Silva, McGee, Thomas, & Williams, 1982) and low academic performance. However, it is important to supplement this understanding of the possible predictors of low academic achievement with methods that focus on the individual's experience of various combinations of risk and protective factors (Bergman, Magnusson, & El-Khouri, 2003; Magnusson, 1988; Magnusson & Casaer, 1993).

This study uses the holistic-interactionistic theory to guide a conception of individuals experiencing both risk and protective factors for low academic performance simultaneously throughout their lives. The simultaneous nature of risk and protective factors are examined

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using a person-centered cluster technique, latent profile analysis, for both males and females. The classes from this analysis are used to predict low academic performance in an attempt to illustrate how risk and protective factors might best be conceived as a unified whole.

Holistic-Interactionistic Theory

The holistic-interactionistic theory (Magnusson, 2001; Magnusson & Stattin, 2006) emphasizes the development of the individual from a holistic process involving the interaction of numerous elements. These elements are indivisible, complex, and active and serve an adaptive function. An individual adapts and changes over a period of time through a process where elements of the individual act simultaneously within a coordinated fashion. These elements include the interaction of mental, biological, and behavioral elements together with the interaction of the complete and complex factors within the environment surrounding the individual. Research examined within the holistic-interactionistic theory models the organism as a whole, across time and to the fullest extent possible given the constraints of the data gathered (Laursen & Hoff, 2006). This theoretical paradigm supports a person-centered research method that focuses the analytical techniques at the individual level as opposed to the examination of relationships among different variables (Laursen & Hoff, 2006).

Following the methodology that directly stems from holistic-interactionistic theory, we utilized a person-centered approach. Person-centered approaches identify groups or types of individuals who share particular attributes or relations among attributes and are best suited for research questions that concern group differences in patterns of development (Laursen & Hoff, 2006). These models are predicated on the assumption that the population is heterogeneous with respect to how the predictors operate on the outcomes. Appropriate statistical techniques include profile, class, and cluster analyses (Laursen & Hoff, 2006).

The "fundamental tenet of the person-centered approach is that a holistic and interactionist perspective of the individual is needed for a thorough understanding of the individual's functioning and development" (Von Eye & Bergman 2003, p.553). Therefore, we posit two distinct hypotheses. First, it is predicted that risk and protective elements within the individual's experience will cluster together and form distinct and identifiably different clusters in predicting low academic performance. Second, it is hypothesized that males and females will have identifiably different risk/protection profiles in connection with low academic performance..

Literature Review

Risk Factors

In this study we focus on several well-documented risk factors for low academic performance, including physical child abuse, exposure to intimate partner violence (IPV), early problem behavior in children, and low socioeconomic status (SES) in the family. In a study of maltreated children in kindergarten through 12th grade, Eckenrode, Laird, and Doris (1993) found that physical child abuse increased the risk of low academic performance. Kinard (1999) also found a strong effect of physical child abuse on low academic performance in her study on abused children after controlling for maternal education, maternal employment and child's gender. Other studies have also found child maltreatment is an important risk for school problems among children and adolescents (Boden, Horwood, & Fergusson, 2007; Leiter, 2007; Veltman, & Browne, 2001). Along with direct child maltreatment, exposure to intimate partner violence (IPV) has been identified as another primary risk factor for low academic performance among children and adolescents (Graham-

Bermann, 1998; Koenen, Moffitt, Caspi, Taylor, & Purcell, 2003; Sudermann & Jaffe, 1997; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). Other individual characteristics of the child, including low IQ, have been shown to increase the risk of academic failure during adolescence (Werner & Smith, 2001) and early problem behavior is associated with low academic performance in children (Achenbach, Howell, McConaughy, & Stranger, 1995; Agostin & Bain, 1997; Barriga, Doran, Newell, Morrison, Barbetti, & Robbins, 2002; Malecki & Elliott, 2002). Problems with inattention have also been associated with lower levels of academic achievement, especially if those problems occur early in the child's academic career (Giannopulu, Escolano, Cusin, Citeau, & Dellatolas, 2008; Rabiner & Coie, 2000). Children who have problems being viewed as normal socially among their peers have also been shown to have lower academic achievement (DeRosier & Mercer, 2009). Finally, several studies have found low socioeconomic status (SES) in the family to be a primary risk factor for poor academic achievement among children and adolescents (Bradley & Corwyn, 2002; D'Angiulli, Siegel, & Hertzman, 2004; Greenberg, Lengua, Coie, & Pinderhughes, 1999).

Protective Factors

Research on protective factors has been slower to develop than research on risk factors for low academic performance; however, some studies have included a number of protective factors that are associated with academic performance. For example, both Feldman and Matjasko (2005) and McNeal (1995) both found involvement in extracurricular activities to be a protective factor for low academic performance. Higher IQ and better mental health have been found to improve grades among children and adolescents (Gutman, Sameroff, & Cole, 2003). Several studies have also examined the positive influence of school engagement on academic retention and achievement (Finn & Rock, 1997; Fredricks, Blumenfeld, & Paris, 2004; Janosz, Archambault, Morizot, & Pagani 2008). Religious involvement and importance is also associated with higher levels of academic achievement in children and youths (Milot & Ludden, 2009; Park & Bonner, 2008). A time orientation that emphasizes hope for the future is also associated with increases in academic achievement (Bowles, 2008; Brown & Jones, 2004) Finally, parental involvement and support have been shown to protect at-risk youth from low academic performance (Burchinal, Robers, Zeisel & Rowley, 2008; Gutman, Sameroff, & Eccles, 2002).

