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Role of resilient personality on lower achieving first grade students' current and future achievement

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Abstract

This study investigated a measurement model of personality resilience and the contribution of personality resilience to lower achieving first grade students' academic achievement. Participants were 445 ethnically diverse children who at entrance to first grade scored below their school district median on a test of literacy. Participants were administered an individual achievement test in first grade and 1 year later. Confirmatory factor analysis confirmed a second-order latent construct of resilient personality defined by teacher-rated conscientiousness, agreeableness, and ego-resiliency that was distinct from measures of externalizing behaviors and IQ. Using latent structural equation modeling and controlling for baseline economic adversity, IQ, and externalizing symptoms, resilient personality predicted children's concurrent and future achievement (controlling also for baseline achievement in the prospective analyses). Model fit was invariant across gender.

Keywords

Resilience; Academic achievement; Elementary students; Ego-resiliency; Positive personality; School readiness

It is well established that early school adaptation forecasts long-term schooling outcomes (Alexander, Entwisle, & Dauber, 1993; Finn, 1989; Reynolds & Bezruczko, 1993; Stipek, 2001). The long-term prediction of academic performance from early school adaptation is attributed, in part, to the finding that child differences at school entry both impact and are impacted by classroom experiences, through reciprocal causal processes (Pianta, in press; Sameroff, 1975). Consequently, initial differences in school readiness tend to be magnified rather than minimized during the elementary school years (Dodge & Pettit, 2003; Hughes, Gleason, & Zhang, 2005), such that even small increments in achievement in first grade have implications for children's long-term school success (Alexander, Entwisle, & Kabbani, 2001; Stipek, 2001). Given the long-term developmental significance of early school achievement, it is imperative to identify factors that contribute to early academic competencies. Such knowledge would be useful in early intervention efforts, both in selecting children most in need of early intervention and in designing programs that strengthen protective factors and reduce risks.

Extensive research conducted over the past two decades has identified both intra-individual (i.e., child) and extra-individual (i.e., environmental) factors that predict success in kindergarten and first grade (for review, see The Future of Children, 2005). For example, family and neighborhood poverty independently contributes to the prediction of early school failure (Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998; Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002). A number of individual child characteristics are associated with successful

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adaptation to school. Among these factors are early literacy (Barnett, 1995; Whitehurst et al., 1999), general cognitive ability (Ceci, 1991; Lassiter & Bardos, 1995), attention and behavioral self-control (Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Rabiner, Coie, & the Conduct Problems Prevention Research Group, 2000; Spira, Bracken, & Fischel, 2005), emotional competence (Denham et al., 2003), and prosocial attitudes and behaviors (Ladd, Birch, & Buhs, 1999). Given the well-established relation between intellectual functioning and early achievement, it is noteworthy that investigators have documented negative effects for externalizing symptoms and poor regulatory control on achievement in the early grades when controlling for prior intellectual functioning (Normandeau & Guay, 1998). Longitudinal studies with preschool and early elementary students have also found independent effects for prosocial behavior and externalizing problems on achievement when controlling for prior achievement (Ladd et al., 1999).

The role of children's positive personality, or adaptive personality characteristics, in children's early academic achievement has received much less research attention. This oversight is surprising given the resurgence of research in the past decade on resilience (Masten, 2001) and on "positive psychology" (Folkman & Moskowitz, 2000; Fredrickson & Losada, 2005). Consistent with resiliency and positive psychology perspectives, researchers have reported links between adaptive personality processes (e.g., positive emotionality, conscientiousness, and stress resistance) and academic achievement (Digman, 1989; Wentzel, 1991, 2004; Wentzel & McNamara, 1999). Children who are high in positive personality characteristics such as adaptability, agreeableness, conscientiousness, and positive emotionality would be expected to cope with classroom stressors better, persist in the face of challenges, and achieve more in school. The benefits of personality resiliency to academic achievement may be more pronounced for children who face threats to positive academic outcomes. Such threats might include child variables such as low academic or behavioral readiness competencies as well as environmental risks such as a disorganized classroom.

In personality psychology, two major models of personality structure, the Ego-Control-Ego-Resiliency Model (Block & Block, 1980) and the Five-Factor Model of Personality (FFM; John, 1990) are associated with children's behavioral and emotional adjustment (Huey & Weisz, 1997). However, few researchers have investigated whether these traits play a role in academic achievement. Previous studies investigating the associations between children's positive personality factors and academic outcomes (Barbaranelli, Capara, Rabasca, & Pastorelli, 2003; Digman, 1989; John, Caspi, Robins, & Moffitt, 1994; Schoen & Nagle, 1994) have not employed statistical controls for child externalizing problems and general cognitive ability. Because externalizing symptoms and cognitive ability are correlated with both positive personality factors and academic achievement (Howse et al., 2003; Huey & Weisz, 1997), it is difficult to determine the influence of children's positive personality on achievement over and above the effect of these factors. Even fewer studies have investigated the prospective role of positive personality factors on children's achievement (Digman, 1989). A further limitation of previous research is reliance on one source, usually the teacher, to report both on personality factors and school achievement, introducing the possibility that results are due to shared assessment methods.

