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Identifying Patterns of Early Risk for Mental Health and Academic Problems in Adolescence: A Longitudinal Study of Urban Youth

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Abstract

This investigation examined profiles of individual, academic, and social risks in elementary school, and their association with mental health and academic difficulties in adolescence. Latent profile analyses of data from 574 urban youth revealed three risk classes. Children with the “well-adjusted” class had assets in the academic and social domains, low aggressive behavior, and low depressive symptoms in elementary school, and low rates of academic and mental health problems in adolescence. Children in the “behavior-academic-peer risk” class, characterized by high aggressive behavior, low academic achievement, and low peer acceptance, had conduct problems, academic difficulties, and increased mental health service use in adolescence. Children with the “academic-peer risk” class also had academic and peer problems but they were less aggressive and had higher depressive symptoms than the “behavior-academic-peer risk” class in the first grade; the “academic-peer risk” class had depression, conduct problems, academic difficulties, and increased mental health service use during adolescence. No differences were found between the risk classes with respect to adolescent outcomes.

Keywords

childhood risk; adolescent adjustment; person-centered approach

Life Course Social Fields and Developmental Cascades models suggest that children entering formal schooling experience rapid changes in their activities, social roles, and capacities based on new tasks and demands set forth by teachers and peers [1, 2, 3]. Children’s successful navigation of demands is largely determined by their skills and performance in a variety of areas (e.g., academics, athletics) [2, 4, 5]. Also of importance in this regard is children’s appraisal of how their performance fares relative to teachers’ standards and to their classmates’ own performance [2, 4]. This appraisal influences children’s sense of confidence and competence [4], which in turn may shape children’s later attitudes and adjustment in school [1, 6].

Emerging risks may be emotional, behavioral, academic, and interpersonal, and are likely to be interrelated [3]. Guided by both developmental models and recently developed person-centered analytical approaches, the present study examines risks salient during the elementary school years and identifies how these risks co-occur. The study then examines

whether these early risk patterns are differentially associated with adolescent mental health and educational outcomes. Having an enhanced understanding of patterns of risk factors in elementary school for subsequent problems will direct to potential targets for early preventive interventions [7].

Risks in Elementary School

Risk factors salient in the early elementary school years include aggressive behavior, depressive symptoms, peer difficulties, and academic problems [2]. Separately, these problems have been documented to have a significant impact on child adaptation and subsequent adolescent adjustment [6]. For example, studies using community samples have estimated the prevalence of aggression in children to range from 0.9% to 20%, with estimates being much higher (up to 90%) in clinical samples [8]. Physical aggression is more common in elementary school boys than girls, for whom onset takes place approaching adolescence [8]. Rates of aggressive behavior in elementary school are alarming not only because of the increased number of aggressive acts during this time but because aggression has a different purpose for the elementary school child than the preschool child (e.g., hostility and retaliation vs. frustration for not getting needs met). Unabated and in the presence of other risk factors (e.g., individual, family, neighborhood), aggressive behavior in elementary school is associated with a life course trajectory of conduct problems and delinquency [9, 10].

While clinically diagnosable depression is comparatively rare in childhood, with an estimated 1-year prevalence ranging from less than 1% to up to 3% [11], studies show that children can and do experience depression at early ages (i.e., elementary school) [1]. Ialongo and colleagues [1] measured depressive symptoms in the first grade and found that children were reliable and valid reporters of their mood. Further, they found that first-graders' report of depressive symptoms was associated with educational and mental health outcomes in fourth, sixth, and eighth grades [1]. Other studies show that 10–15 % of children have depressive symptoms, which can be just as functionally impairing as clinically diagnosed depression [11] and increase risk of depression in middle childhood and adolescence [1, 3]. Thus, depressive symptoms alone can have deleterious effects on children's functioning over time, and its association with suicide and loss of productivity in adolescence and adulthood are concerning not only to the individual but society as a whole [3, 11].

Research shows that the establishment of social friendships is a hallmark of the transition to elementary school [1, 2]. Children rely on peers for coordinated play, conversation, and coping with peer rejection or bullying [12]. The availability of these supportive functions depends greatly on children's social acceptance [1, 2]. Whether children are accepted by peers is of utmost importance in their identity development [4, 13]. Thus, low peer acceptance in childhood predicts isolation and social avoidance, deviant peer affiliation, conduct problems, depression, and poor school functioning in adolescence [12, 13]. Further, low peer acceptance relates to higher mental health utilization in adolescence [14].

Finally, children's successful accomplishment of early academic tasks may provide a sense of mastery and self-esteem that in turn forms the foundation for successful academic functioning during adolescence [15]. Conversely, children with low academic achievement in one or more areas (e.g., reading, math) may experience feelings of low self-concept and low sense of control that jeopardizes their competence in and orientation to academics [5]. Thus, children with an early history of low academic achievement are particularly vulnerable to grade retention, school failure and attrition, disruptive behavior, and depression in adolescence [7, 15]. In addition to these personal costs, there are societal costs

related to the associated use of special education services, school dropout, and subsequent under- or unemployment [5].