Male/Female Differences

Several researchers indicate that different paths for the development of low academic performance and failure to complete schooling for males and females may exist (Alspaugh, 2000; Jordan, Lara, & McPartland, 1996). In terms of low academic performance research indicates there are gender differences in risks associated with males and females (Goldberg, Prause, Lucas-Thompson, & Himsel, 2008; Hoglund, 2007; Rauh, Parker, Garfinkel, Perry, & Andrews, 2003). Hoglund (2007) examined peer victimization and school functioning and found that school engagement was a mediator for internalizing problems and physical victimization for girls but only acted as a mediator for externalizing problems for boys. Similarly, Dotterer, McHale, and Crouter (2007) found time spent in extracurricular activities was related to higher self-esteem related to school achievement and greater school bonding for boys and girls, and that time spent on homework was a positive predictor of school bonding for boys. Another study of academic achievement in adolescents indicated that females benefited more than males from a close attachment to an authoritative mother and teacher (Blitstein, Murray, Lytle, Birnbaum, & Perry, 2005). Crosnoe, Erickson, and Dornbusch (2002) found that teacher bonding and academic achievement functioned as protective factors for females but not for males, in the development of delinquent behaviors. In a study of African American inner city middle-school adolescents, family cohesion and parental monitoring predicted school engagement but not GPA, however findings revealed

significant gender differences (Annunziata, Hogue, Faw, & Liddle, 2006). Tests of gender effects found that for boys, family cohesion affected school engagement only in families with high levels of parental monitoring, while family cohesion and parental monitoring each had an additive effect on school engagement for girls with girls from cohesive homes with high parental monitoring being most engaged in school.

With respect to gender differences in school completion, both Alspaugh (2000) and Jordan, Lara, and McPartland (1996) found males had higher rates of dropping out of school than females. Specifically, among Black adolescents in the most disadvantaged neighborhoods, boys are twice as likely to drop out of school as girls (Crowder & South, 2003). Kokko, Tremblay, Lacourse, Nagin, and Vitaro (2006) followed trajectories of physically aggressive behavior among boys age 6–12 and found a high trajectory of aggression to be significantly related to school dropout at age 17. Despite research on gender differences in risk and protection, however, researchers have yet to investigate multiple risk factors and protective factors in combination for males and females on low academic performance.

This study has three main aims. First, it attempts to replicate previous research on multiple risk factors and their negative influence on academic achievement using a person-centered methodology. Second, it extends the literature on multiple risk factors by simultaneously modeling protective factors that are also present during the experience of multiple risks. Third, it grounds this methodological approach within a holistic theory of human development and action (Magnusson, 2001; Magnusson & Stattin, 2006) in an attempt to help inform possible interventions within the field of community psychology.

Method

Sample

Study participants were sampled from child welfare service programs, Head Start centers, and child care programs in a two-county area of Pennsylvania. Families from child welfare services comprised two groups: those cited for documented physical abuse (called 'child welfare abuse') and those receiving services because child neglect was a concern, although no abuse had been documented (called 'child welfare neglect'). The two-county area in which the study was conducted includes a substantial urban/suburban population along with some rural areas. Selection of the sample of child welfare families was accomplished by county child welfare agencies referring to the study over a two-year period. Families were informed of the study by the agency and were approached by a member of the project staff to request their participation. From child care settings and Head Start classrooms, additional child/family participants were recruited to the study to comprise a possible non-abused control group. These settings were geographically spread over the same two counties served by the child welfare agencies referring to the study and included 13 Head Start centers, 12 day care programs, two programs for children with disabilities, three Home Start programs, and eight nursery school programs.

An initial assessment of preschool children and their families was completed in 1976–77. The 457 children in the initial sample ranged in age from 18 months to six years. A second assessment was completed in 1980–1982 when the children were in elementary school and were between 6 and 11 years old. Eighty-two percent of children assessed in preschool were again assessed in elementary school (n=375). A third and final assessment was completed in 1990–1992 when children in the sample were adolescents (average age=18 years). The final assessment included 416 (91%) of the original 457 children due to a concerted effort to recapture some of the participants who not assessed in the schoolage wave of the study. These 416 adolescents made up the final sample for this study. Parents consented in writing to data collection in the first two waves of the study and were informed about

confidentiality. Consent from adolescent children was obtained in writing in the third wave of the study.

The initial sample (N= 457) contained 248 (54%) males and 209 females from 297 families. One child was assessed in 52% (n=155) of the families, two children were assessed in 43% (n=128) of the families, and three or four children were assessed in 5% (n=14) of the families. The racial breakdown of the initial sample was: 80.7% (n=369) White, 1.3% (n=6) American Indian/Alaska Native, 0.2% (n=1) Native Hawaiian or Other Pacific Islander, 5.3% (n=24) Black or African American, 11.2% (n=51) more than one race and 1.3% (n=6) unknown. The ethnic composition of the initial sample was: 7.1% (n=33) Hispanic or Latino, 91.5% (n=381) Not Hispanic or Latino, and 1.3% (n=6) unknown. These percentages are consistent with the makeup of the two-county area from which the sample was drawn. Eighty-six percent of children were from two-parent households at the time of initial assessment and 63% (n=425) of families had monthly incomes below $700 in 1976–1977.