The primary purposes of this study are to test a measurement model of personality resilience, defined by ego-resiliency, agreeableness, and conscientiousness, and to investigate the contribution of personality resilience to first grade children's current and future academic achievement, above the effects of children's externalizing behaviors, cognitive ability, and family adversity. Next we summarize the literature on the Ego-Control-Ego-Resiliency Model and the Five-Factor Model, paying special attention to research establishing their associations with competencies known to be important to children's academic success in the early grades.

Ego-resiliency

Ego-control and ego-resiliency are conceptually independent but dynamically linked control systems (Kremen & Block, 1998). “Whereas ego-control refers to the degree to which individuals express their impulses, ego-resiliency describes the internal personality structures that function to modulate these impulses adaptively” (Huey & Weisz, 1997, p. 404). The ego-control dimension ranges from ego-undercontrol (a relatively low threshold for the expression of urges) to ego-overcontrol (a relatively high threshold for impulse expression). Ego-overcontrol is associated with behavioral inhibition and internalizing problems (Block & Gjerde, 1990); ego-undercontrol is associated with impulsivity and a range of externalizing behaviors including delinquency, aggression, and substance abuse (Shedler & Block, 1990; White et al., 1994). Due to the nominal and empirical overlap between ego-control and patterns of psychopathology, researchers have called into question whether ego-control is distinct from dimensions of psychopathology (Huey & Weisz, 1997).

Ego-resiliency refers to an individual's ability to adapt one's level of impulse expression to changes in one's environment. The ego-resilient individual is resourceful and flexible, adjusts to changes in the environment quickly, and recovers quickly from stress (Block and Block, 1980). At the low end of ego-resiliency, individuals adapt poorly to new situations, are slow to recover from stress, and are described as “falling to pieces” when stressed (Block & Block, 1980; Cumberland-Li, Eisenberg, & Reiser, 2004). In comparing the associations between ego-control and ego-resiliency with internalizing and externalizing symptoms, Huey and Weisz (1997) concluded that ego-resiliency may be especially important to individuals disposed to express impulses, such that high ego-resilient children are less likely to express impulses in an externalizing or internalizing direction. Ego-resiliency in children is also associated with empathy and social competence (Block & Block, 1980; Graziano, Jensen-Campbell, & Sullivan-Logan, 1998). In a sample of children ages 7–17, Huey and Weisz (1997) reported associations between teacher-rated ego-resiliency and both the FFM model and teacher-rated externalizing and internalizing symptoms. Ego-resiliency had its highest associations with neuroticism ($r=-.75$), conscientiousness ($r=-.64$), and agreeableness ($r=-.59$). It correlated somewhat higher with teacher ratings of internalizing ($r=-.41$) than with teacher ratings of externalizing ($r=-.30$) symptoms. Conversely, in this same study, ego-control correlated more highly with teacher ratings of externalizing ($r=-.60$) than with internalizing ($r=-.24$) symptoms.

Ego-resiliency has been found to mediate relations between behavioral and emotional control and children's social competence and agreeableness (Cumberland-Li et al., 2004; Eisenberg et al., 1997). Cumberland-Li et al. concluded that “children who can effortfully control their emotions and behaviors are also likely to be flexible and more adaptive in stressful situations, and these resilient children are more likely to be agreeable” (p. 20).

Agreeableness and conscientiousness

The FFM of personality is an attempt to provide a unifying model for personality structure (John, 1990). The five factors are most commonly referred to as extraversion, agreeableness, conscientiousness, neuroticism, and openness/intellect. A strength of the Big 5 taxonomy is “that it can capture, at a broad level of abstraction, the commonalities among most of the existing systems of personality traits” (John & Srivastava, 1999, p. 122). Studies using diverse assessment strategies including Q-sort and questionnaires completed by parents, teachers, and professionals yield strong evidence supporting the existence of these five factors in children (Digman, 1989; Digman & Takemoto-Chock, 1981; John et al., 1994; Kohnstamm, Halverson, Mervielde, & Havill, 1998).