Co-occurrence of Early Risks

Although the individual aforementioned risk factors in elementary school each predict adolescent functioning, studying the interrelatedness of these risk factors can help determine which types of children are at greater risk for a variety of outcomes in adolescence. Determining various types of risk groups further allows researchers and practitioners to design early prevention programs to better suit the complex and different presentations of children [16].

Aggressive behavior, low social acceptance, depressive symptoms, and low academic achievement do not typically occur in isolation. Children with aggressive behavior tend to engage in bullying, both as perpetrators and victims [9, 17] because they have fewer friendships and are less accepted by peers [17, 18]. Likewise, aggressive behavior relates to concurrent and later low peer acceptance given its impact on peers and others around the child [18]. Because aggressive behavior results in frequent negative feedback from peers, aggressive children are less likely to like school and more likely to exhibit depressive symptoms during elementary school [10]. Although depressive symptoms are more variable in children than aggressive behavior, children who experience both aggressive behavior and depressive symptoms in childhood are at an increased risk for depression and conduct problems in adolescence, compared to children with aggressive behavior problems alone [3]. Moreover, aggressive behavior tends to be associated with poor academic achievement, with rates of co-occurrence ranging from 10% – 50% [see 5].

To further elaborate on the co-occurrence among risk factors, children with depressive symptoms may experience diminished self-worth, lowered academic competence, and negative peer relationships [1]. Theoretical models of the cognitive foundations of depression elucidate a strong relationship between depressive symptoms and school-related variables [11, 19]. For example, the learned helplessness model states that repeated perceptions of uncontrollable events can challenge children's belief that they can shape events around them [19]. Thus, perceived lack of control resulting from depressive symptoms is associated with deficits in (a) motivation to initiate or sustain a task, (b) cognitive planning and execution to control events, and (c) emotional regulation leading to hopelessness, sadness, and lowered self-esteem [19]. Not surprisingly, depressive symptoms are strongly linked with lowered academic achievement.

Similarly, depressive symptoms and academic achievement have been linked to peer relationships in that children who have a high sense of efficacy and competence are more likely to have higher academic performance and to be viewed by peers as more desirable friends [3, 20]. Reciprocally, socially desirable children receive more positive feedback about their competence in academics and other areas, in turn experiencing greater confidence and self-esteem[20].

The co-occurrence of aggressive behavior, low peer acceptance, depressive symptoms, and low academic achievement is also greater for children who are exposed to negative life events (e.g., family problems, community violence) [7]. Salient to this study, is the relationship between patterns of risk and outcomes for urban minority youth, who may have the greatest behavioral and community risks and lowered access to mental health services [7, 18].

Significance of Mental Health and Educational Adjustment in Adolescence

The literature reviewed is commensurate with Life Course/Social Field and Developmental Cascades models, in that early school failures may set the stage for subsequent failures and, thus, increased and more challenging demands from teachers and peers. A chronic history of failure or developmental cascades may result in sustained emotional, behavioral, academic, and social distress and the risk of negative outcomes in adolescence [1, 3, 10].

In adolescence, depression is associated with future depressive episodes, anxiety, substance abuse, suicidal behaviors, and interpersonal difficulties [21] particularly among urban adolescents [7]. Problems with conduct are also common in urban settings and have been linked to subsequent juvenile offending, substance use, depression, school drop-out, and early sexual activity and parenthood [22]. Emotional and conduct problems in adolescence are often accompanied by decreases in academic achievement [3, 10]. Lower academic achievement has been found to decrease self-esteem and competence, and increase delinquent behaviors [3]. Moreover, academic difficulties in urban adolescents are associated with school-dropout and limited employment opportunities [10].

Adolescents who experience emotional, behavioral, and academic difficulties may likely be in need of mental health services. Despite this need, few adolescents receive services for internalizing problems [23]. Bradshaw and colleagues [16] found that children with internalizing symptoms were not only less likely to be referred by teachers to mental health services, but were referred for these symptoms at a later age than children with externalizing symptoms. This referral difference may partially be explained by teachers' (a) difficulty detecting depressive symptoms, and (b) decreased experience of classroom disruption from these children relative to children with aggressive behavior [16]. Although children with externalizing problems are more likely to be referred for mental health services, far fewer female and minority adolescents receive services for externalizing problems than male or non-minority adolescents [23].

Although mental health service use per se is not a precise indicator of adolescent emotional, behavioral, and educational adjustment, the type of mental health setting may reflect the severity of the difficulties experienced. Adolescents with moderately impaired behaviors generally receive mental health services at school [14]. Referral to inpatient and outpatient mental health services, on the other hand, may indicate very impaired behavior and referral is often initiated by parents who are burdened by and unable to address the child's emotional and behavioral needs [23]. As mental health services utilization in adolescence has been associated with elementary school functioning [16], and use of these services has the potential to curb the negative trends that may continue into adulthood, it is critical to study mental health service use as an adjustment outcome of early patterns of elementary school risk.