Of the 416 participants assessed in the third wave as adolescents, 229 (55.0%) were males, 187 (45.0%) were females. The racial breakdown of the final sample was 81.5% (n=339) White, 1.4% (n=6) are American Indian/Alaska Native, 0.2% (n=1) Native Hawaiian or Other Pacific Islander, 5.0% (n=21) Black or African American, and 11.7% (n=49) more than one race. By the time of the adolescent assessment, four participants were deceased: one child in the child welfare abuse group had died from illness and another from a car accident; one in the child welfare neglect group had been murdered; and one child in the child care programs group had died in a car accident. Table 1 presents descriptive statistics on the final adolescent sample along with means and standard deviations for the study outcome and selected risk and protective factors.

The equality of attrition across groups (in adolescence) was tested. Percentages lost to attrition from each composite group in the sample (e.g., child welfare abuse) were not significantly different. Further, no significant differences were found when those lost to attrition and those who remained in the study were compared on several key variables, including childhood SES and physical child abuse (using independent sample t-tests for equality of means all p's >.05) (see Herrenkohl, Tajima, Whitney, & Huang 2005 for more detail).

Measures

Risk Factors

Physical child abuse: Self–reported acts of physically abusive discipline were provided by primary caregivers (mostly mothers) in the first two waves of the larger study. These included hitting a child with a strap, biting a child, and hitting a child so as to bruise the child. Each item was weighted for severity using independent ratings from social welfare and child maltreatment experts. To represent the severity of physical child abuse, items were summed based on the weighted scores (α=.68).

Exposure to IPV: Exposure to IPV was based on retrospective reporting by adolescents (in the third wave of the larger study) in which they identified the number of times during their lifetime they recalled their mother being hit, pushed, or kicked. The same question was asked of participants about their fathers being victimized by their mother. Responses were then averaged and combined (α=.65).

Low IQ: IQ scores are from three data sources: the McCarthy Scales of Cognitive Ability (McCarthy, 1972) administered in the preschool wave of the study; the Wechsler

Intelligence Scale for Children-Revised (WISC-R) (Wechsler, 1974) administered in the schoolage wave of the study; and school records from the schoolage wave. Not all respondents were located or agreed to participate in the second wave of the study. Thus, scores on the WISC-R were available for 341 of 374 participants reassessed in the schoolage wave. When WISC-R scores for both IQ tests were not available, only scores from the McCarthy Scales of Cognitive Ability were used. All scores were weighted and combined using standardized scores.

Early problem behavior: Data on school-age delinquency and aggression were taken from a modified form of the Achenbach Child Behavior Checklist (CBCL) (Achenbach, 1978, 1999; Achenbach & Edelbrock, 1979), which was completed in the schoolage assessment by the child's mother, father, and teacher. The modified CBCL used in the study included several positive behaviors in addition to the other items of the scale. Data (on children) from mothers reports were organized as two subscales of aggressive (18 items: e.g., teases, cruel or mean to others, destroys things) and delinquent (10 items: e.g., vandalizes, steals, runs away) behaviors. To limit a problem with multicollinearity and to broaden the dimension of early problem behavior used in the analysis, items for the two subscales (α = .84 and .71, respectively) were standardized and added to form a single measure. The combined scale, based on a total of 28 individual items, has a standardized alpha of .87 and was collected during the second wave of data.

Schoolaged social and attention problems: Data on school-aged social and attention problems were also taken from the modified CBCL instrument used in the schoolage assessment. These constructs were kept separate from the other early problem behavior scales because they represent distinct, theoretically meaningful constructs that may relate differently to one or more of the hypothesized outcomes (Hawkins, Herrenkohl, Farrington, Brewer, Catalano, & Harachi, 1998). Mothers' reports of their children's behaviors were again combined into a composite scale, and for this study, 20 items were used (e.g., "Is easily distracted," "Has short attention span," and "Doesn't get along with other children"). The full scale has a standardized alpha of .80.

Low SES: Socioeconomic status (SES) was created using a composite of parents' occupational status, educational level, family income, and the total number of rooms in the family's home. These family-level items were measured in the preschool wave (α= .84).

Control variables: The age of the child (continuous variable) and child's biological sex (1=male, 2=female) were also included in analyses as controls.

Protective Factors

Positive future orientation: A measure of positive future orientation was developed by combining 12 items on youth participants' goals and outlook for the future based on a 5-point scale (1=not at all important, 5= very important). Data was collected in adolescent wave and examples of items include, "How important is it to you to be a success in your work or career?" and "How important is it to you to graduate from college?" The standardized scale alpha is .68.

Religion (Importance and Involvement): In adolescent wave, adolescents rated the importance (1=not at all, 5=very), attendance (1=never, 6=several times a week) and influence (1=very little, 5=a great deal) of religion on their life (e.g. "How important has religion been in your life"). A single summary score was constructed using responses from the three items (α=.82).

Extracurricular activities: A measure of involvement in extracurricular activities combines responses from two questions asked of adolescents: "How many sports teams, including intramurals, have you been on?" and "How many clubs, organizations or activities have you been involved in?" The final scale is a continuous variable (range 0–17) based on the total number of activities from the two questions.

Parental/Peer disapproval of anti-social behavior: The parental/peer disapproval of anti-social behavior scale consists of responses to 20 questions about the messages adolescents received regarding reactions to antisocial behaviors. For example, participants were asked how their parents and/or peers would react on a 5-point scale (1= strongly disapprove, 5=strongly approve) if they sold hard drugs such as heroin, cocaine, and LSD, were caught stealing, or perpetrated violence (α= .89).

Perceived parental responsiveness and acceptance: The parental responsiveness and acceptance scale consists of 10 questions gauging the parenting practices used with adolescents. Youth responded on a five point scale (1=Never or almost never true, 5=Always or almost always true) to questions like, "My parents accept me as I am," and "How much support/encouragement have you received from your parents" (1= Very little, 5=A great deal) (α= .85).

These protective factors have also been used in prior analyses, for example, Herrenkohl et al. (2005) found positive future orientation, religion (religious service involvement) and parent and peer disapproval of antisocial behavior wee protective factors against antisocial behaviors in youths with a history of physical child maltreatment. In addition, Tajima, Herrenkohl, & Moylan, (in press) found perceived parental responsiveness and acceptance moderated the negative influence of domestic violence on youth development.

Outcome Variable

A principal component analysis (results not shown) was used to test for higher order factors among a range of school-related outcomes. Only one factor was extracted, which explained 45.7% of the total variance in the items (all loading above .547). This factor is labeled *low academic performance* and is comprised of grades (during last grading period), number of times skipping school lifetime, number of school suspensions (lifetime), time studying (on average over the last week) and satisfaction with school (lifetime). Grades, time studying and school importance/satisfaction were reverse coded so all scale items were consistently negative; therefore, high scores on low academic performance indicate greater difficulty in school. Data for the scale were from the adolescent wave of the study.

Analytic Approach

Following the holistic-interactionistic theory, it is assumed that the lived experience of youths includes various forms of risk and protective factors. It is also assumed they encounter risk and protective factors at the same time within a variety of different contexts. This latter assumption is guided by the idea that protective factors may be latent within the individual or environment and are only recognized and utilized as protective factor when the individual is exposed to stressors. It is only after the stressful event(s) that the protective factor is labeled a 'protection' against the influence of the stress leading to negative consequences. To limit the modeling of risk and protective factors to a linear relationship where the risk always precedes protection may not be the only approach to examine the experience of individuals who encounter risky situations within their environment.

An alternative approach to the analysis would be to examine the relationships between the variables contained within the study through a variable-centered approach such as structural

equation modeling. This type of analysis would indicate the influence of the variables upon the outcome across time. Variable-centered approaches examine relationships among variables based on least squares approaches, where the focus lies with how much variance in the dependent variable is explained through changes in the independent variables (Nurius & Macy, 2008). The results of variable-centered approaches focus on the relationship between the dependent and independent variables for the overall sample. One possible problem with modeling complex, simultaneously-occurring multiple factors from a variable-centered approach is that it does not allow for cases to be clustered within groups that represent similarly occurring experiences. Variable-centered approaches can only provide scores for each case on the factors under investigation through a step by step process in a sequential order. In contrast, person-centered approaches examine relationships at the personal level rather than the variable level and the focus is on finding a common pattern of characteristics that apply to one subgroup and that distinguish it from another subgroup (Nurius & Macy, 2008; Pears, Kim, & Fisher, 2008).

Both approaches use variables when manipulating quantitative data, but person-centered models test intra- and inter-individual differences among the variables of interest to demonstrate heterogeneity within a sample (Nurius & Macy, 2008). The strength of a person-centered approach is the modeling of multiple factors influencing an individual under the assumption that all factors are simultaneously working to influence behavior. There is evidence that not all children who experience family violence or have problem behaviors will perform poorly in school and this type of procedure allows for greater variability of experience and outcome among youth. Person-centered (or pattern-centered, person-oriented) methodologies help increase understanding of the ways risk and protective factors influence outcomes and promote resilience.

Latent profile analysis (LPA) was used to establish latent classifications of risk and protection. To provide the clearest possible solution for each case in terms of class placement, LPA assumes that the classes are independent from each other or they are uncorrelated with each other. For the analysis, we used the M*plus* statistical software package (Version 5.01) (Muthén & Muthén, 2001). Model fit in LPA is assessed using a variety of statistics, including the Bayesian Information Criteria (BIC). Models with lower BICs are favored over models with higher BICs (Hagenaars & McCutcheon, 2002). The following guidelines were used to compare models and assess model difference (Fraley & Raftery, 1998): a difference between BIC scores <2 is considered weak evidence of model difference, a difference between 2–6 points is considered positive evidence, and a difference of 6–10 points is considered strong evidence where a difference >10 is considered very strong evidence of model difference.

Results

Latent Profile Analysis of Risk/protection Indicators

For males, a four-class model fit the risk data best (BIC=4966.43), compared to a three-class model (BIC=4977.35) and a five-class model (BIC=4981.32). The model's average probabilities for assignment were 91% for class one, 86% for class two, 88% for class three, and 97% for class four indicating a clean definition across the four classes. BIC differences between the three-class and four-class model (10.92) and between the four-class and the five-class model (14.89) both indicate very strong evidence for model difference.

For females, a five-class model fit the risk data best (BIC=3834.26), compared to a four-class model (BIC=3853.86) and a six-class model (BIC=3854.12). The model's average probabilities for assignment were 86% for class one, 99% for class two, 99% for class three, 92% for class four and 92% for class five, indicating a clean definition across the five

classes. BIC differences between the four-class and five-class model (19.60) indicate very strong evidence for model difference between those two classes. However, the BIC difference between the five-class and the six-class models was very weak (.26). Due to results from the BIC difference, other fit indices were examined to determine the best fit between these two cluster solutions.

The entropy for the five-class model was higher than for the six-class model, .887 compared to .838. The five-class model's average probabilities for assignment (87, 99, 99, 92, 92) were also slightly better than the six-class model's (99, 85, 86, 99, 76). Both a Lo-Mendell-Rubin likelihood ratio test of model fit (Lo, Mendell, & Rubin, 2001) and a parametric bootstrapped likelihood ratio test (McLachlan & Peel, 2000) were conducted to test model fit between a five-class model and a six-class model. Results of both tests were not significant (p=.73 & p=.67) indicating that the six-class model did not fit better than a five-class model. The five-class model also contained meaningful distribution patterns of differences between the groups compared to the six-class model leading to an easier interpretation of the results. When all of the various fit indices and factors are taken in total, the five-class model was preferred over the six-class model.