A Person-Centered Approach to Childhood Risk

Our conceptual framework is based on the Life Course Social Fields model which posits that failure to meet early task demands, and the consequent academic, social, and behavioral difficulties that may emerge, can limit children's ability to successfully navigate future developmental challenges [1, 2]. The Developmental Cascades model [3] further proposes that difficulties in early domains of functioning (e.g., academics, peer relationships) tend to co-occur, are interrelated, and together may undermine adaptive functioning.

Our study uses a person-centered approach to advance these theoretical models by examining how difficulties in domains of functioning in the first grade come together to predict adolescent outcomes. To better understand a person-centered approach, it is

important to distinguish it from traditional, variable-centered approaches. A variable-centered approach, like SEM and regression analyses, focuses on relations among variables and aims to predict outcomes, relate independent and dependent variables, or assess intervention effects [24]. In contrast, a person-centered approach distinguishes classes of individuals based on characteristics that are similar within a class and that are different from individuals in other classes [25].

Person-centered approaches like latent profile analysis (LPA) and cluster analysis may reveal a group of children with overall positive functioning across emotional, behavioral, and academic domains, and groups of children with varying combinations of negative functioning across the same domains. Within person-centered approaches, LPA has advantages over cluster analysis in that LPA is model-based (allowing more flexibility in model specification), and uses fit statistics to determine the number of underlying classes [24, 26]. In addition, outcomes can be included in an LPA model to examine predictive validity of the classes [27]. Moreover, LPA has a conceptual and empirical advantage over cumulative risk models [28]. In cumulative risk models, isolated risk experiences or single stressors often have negligible effects on adjustment while exposure to multiple stressors better predicts adjustment in adolescence [7, 28]. Cumulative stress models focus on the number of stressors experienced but do not inform about whether patterns of stressors experienced have differential effects on later adjustment, or what patterns of risk that distinguish well-adapted from poorly-adapted children and that are associated with different outcomes in adolescence. LPA has the potential to advance existing research by grouping children not only based on the number of risks but also based on qualitatively distinct risks [24] from emotional, behavioral, academic, and peer risk domains. Thus, a person-centered approach like LPA is an ideal method for studying the complexity of children's interrelated risks, and their consequences in adolescence.

For the present study, children were grouped into qualitatively distinct patterns based on domains of functioning that are salient in the first grade: aggressive behavior, depressive symptoms, low peer acceptance, and low academic achievement. We evaluated the utility of these risk patterns in predicting later adolescent depression, conduct problems, academic achievement, and use of school-based and outpatient and inpatient mental health services. We hypothesized that children with different risk patterns in the first grade would experience different levels of depression and conduct problems, academic failure, and mental health services use during adolescence. However, given the limited attention to patterns in samples like ours, we relied on our person-centered methods to determine the number and composition of risk profiles. This study was based on a large community sample of primarily African American youth. Although urban youth are exposed to multiple stressors, there is expected variation in exposure to risks. Thus, multiple problem groups were expected in this sample.

Method

Participants

Data were drawn from a community sample of youth living in an urban metropolitan area. Children were representative of first graders across nine elementary schools and were assessed in the fall of first grade as part of an evaluation of two randomized school-based preventive interventions whose immediate targets were early learning and behavior [1]. The first intervention consisted of curricular enhancement and improved behavior management in the classroom; the second intervention consisted of parent and teacher training in parent-school collaboration. Written parental consent and youth assent were obtained for 97% of eligible children prior to data collection. Thirty-three percent of the sample participated in the classroom intervention, 33% in the family intervention, and 33% in the control

condition. First grade assessments were conducted prior to the intervention. As shown in Table 1, the majority of youth who completed the first grade assessments were African American (86.3%), half were male (53.4%), and ages ranged from 5.3 to 7.7 ($M = 6.2$, $SD = .34$). Sixty-eight percent of the sample received free or reduced lunches. Study procedures were conducted with full IRB approval.

Approximately 85% of the original sample ($N = 574$) participated in the adolescent follow-up assessments in grades 6 through 9 and comprise the sample of interest for this study. Reasons for non-participation included parental refusal ($n=42$), failure to respond ($n=30$), inability to locate ($n=30$), and death of child ($n=3$). For the variables of interest, no differences were found between participants and nonparticipants in grades 6–9 based on intervention status, gender, race, or lunch status in the first grade ($ps > .05$).

Measures

Child functioning was measured in grade 1. Children reported their depressive symptoms, and their academic achievement was based on standardized achievement test scores. Children's aggressive behavior and social acceptance were reported by peers. In grades 6 through 9, symptoms leading to diagnoses of Major Depressive Disorder (MDD) and Conduct Disorder (CD) were reported by adolescents and their parents, academic difficulties were reported by teachers, and inpatient/outpatient treatment and school counseling were separately reported by parents and teachers, respectively. Adolescents, parents, and teachers completed these measures annually between grades 6 and 9. MDD, CD, academic difficulties, and counseling were recorded if reported at any time during the 6th through 9th grades.