A MANOVA model (results not shown) confirmed that the means of the latent classes for males on the risk/protective variables are significantly different from one another after controlling for age, Wilks' Lambda $F(6, 446) = 10.33$ (p<.000). Similar results were found for the female class solution, Wilks' Lambda $F(8, 360) = 5.62$ (p<.000).

Figure 1 and Table 2 show the standardized estimated means for the four latent profile classes for each of the risk/protective factors for males. As shown, latent class 1 is an 'average' class category with relatively low scores on all risk items and sample mean scores on protection items. Latent class 2 represents a 'mixed' class with elevated levels of physical abuse, early problem behaviors, and early attention and social problems, and mean level of exposure to IPV. IQ and SES are below the sample mean for this class and the only protective factor above the sample mean is religious importance/involvement. Latent class 3 represents a 'high risk, low protection' category with relatively low scores on IQ and SES and relatively high scores on physical child abuse, IPV exposure, early problem behavior, and early attention and social problems with low levels on all protective factors. Latent class 4 represents a 'low risk, high protection' category, with elevated levels of IQ and SES, low scores on physical abuse, exposure to IPV, early problem behaviors, and early attention and social problems with high levels present for all protective factors.

Figure 2 and Table 3 show the standardized estimated means for the five latent profile classes for each of the risk/protective factors for females. As shown, latent class 1 represents a 'moderate risk, moderate protection' class with low levels of SES and IQ, moderate levels of risk factors and some protective factors, most noticeably positive future orientation and parent/peer disapproval of anti-social behavior. Latent class 2 represents a 'low risk, high protection' category, with elevated levels of IQ and SES, low scores on physical abuse, exposure to IPV, early problem behaviors, and early attention and social problems with high levels present for all protective factors. Latent class 3 represents an 'Intimate Partner Violence (IPV), low protection' class with relatively high scores on exposure to IPV and low levels on all protective factors. Latent class 4 represents a 'high risk, low protection' category with relatively low scores on IQ and SES and relatively high scores on physical child abuse, exposure to IPV, early problem behavior, and early attention and social problems with low levels on all protective factors. Finally, latent class 5 is an 'average' class category with relatively low scores on all risk items and sample mean scores on protection items.

Relationship between Risk/protection Classes and Low Academic Performance

A one-way ANOVA with a post-hoc Scheffé test was conducted to test mean differences between latent classes and the outcome of low academic performance. Mean differences are shown on Table 4 for males and Table 5 for females. For both males and females, the risk/protection classes with the highest levels of risk exposure and lowest levels of protective were significantly more likely to have low academic performance than those with low risk/high protection. Only one other comparison was statistically significant, that for males who reported low levels of risk and average levels of protection. This class scored more favorably on the academic performance scale when compared to the class of males with higher levels of risk and lower levels of protection.

Discussion

This study used holistic-interactionistic theory to examine the overlap and joint prediction of several risk and protective factors associated with low academic performance separately for males and females using a person-centered analysis. The authors first hypothesized that risks and protective factors are acting simultaneously within the individual and the environment to create developmental supports and stressors that lead to specific developmental trajectories for males and females. Second, the authors hypothesized that risk and protective factors profiles will differ by gender. Findings from the analysis indicate support for both hypotheses.

Both males and females had similar low risk/high protective classes, mean levels of risk/protection classes and high risk/low protection classes; however, data from males revealed a risk/protection class that was high on exposure to physical abuse with mean levels of IPV (class 2) that was not present for females. Similarly, the risk/protection classes for females revealed a class with slightly elevated rates of exposure to IPV, mean levels of other risk factors and low levels of protective factors (class 3) that was not present for males. Risk/protection classes also indicated that importance/involvement in religion, extracurricular activities and parental responsiveness/acceptance are important protective factors for both males and females; however, parental/peer disapproval of anti-social behavior may be an important protective factor for females only. Finally, significant differences between the risk/protection classes exist for both males and females in relation to low academic performance. Cases that experienced low levels of protection and high levels of risk reported the highest levels of low academic performance when compared to other risk/protection classes. This finding is consistent with previous research (Herrenkohl et al., 2005; Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008).

The unique finding that females showed a class with elevated levels of exposure to IPV with mean levels of physical abuse and males showed a class with elevated levels of physical abuse but only mean levels of IPV exposure was not expected given literature on the relatively high co-occurrence of adult IPV and child physical abuse (Herrenkohl, Tajima, Whitney, & Huang, 2005; Renner & Slack, 2006; Renner, Slack, & Berger, 2008). While some previous research has indicated significant differences between males and females in reporting exposure to IPV (Flannery, Singer, & Wester, 2001; Singer, Anglin, Song, & Lunghofer, 1995) the mechanisms for this difference are not well understood. Based on our findings we have considered two possible explanations for differential responses to exposure to IPV and child physical abuse among males and females. One possible explanation stems from how violence may be differentially conceptualized between genders. For example, males and females may define and interpret acts of violence in different ways, with males more likely to rate *exposure* to violent behavior as 'nonviolent' than females. The case may also be made that adolescent females may spend more time within the household than male adolescents leading them to have more opportunities to witness IPV. This second possible

explanation may encompass physical as well as psychological proximity between adolescent females and their mothers, meaning an adolescent female may be more negatively affected by her mother's (who may be viewed as a 'victim' of IPV) abuse than an adolescent male due to the emotional connection between mother-daughter and experiences shared by same gendered persons in a family.

Along with exploring two hypotheses, the study also sought to replicate and extend research on multiple risk factors based upon variable-centered methodologies. To a large extent the results here can be seen in other research that have examined the relationships between multiple experiences of risk factors and a variety of different detrimental experiences with the development of youth (Hart, O'Toole, Price-Sharps, & Shaffer, 2007; Vucina, & Becirevic, 2007; Gutman, Sameroff, & Eccles, 2002). However, the study also represents one of a few empirical studies that have attempted to model a holistic understanding of both risks and protective factors working together within the lived experience of youths (Hart, O'Toole, Price-Sharps, & Shaffer, 2007; Vucina, & Becirevic, 2007). The study also aimed to examine the presence of both risk and protective factors from the theoretical standpoint of the holistic-interactionistic theory developed by David Magnusson (Magnusson, 2001; Magnusson & Stattin, 2006), and several important parts of the theory were substantiated by the results within the study. First, the theory predicts development occurring within the framework of multiple, interacting elements that simultaneously influence the individual. To the extent that the classes show the presence of multiple forms of risks and protective factors and not classes with the presence of a single risk factor and no protective factors (or vice versa), this element of the theory was supported. Second, the theory advocates the use of person-centered research methodologies to explore the heterogeneity of individuals with their development. The results of the current study, for both males and females, show discrete classes of individuals that show important differences in their experiences of risks and protective factors in the development of academic performance.

Strengths and Limitations

The strength of the current study rests in its conception of multiple risks and multiple protective factors as a single and indivisible unit of analysis separately for males and females. Results provide some support for the co-occurrence of risk and protective factors within the experience of individuals, with higher risk subjects also experiencing low levels of protection and low risk subjects experiencing high levels of protection. The relationship between risk and protection may be a problem of first cause, and the question becomes: "Do risks precede the development of protective factors or are protective factors already present and act to stop events from developing into risks?" The results from this analysis suggest that the experience of most individuals is complex with both risks and protective factors occurring simultaneously. These unique combinations of risks and protective factors or developmental profiles may lead to a more detailed understanding of the current experience of youths. This more detailed understanding may in turn led to a more precise intervention strategies that concentrate on the multiple forms of risk present and to the strengthening of multiple protective factors within the individual and the environment.

In addition to the unique findings and strengths of the study, some limitations must be acknowledged. This study used secondary data and therefore several protective factors that may have an influence on the development of negative school experiences were not available for analysis. For example, the presence of a positive parental figure or the availability and quality of a mentor has been found to be important protective factors for youths (DuBois & Neville, 1997; Werner & Smith, 2001). Similarly, additional risk factors such as drug usage (Jeynes, 2002) and mental health issues (DeSocio & Hootman, 2004) have been shown to have a significant influence on negative school experiences and these factors were not available for inclusion in the present study. Another limitation is the limited

diversity within the sample in terms of racial and cultural differences that may influence the development of risk and protective factors. The study also makes use of parents' self-reports of child maltreatment, which may underestimate the range of behaviors and severity of abuse to children due to parent's being reluctant to reveal all the negatively disciplining practices in which they engage. However, analyses of these data show that parents are indeed quite forthcoming about the ways in which they discipline their children.

Conclusion

The framework and findings of this study are viewed as a complement to the existing body of literature that models risk and protective factors through a variable-centered approach. The issue of how risks and protective factors influence the development of academic performance is a complicated question, especially given variability in experiences and outcomes. However, a more complete understanding of the mechanisms involved can only be achieved through the use of a number of complementary theoretical and analytical approaches. Combining knowledge gained from various approaches can help to advance the most promising avenues for intervention.

Future directions for research using an approach that combines multiple risk and protective factors might include analyzing a larger, more diverse population which would allow the important contributions of race, ethnicity, and culture to be examined. It is also important to understand *how* protection may influence risk exposure. For example, do protective factors alleviate the influence of risk factors *after* they have been experienced or due they act *to prevent* exposure to risk factors? Future studies that examine the different roles between protective factors and preventive factors would help clarify and inform intervention strategies that might be used to help alleviate the experiences of high-risk youth.