Child functioning: Grade 1. Depressive symptoms were assessed using the Baltimore How I Feel-Young Child Version, Child Report (BHIF-YC-C) [29], a 30-item self-report scale of depressive and anxious symptoms as defined in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R) [30]. The BHIF-YC-C was designed to be administered on a classroom-wide basis and to require no reading skills on the part of the children. Children reported the frequency of depressive and anxious symptoms over the last two weeks on a three-point scale (0 = Never, 1 = Sometimes, 2 = Almost Always). The 11-item BHIF Depression subscale (e.g., “felt sad”, “no use in really trying”) was used in the current research. The internal consistency of this subscale was .70 in the fall of 1st grade, consistent with studies of first-grade children using the Children's Depression Inventory over a two-week period [1]. In terms of concurrent validity, previous studies have shown that for each standard deviation increase in BHIF-YC-C Depression subscale scores in 1st grade, there was a threefold increase in the likelihood of the child's parent reporting that the child was in need of mental health services for “feeling sad, worried or upset” and a fivefold increase in the likelihood of the child's teacher reporting that the child was in need of an evaluation for special education services. In addition, BHIF-YC-C administered in elementary school was associated with lifetime suicide attempt (Odds ratio [OR] = 2.38, Confidence Interval [CI] = 1.30, 4.25) and episodes of Major Depressive Disorder at age 19–20 (OR = 1.84, CI = 1.16, 2.92).

Aggressive behavior was measured using the Peer Assessment Inventory (PAI), a modified version of the Revised-Pupil Evaluation Inventory (R-PEI) [31]. The PAI assesses the child's adaptation to the demands of the classroom peer group. A question is read aloud to the class and children are instructed to circle the pictures of all children in their classroom described by the question. Peers make unlimited nominations of their classmates for each one of the four items assessing aggressive behavior (“which children: ‘are bullies?’, ‘start fights?’, ‘are picked on?’, ‘get in trouble?’”). A summary score was created from the mean of these items. Coefficient alpha for the aggressive behavior subscale in fall of grade 1 was .

88. In terms of concurrent validity, the aggressive behavior items were each significantly correlated with teacher-rated conduct problems and oppositional defiant behavior in first grade.

Peer acceptance also was assessed using items from the PAI [31]. Peers make unlimited nominations of their classmates for each of the following 3 questions: “which children: ‘do you like best?’, ‘have lots of friends?’, ‘are your best friends?’” A summary score was created from the mean of these items. The coefficient alpha for this subset in fall of first grade was .85. In terms of concurrent validity, in a previous study these items were each correlated in the expected direction with teacher-rated likeability/rejection in first grade.

Academic achievement was assessed with the Comprehensive Test of Basic Skills 4 (CTBS) [32], which is one of the most frequently used standardized achievement tests in the United States. The CTBS was individually administered to children to measure their academic achievement through verbal and quantitative subtests. Results from the CTBS are reported as Normal Curve Equivalent scores which have a mean of 50 and a standard deviation of 21.06. The mean of the CTBS reading and math scores was computed to create a composite academic achievement variable. The CTBS was standardized with a nationally representative sample of 323,000 children and adolescents and has a coefficient alpha of 0.89 (KR-20 = .90) [32].

Adolescent outcomes: 6th through 9th grades. Major Depressive Disorder and Conduct Disorder were assessed using the Diagnostic Interview Schedule for Children-IV (DISC-IV) [33], a structured clinical interview designed to be administered by lay interviewers, that yields Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) diagnoses [34]. Although complete results of the psychometric studies of the DISC-IV have yet to be published, data on an earlier version, DISC 2.1, suggest adequate test-retest reliability of combined parent and child reports (.70 for Major Depressive Disorder, .71 for Conduct Disorder). In terms of validity, DISC-IV diagnoses are associated with elevated scores on the SCL-90-R Global Severity Index [35], and there appears to be adequate correspondence (52%–60% agreement) between DISC diagnoses by lay interviewers and clinician diagnoses [33].

The DISC-IV’s Major Depressive Disorder (MDD) and Conduct Disorder (CD) modules were administered to adolescents and parents in each of the 6th through 9th grades. A computer algorithm developed by Shaffer et al. [33] was used to determine whether respondents met criteria for MDD and CD. A diagnosis of MDD or CD was recorded based on either the adolescent or parent report, given that multiple informants are likely to contribute complimentary observations about different aspects of the condition [36]. While youth may be better reporters of feelings and thoughts, adults may be better reporters of irritability and other behavioral manifestations of depression. A binary variable was created to indicate whether or not the adolescent met criteria for MDD and CD at any time during the 6th through 9th grades.

Mental health service utilization was assessed using the Service Assessment for Children and Adolescents-Parent Report (SACA-P) [37], a structured interview designed to accompany the DISC-IV [33]. In each of grades 6–9, parents indicated whether their adolescent had received inpatient or outpatient treatment during the past year. A binary variable was created to indicate whether or not the adolescent had received inpatient or outpatient treatment at any time during grades 6 through 9. *School counseling* was assessed using a school version of the SACA-P. Each academic year, the school psychologist and/or social worker reported the nature, quantity, and types of counseling provided at school. A

binary variable was created to indicate whether or not adolescents participated in counseling at school at any time in the 6th through 9th grades.