Acknowledgments

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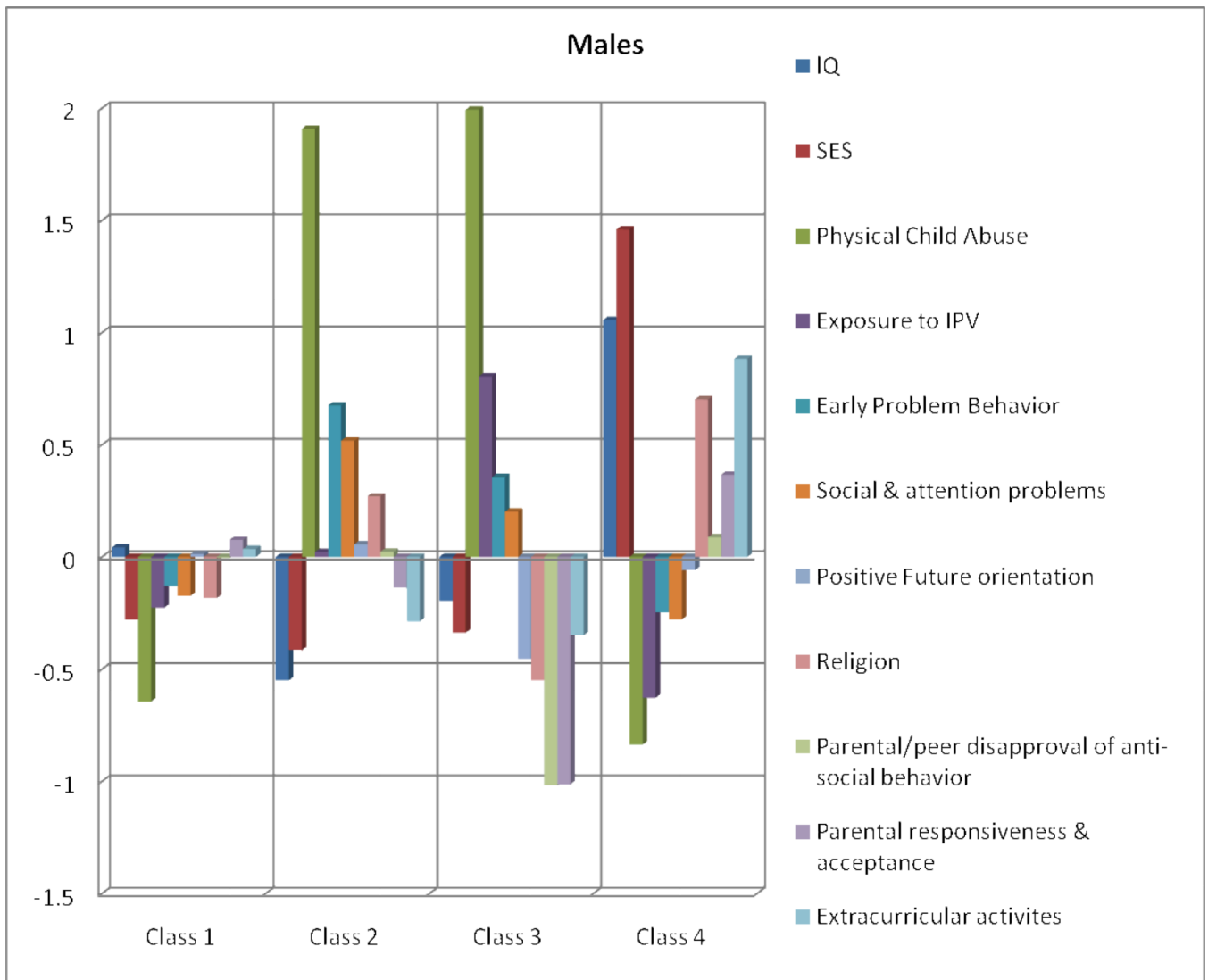
Figure 1.
Latent profile analysis risk/protection classes, males
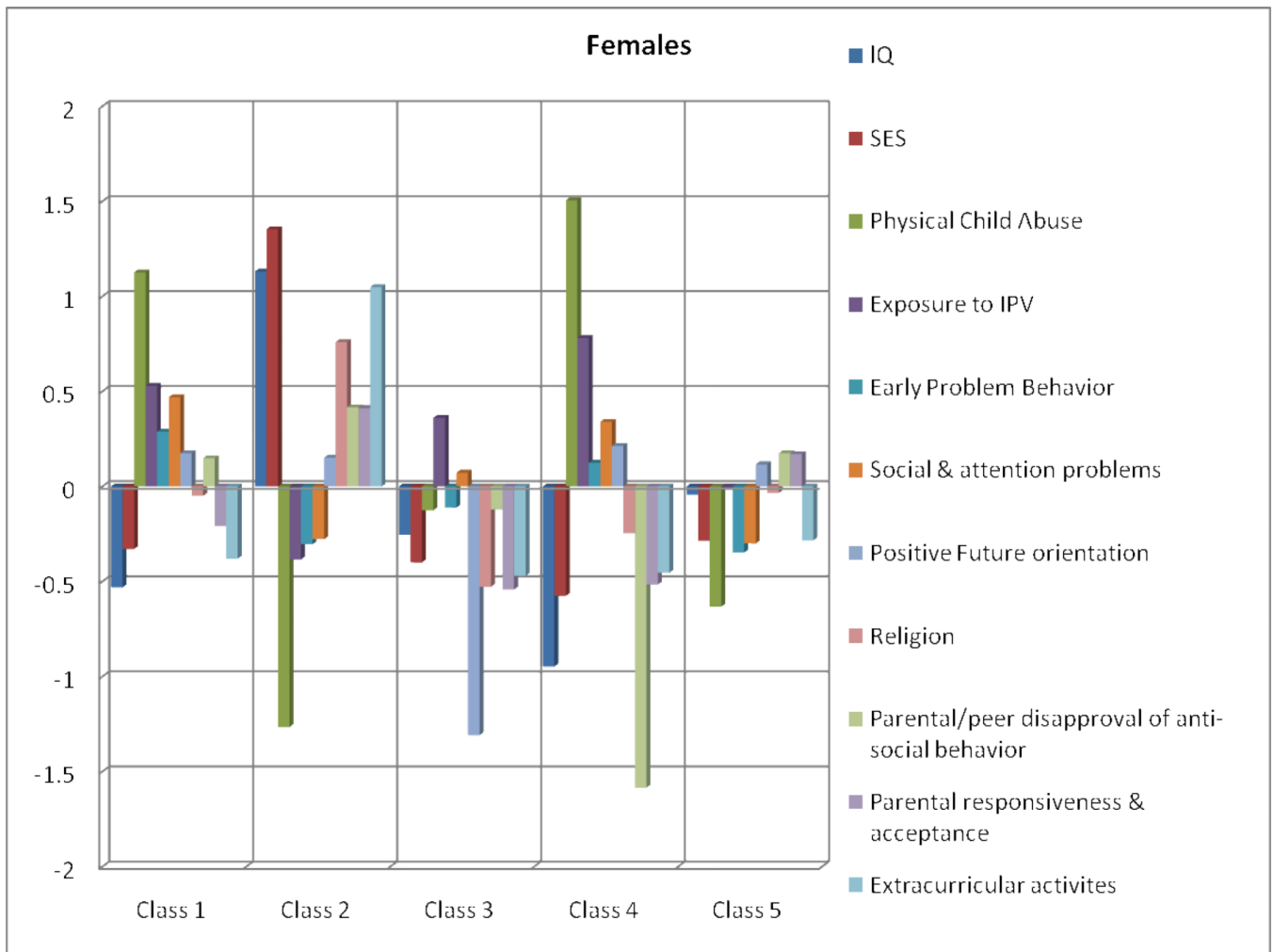
Figure 2.
Latent profile analysis risk/protection classes, females