Academic performance was assessed by the adolescents' English and Math teachers' report of their grades on a 5-point scale (1 = excellent, 2 = good, 3 = fair, 4 = barely passing, 5 = failing). Teachers reported grades in each of 6th through 9th grades, and these reports were combined to give an overall average for each academic year. An average grade point average over the 6th through 9th grades was calculated. An initial inspection of the data revealed highly skewed distributions for academic performance. Thus, this variable was dichotomized to indicate whether the adolescent's average grade point average was indicative of (a) low academic performance based on barely passing or failing grades (letter-grade equivalents of C, D, or F), or (b) high academic performance based on fair to excellent grades (letter-grade equivalents of A or B). The cut-point was selected to specifically examine adolescents who were struggling academically versus those who were not. This dichotomization has been used in prior research [1] and found to have significant relations with early risk factors.

Analytic Strategy

Latent Profile Analysis (LPA) is a statistical technique that derives information about categorical latent variables based on the observed values of continuous manifest variables or indicators [26]. Because LPA assumes that the indicators are explained by unobserved constructs, the technique fits latent profile models to the measured data. LPA was completed using the *M plus* statistical package, Version 4.1 [38]. The first set of analyses determined the best and most parsimonious class solution based on child risk factors assessed in the first grade. Next, odds ratio (OR) and confidence intervals (CI) were used to measure the relative likelihood of experiencing difficulties in adolescence as a function of class membership based on child risk factors. Latent class prevalence, class specific means, and ORs and CIs are presented.

Model Diagnostics

An advantage of LPA is that classes are identified through statistical model testing, rather than determined a priori. To determine the best fitting and most parsimonious model, models with increasing numbers of classes were compared and test statistics for non-nested models were examined [39]. Lower scores on the Bayesian Information Criterion (BIC) [40] and the sample size adjusted Bayesian Information Criterion (SSA BIC) [41] indicate better fitting models. In addition, the Lo-Mendell-Rubin likelihood ratio test (LRT) [42] and an adjusted version were used to compare the estimated and alternative models. The obtained p-value represents the probability that the null hypothesis (i.e., there is no difference in how the 2 models fit the data) is true. A low p-value indicates that the estimated model is preferable to a model with one fewer class. Finally, while entropy is not a measure used for the selection of the number of classes, it provides a summary of the overall classification quality [43]. Entropy values range from 0 to 1, with values closer to 1 indicating better classifications of individuals to specific classes. The estimation for a model with an increasing number of classes was stopped, when none of the fit indices yielded further improvement. Supplementing these estimation methods was a content-oriented approach to the selection of classes [26]. According to this approach, if a model seems to be splitting a well-interpretable class into two poorly interpretable classes, then the more parsimonious model with one fewer class will be selected [26].

Treatment of Missing Data

Eighty-five percent of children who participated in the first-grade data collection had data in grades 6–9. Rather than deleting cases with missing outcome data, full information

maximum likelihood estimation under the assumption of “missing at random” was used. Missing at random assumes that the reason for missing data is either random or random after incorporating other variables measured in the study [44]. Full information maximum likelihood estimation is widely accepted as an appropriate way of handling missing data [45, 46].

Results

Model Selection

Fit measures indicated that a solution with three or four classes provided an adequate fit for the data (see Table 2). Although a four-class solution had lower BIC and SSA BIC values, and lower LRT p-values than a three-class solution, the fourth class was small consisting of only 19 children (2%) and its risk pattern was almost indistinguishable from the third class. The lack of distinction between the third and fourth classes suggests a variation of one class rather than independent classes. Based on this content approach to ensure model conceptual clarity and parsimony [26], the three-class model was selected.

Latent Class Patterns in First Grade

Class 1 ($N = 63$, 9%), *behavior-academic-peer risk*, consisted of children who were above the mean on aggressive behavior, below the means on academic achievement and peer acceptance, and at the mean on depressive symptoms. Children in class 2 ($N = 309$, 46%), *academic-peer risk*, were below the means on academic achievement and peer acceptance, and slightly above the mean on depressive symptoms and slightly below the mean on aggressive behavior. Children in class 3 ($N = 304$, 45%), *well-adjusted*, were below the means on depressive symptoms and aggressive behavior, and above the means on peer acceptance and on a standardized achievement test. The means for the first-grade factors for each of the latent patterns are presented in Table 3.

Class Membership and Prediction of Adolescent Outcomes

Figure 1 displays the percentages of youth with each adolescent outcome, according to the first grade class patterns. Fifteen percent of children in the academic-peer risk class met the cutoff criterion for Major Depressive Disorder (MDD) in adolescence as compared to 7% and 6% of children in the behavior-academic-peer risk class and the well-adjusted class, respectively. Children in the academic-peer risk class were nearly three times more likely to meet the criterion for MDD in adolescence than children in the well-adjusted class ($OR = 2.78$, 95% $CI = 1.08/7.17$). Children in the behavior-academic-peer risk class were no more likely to meet criteria for MDD in adolescence than children in the well-adjusted class. Children in the academic-peer risk class were not at statistically greater odds of meeting criteria for MDD in adolescence than children in the behavior-academic-peer risk class. Odds ratios are presented in Table 4.

Thirty-five percent of children in the behavior-academic-peer risk class met the cutoff criterion for Conduct Disorder (CD) in adolescence, compared with 25% of children in the academic-peer risk class, and 5% of children in the well-adjusted class. As shown in Table 4, children in the behavior-academic-peer risk class were almost ten times more likely to meet the criterion for CD in adolescence than children in the well-adjusted class ($OR = 9.97$, 95% $CI = 3.52/28.22$). Children in the academic-peer risk class were six times more likely to meet the criteria for CD in adolescence than children in the well-adjusted class ($OR = 6.048$, 95% $CI = 1.76/20.75$).

With respect to academic difficulties, 30% of children in the behavior-academic-peer risk class were reported to have low academic performance in adolescence compared to 26% of

children in the academic-peer risk class. No children in the well-adjusted class were rated as having low academic performance in adolescence. Children in the behavior-academic-peer risk and academic-peer risk classes had similar odds of low academic performance during adolescence.

In terms of mental health service use, 36% of children in the behavior-academic-peer risk class received inpatient or outpatient treatment in adolescence, and 49% received school counseling. In the academic-peer risk class, 23% received inpatient or outpatient treatment in adolescence, and 29% received school counseling during adolescence. In the well-adjusted class, only 3% of children received inpatient or outpatient treatment in adolescence and 11% received counseling in school. Children in the behavior-academic-peer risk class were almost 17 times more likely to receive inpatient or outpatient treatment than children in the well-adjusted class (OR = 16.59, 95% CI = 4.60/59.84). Similarly, children in the academic-peer risk class were almost nine times more likely to receive inpatient or outpatient treatment in adolescence than children in the well-adjusted class (OR = 8.51, 95% CI = 1.53/47.37). There were no differences in the odds of receiving inpatient or outpatient treatment or school counseling in adolescence between the behavior-academic-peer risk and the academic-peer risk classes. With respect to school counseling, children in the behavior-academic-peer risk class were seven times more likely to receive services in adolescence than children in the well-adjusted class (OR = 7.02, 95% CI = 3.26/15.15). Children in the academic-peer risk class were three times more likely to receive school counseling in adolescence than children in the well-adjusted class (OR = 3.10, 95% CI = 1.03/9.31).

Discussion

Patterns of Risk in the First Grade

This study identified classes of children with distinct patterns of risk in the first grade and examined the predictive value of these risk classes for adolescent outcomes. Consistent with our theoretical developmental models [1–3], children's risk was conceptualized as a constellation of emotional, behavioral, school, and social factors that commonly emerge when children enter school and are faced with navigating new tasks and demands from teachers and peers. Three classes of first-grade children were identified. The first class consisted of a well-adjusted class of children who were doing well academically, were accepted by peers, and had low levels of depressive symptoms and aggressive behavior. Two risk classes were identified: one with behavior, academic, and peer risks and the other with predominantly academic and peer risks. The second risk class, academic-peer risk, also had children with slightly elevated, albeit average, scores on depressive symptoms.

The majority of children in this study were either well-adjusted or exhibited co-occurring academic and social risks. A smaller percentage of children had aggressive, academic, and social risks. That nearly two-thirds of the children in the first grade exhibited low academic achievement is also reflective of the challenges that many urban, ethnic minority children face when they enter school [5]. Many urban children enter the first grade with low levels of school readiness, in part due to lack of participation in preschool learning programs or participation in under-resourced preschool learning programs [47]. Other potential risk factors for these children (e.g., socioeconomic status) should be explored to fully understand academic difficulties that vulnerable children may experience as early as the first grade [7].

Although examination of gender differences was beyond the scope of this study, it is noteworthy that a greater number of girls than boys were in the well-adjusted class in elementary school (see Table 3). This finding is consistent with research documenting that young girls are less vulnerable to psychosocial stressors than young boys [48], perhaps due to girls being more likely to seek instrumental help and emotional comfort when exposed to

stress than boys [49]. Thus, girls may be more successful at meeting new demands than boys, in part because they seek emotional and instrumental assistance from others when challenges arise. Further, some research on neighborhood stress, poverty, and crime has identified more aggression and associated problems (e.g., low academic achievement) in boys than girls [50]. Recent research has begun to investigate effects of gender-specific risk patterns in adolescence [5, 16].

Prediction of Adolescent Outcomes

We furthered our Life Course Social Fields and Developmental Cascades models by using a person-centered approach to identify how classes of children with coalescing risk factors predict later outcomes. Children identified as experiencing distinct patterns of risk in the first grade were more likely to receive school and specialized mental health services and more likely to have low academic performance in adolescence than children in the well-adjusted class. In addition, children in the behavior-academic-peer risk class were more likely to meet criteria for Conduct Disorder in adolescence than children in the well-adjusted class. Similarly, children in the academic-peer risk class that included slightly elevated depressive symptoms were more likely to meet criteria for Major Depressive Disorder in adolescence than children in the well-adjusted class. As expected, children in both classes of risk had worse outcomes in adolescence than children who were well adjusted.