Table 1

Demographic information and variable means and standard deviations, Wave 3.

	Males		Females	
N	229		187	
Ethnic group				
White	175		139	
Hispanic	17		10	
Black	19		24	
Other	18		14	
	M	SD	M	SD
Age	18.23	1.80	18.24	1.82
Physical child abuse	.44	.46	−.02	.42
Exposure to IPV	−.11	.83	.12	.88
IQ	.67	.97	−.03	1.00
Early problem behavior	.10	.52	−.13	.39
School-aged social and attention problems	.18	.50	−.03	.50
SES	.28	.84	.01	.81
Positive future orientation	−.03	.55	.04	.48
Religious involvement/importance	−.07	.89	.07	.85
Extracurricular activities	.93	.74	.88	.84
Parent/peer disapproval of antisocial behavior	−.07	.89	.09	.59
Parental responsiveness	−.02	.62	.03	.68
Low academic performance	2.77	.58	2.60	.51

[*] All items are standardized except for age and low academic performance

Table 2

Means and standard deviation for risk classes, males.

	Class 1 N=101		Class 2 N=60		Class 3 N=22		Class 4 N=46	
	M	SD	M	SD	M	SD	M	SD
IQ	.04	.10	-.55	.19	-.19	.28	1.06	.12
SES	-.28	.06	-.41	.06	-.34	.11	1.46	.08
Physical child abuse	-.64	.27	1.91	.38	1.99	1.04	-.84	.33
Exposure to IPV	-.23	.11	.22	.20	.80	.40	-.63	.05
Early problem behavior	-.13	.05	.67	.09	.36	.19	-.25	.05
Early attention and social problems	-.17	.05	.52	.09	.20	.06	-.28	.07
Positive future orientation	.01	.06	.06	.07	-.45	.16	-.06	.13
Religious importance/involvement	-.18	.09	-.27	.12	-.55	.21	.70	.13
Parental/peer disapproval of antisocial acts	-.01	.05	.02	.09	-1.02	.35	.09	.05
Parental warmth & responsiveness	.08	.07	-.14	.12	-1.01	.15	.37	.07
Involvement in Extracurricular activities	-.03	.09	-.29	.07	-.35	.13	.88	.12

Table 3

Means and standard deviations for risk classes, females.

	Class 1 N=48		Class 2 N=38		Class 3 N=14		Class 4 N=12		Class 5 N=75	
	M	SD	M	SD	M	SD	M	SD	M	SD
IQ	-.53	.23	1.13	.11	-.25	.25	-.95	.38	-.04	.11
SES	-.33	.08	1.35	.09	-.40	.15	-.58	.08	-.29	.05
Physical child abuse	1.12	.41	-1.27	.23	-.12	.51	1.50	.87	-.63	.39
Exposure to IPV	.53	.14	-.38	.11	.36	.28	.78	.57	-.01	.11
Early problem behavior	.28	.08	-.30	.06	-.11	.07	.12	.18	-.35	.04
Early attention and social problems	.47	.09	-.28	.09	.07	.11	.34	.17	-.30	.05
Positive future orientation	.17	.05	.15	.05	-1.31	.12	.21	.20	.12	.03
Religious importance/involvement	-.05	.16	.76	.14	-.53	.18	-.25	.20	-.03	.10
Parental/peer disapproval of antisocial acts	.15	.14	.42	.04	-.12	.12	-1.58	.54	.17	.47
Parental warmth & responsiveness	-.21	.11	.41	.09	-.54	.20	-.52	.26	.17	.07
Involvement in Extracurricular activities	-.38	.15	1.05	.11	-.47	.16	-.45	.18	-.28	.08

Table 4

Scheffé post-hoc results, males.

Low academic performance	Classes			
	1	**2**	**3**	**4**
M	2.77[a]	2.97[b]	3.19[ac]	2.29[abc]
SD	.58	.58	.49	.22
Range	2–4.41	2.15–4.24	2.14–4.13	2.08–3.50

Note: Means sharing a common superscript are significantly different ($p<.05$)

Table 5

Scheffé post-hoc results, females.

Low academic performance	Classes				
	1	**2**	**3**	**4**	**5**
M	2.73^a	2.23^{ab}	2.92^b	2.86^b	2.61^b
SD	.55	.15	.51	.52	.51
Range	2.10–3.90	1.95–2.82	2.27–3.83	2.07–3.58	2–3.99

Note: Means sharing a common superscript are significantly different (p<.05)