Contrary to our expectation, however, children in the risk classes did not differ significantly with respect to adolescent outcomes. Thus, our findings may suggest that a cumulative risk model [28], in which the presence of multiple risk factors rather than the type of risk factors within each class, is predictive of later outcomes. Another explanation is that even though the overall sample was large, there were only a small number of children in the behavior-academic-peer risk class, possibly reducing power to detect differences between groups. In addition, we sought to establish long-term effects (5–8 years later), which are quite difficult to detect; the small number of children in one of the risk classes may have made detection of effects even more difficult. Replicating this study with an even larger sample and measuring nearer-term outcomes may help to clarify whether the two classes are indeed equivalent or not with respect to later outcomes.

Although children in both risk classes did not differ significantly with respect to adolescent outcomes, children in the behavior-academic-peer risk class in the first grade had marginally higher rates of conduct problems and higher utilization of school counseling and inpatient/outpatient treatment in adolescence than children from the academic-peer risk class. To further clarify this trend, we conducted a variable-centered examination (logistic regression) of the unique effects of particular risk factors on adolescent outcomes (see Appendix). The strongest first-grade predictor was aggressive behavior, with effects significant for every adolescent outcome. The weakest predictor was depressive symptoms, which on its own did not predict any of the adolescent outcomes in this study. Academic achievement in the first-grade predicted adolescent academic performance, and low peer acceptance predicted Major Depressive Disorder in adolescence, but no other outcomes. While the focus of the present paper was to use a person-centered approach to understand the effects of co-occurring risk on adolescent outcomes, a variable-centered approach helped to elucidate the relative strength of each risk factor in predicting later outcomes. Thus, a possibility exists that our person-centered approach may have had greater predictive validity had the unique risk factors measured in this study been of equal predictive strength. The value of using person-centered and variable-centered approaches concurrently has been described recently [24], and our study shows promise for how these approaches can be used in a complementary fashion.

That depressive symptoms in the first grade did not predict any of the outcomes in grades 6–9 may be explained by the measurement of depressive symptoms in the first grade. The self-report depression questionnaire used in this study had modest psychometric properties, which may have challenged our ability to establish a clear class of children with high depressive symptoms. While some studies have shown that five- and six-year olds are valid and reliable reporters of mood symptoms [1], other research suggests that it is not until children approach adolescence that the frequency and intensity of depressive symptoms and its cognitive vulnerability becomes more consistent and less subject to fluctuation, and children are better able to recognize these symptoms [11]. Untangling the conditions under which depressive symptoms are reliably and validly reported will be an important step in understanding the present findings.

Consistent with the literature, aggressive behavior, and to a lesser degree, low academic achievement and peer acceptance appeared to be stable predictors of adolescent outcomes. It is possible that in particular children who live in urban settings may adjust to threats in their environment with aggressive behavior [22]. This behavior may help children protect themselves from bullying or perceived threat. That aggressive behavior is stable and conduct problems and deviancy are so difficult to treat points to the need for early prevention and intervention [16].

Recent years have witnessed an increase in longitudinal research on risk patterns and later adjustment. Parra and colleagues [22] found that risk class membership in the 7th grade predicted adjustment both concurrently and over time. Similarly, Cairns and colleagues [51] found that adolescents in the 7th grade who struggled with aggression, academics, and peer affiliation were more likely to experience school difficulties, including school dropout. Our study is one of a growing number examining patterns of risk in elementary school that have consequences for adolescent adjustment [for notable examples, see 5, 16, 50, 51]. Moreover, the findings of this investigation confirm the utility of combining a person-centered approach and a variable-centered approach to more accurately disentangle the complexity of risk effects in the first-grade on adolescent outcomes. The community sample of urban children studied minimizes bias associated with clinical and other high risk samples. However, our findings should not be generalized to youth from different socioeconomic, geographic, or ethnic backgrounds.

Implications for Future Research and Practice

Findings of this study can inform the design and implementation of early identification programs and interventions that are tailored to particular risks and aimed at prevention of subsequent difficulties among urban children and adolescents [5, 16]. Future research with larger or more heterogeneous samples should investigate patterns of early risk based on domains that were not included in our study, such as children's inattention, and family SES and functioning. Replications of class solutions in person-centered analyses are needed to ensure consistent results across studies and to further disentangle cumulative risk models from person-centered models [22]. Finally, longitudinal research should address the continuity of group membership over time and the developmental transitions that maintain or change such membership. With respect to clinical practice, this study highlights the need for early identification of children who are at varying risks for subsequent difficulties in adolescence. Programs that address aggressive behavior and co-occurring risks, such as poor peer relations and academic failure and that target the socio-cultural context of youth (e.g., neighborhood influences) should be studied to further disrupt the long-standing negative trajectory of risks from childhood to adolescence [52]. The Good Behavior Program holds promise in promoting positive peer group dynamics and deterring classroom aggression in the early elementary school years [see 52].

Finally, because schools remain the largest provider of mental health services, it will be important for providers to coordinate care with school professionals [14]. Given the complexity of risks among children, ecological programs that provide universal and wrap-around services hold the potential to provide children with the opportunities to successfully meet tasks across settings. Policies supporting early identification should offset its costs to schools and increase the resources required to conduct school-wide assessment and interventions.

Summary

The aim of this investigation was to examine profiles of individual, academic, and social risks in elementary school, and their association with mental health and academic difficulties among urban adolescents. Latent profile analyses of data from 574 urban youth revealed three risk profiles. Children with the “well-adjusted” profile had assets in the academic and social domains, low aggressive behavior, and low depressive symptoms in elementary school, and low rates of academic and mental health problems in adolescence. Children in the “behavior-academic-peer risk” profile, characterized by high aggressive behavior, low academic achievement, and low peer acceptance, had conduct problems, academic difficulties, and increased mental health service use in adolescence. Children with the “academic-peer risk” profile also had academic and peer problems but they were less aggressive and had higher depressive symptoms than the “behavior-academic-peer risk” profile in elementary school; the “academic-peer risk” profile had depression, conduct problems, academic difficulties, and increased mental health service use during adolescence. No differences were found for the two risk groups with respect to adolescent outcomes. Implications and recommendations for future research and practice follow.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Prevalence of Adolescent (6th–9th) Outcomes by Elementary Class Membership (percentages)

Table 1

Participant Characteristics (N = 678)

Characteristic	Sample Children	
Gender	<i>n</i> (%)	
Males	362 (53.4)	
Females	316 (46.6)	
Ethnicity		
African American	585 (86.3)	
Caucasian American	92 (13.6)	
Hispanic	1 (0.1)	
Free/reduced-cost lunch	463 (68.3)	
First Grade Functioning	<i>M (SD)</i>	<i>Range</i>
Aggressive behavior	0.15 (0.12)	(0.0–0.73)
Depressive symptoms	0.79 (0.38)	(0.0–2.0)
Academic achievement	39.47 (18.87)	(1.0–98.0)
Peer acceptance	0.23 (0.13)	(0.1–0.76)
Grades 6–9 (any time) Functioning	<i>n</i> (%)	
Met criteria for Major Depressive Disorder	58 (10.1)	
Met criteria for Conduct Disorder	101 (17.6)	
Received school counseling	133 (23.2)	
Received inpatient/outpatient treatment	89 (15.5)	
Low academic performance	85 (14.8)	

Table 2

Fit Indices for Latent Class Solutions for Study Participants (N = 687)

Number of Classes	BIC	SSA BIC	Entropy	VLMR LRT P-value	Adj. LMR LRT P-value
1 class	4701.85	4676.45	--	--	--
2 classes	4520.94	4479.67	0.865	0.0000	0.0000
3 classes*	4478.31	4421.15	0.663	0.0115	0.0130
4 classes	4432.73	4359.70	0.801	0.0001	0.0002
5 classes	4429.58	4340.68	0.698	0.6737	0.6801

Note. BIC = Bayesian Information Criterion; SSA BIC = sample-size adjusted Bayesian Information Criterion; Entropy = classification accuracy; VLMR LRT = Vuong-Lo-Mendell-Rubin likelihood ratio test; LMR adj. LRT = Lo-Mendell-Rubin adjusted likelihood ratio test.

* 3-class solution selected.

Table 3

Means and Percentages by Class Membership for Elementary School Risk Factors

	Behavior-Academic-Peer Risk (9%)	Academic-Peer Risk (46%)	Well-Adjusted (45%)
	M (100%), F (0%)	M (59%), F (41%)	M (32%), F (68%)
Elementary Risks (Grade 1)	M	M	M
Depressive symptoms	0.79	0.88	0.72
Aggressive Behavior	0.42	0.14	0.09
Academic Achievement	32.71	30.94	48.36
Peer Acceptance	0.17	0.19	0.29

Note. M = Male, F = Female

Table 4
Odds Ratios (OR) of Adolescent (6th–9th) Outcomes by Elementary Class Membership

Outcome	Behavior-Academic-Peer Risk vs. Well-Adjusted		Behavior-Academic-Peer Risk vs. Academic-Peer Risk		Academic-Peer Risk vs. Well-Adjusted	
	OR	95% CI	OR	95% CI	OR	95% CI
Major Depressive Disorder	1.15	.27/4.80	.41	.10/1.71	2.78 [*]	1.08/7.17
Conduct Disorder	9.97 ^{**}	3.52/28.22	1.65	.58/4.71	6.05 ^{**}	1.76/20.75
School counseling	7.02 ^{**}	3.26/15.15	2.26	.84/6.14	3.10 [*]	1.03/9.30
Inpatient/outpatient treatment	16.59 ^{**}	4.60/59.84	1.95	.67/5.64	8.51 [*]	1.53/47.37
Low academic performance	NA [§]	NA [§]	1.25	.39/3.96	NA [§]	NA [§]

^{*} $p < .05$

^{**} $p < .01$.

[§] Could not estimate ORs due to small number of children in the low risk class with low academic performance