Agreeableness and conscientiousness were selected for this study based on research finding that these factors are most consistently linked to measures of adjustment in children (Graziano

& Ward, 1992; John et al., 1994). Agreeableness has been labeled social adaptability, likeability, friendly compliance, social conformity, and empathy. The conscientiousness factor has been labeled dependability, task interest, will to achieve, impulse control, constraint, control, and work (Digman, 1989; John & Srivastava, 1999). Barbaranelli et al. (2003) found that teacher-ratings, self-ratings, and parent ratings of conscientiousness—but not agreeableness—predicted concurrent grades in middle school and junior high, partialling out other Big 5 dimensions. They did not, however, test whether Big 5 factors predicted achievement partialling out measures of externalizing problems or cognitive ability, both of which are associated with agreeableness and conscientiousness as well as with academic achievement. Thus, the association between conscientiousness and grades could have been due to these unmeasured variables. In other research, agreeable individuals were found to respond to interpersonal conflict more constructively (Graziano, Jensen-Campbell, & Hair, 1996; Jensen-Campbell, Graziano, & Hair, 1996), cooperate more productively during interdependent group tasks (Graziano, Jensen-Campbell, & Finch, 1997), and work harder to suppress negative emotions during social interaction (Tobin, Graziano, Vanman, & Tassinari, 2000), presumably because they are able to control frustration generated by other people.

In a rare study investigating associations between FFM dimensions and school behavioral adjustment with grade-school children, Huey and Weisz (1997) reported that both agreeableness and conscientiousness were associated with teacher ratings of externalizing symptoms ($r = -.62$ for agreeableness and $r = -.23$ for conscientiousness) but not with teacher ratings of internalizing symptoms. Digman (1989) investigated the relations between FFM dimensions and school adjustment in a longitudinal study of children from the elementary grades through high school. He found that conscientiousness (which he labeled Will to Achieve) had the highest concurrent and prospective associations with measures of achievement. Digman found that children's conscientiousness scores were predictive of on-task behaviors such as obtaining materials necessary for the task at hand, obtaining task-related information from the teacher, and working on the assigned task. A composite score on this factor formed as an unweighted sum of available values over several years, correlated .70 with high-school GPA. Although this finding is suggestive of a role for conscientiousness in achievement, it is also possible that unmeasured variables such as externalizing behaviors and cognitive ability explained the association between conscientiousness and grades.

Temperament and personality factors

Several researchers have addressed the empirical and conceptual overlap between dimensions of temperament and dimensions of personality (Presley & Martin, 1994; Rothbart & Ahadi, 1994; Teglasi, Cohn, & Meshbesh, 2004). Temperament refers to early and stable individual differences in emotional, attentional, and behavioral inclinations toward acting and reacting (Derryberry & Rothbart, 1997). Temperament has been viewed as the basic emotional and behavioral building blocks that provide the developmental foundations for complex and differentiated socioemotional and motor behaviors, personality, adaptation, and adjustment or psychopathology (Lahey, 2004). The Temperament Assessment Battery for Children (TABC, Martin, 1988), developed for children ages 3–7, is the most researched measure of temperament in the school setting. The TABC assesses five dimensions of temperament: activity level, adaptability, negative emotionality, social inhibition, and persistence.

Given the view that individual differences in personality are rooted in temperament, it is not surprising that there is considerable conceptual overlap between dimensions of temperament and personality, especially in early childhood (Presley & Martin, 1994). Conscientiousness is highly similar to the temperamental dimension of persistence which, like conscientiousness, is associated with academic achievement (Martin, Drew, Gaddis, & Moseley, 1988; Martin & Holbrook, 1985; Newman, Noel, Chen, & Matsopoulos, 1998). Agreeableness and ego-

resiliency overlap with the temperamental dimension of adaptability (Presley & Martin, 1994; Teglasi et al., 2004), which involves both flexibility in responding to changing environmental circumstances and social ease. Interestingly, adaptability does not emerge clearly in factor-analytic studies of young children (Martin, Wisenbaker, & Huttenen, 1994; McClowry, Hegvik, & Teglasi, 1993), presumably because it is more complex and broader than other temperament dimensions and involves “various reactive tendencies and self-regulatory resources as well as non-temperamental attributes” (Teglasi et al., 2004, p. 12). Thus, our three dimensions of positive personality—conscientiousness, agreeableness, and ego-resiliency—are viewed as positive dimensions of personality that emerge from behavioral predispositions as shaped by transactions with the social world from infancy.

Specific aims of study

This study has four specific aims. First, using confirmatory factor analysis, we test a measurement model of resilient personality. The hypothesized model posits that the construct of resilient personality is distinct from externalizing behaviors, general cognitive functioning, and family economic adversity. It is important to establish convergent and discriminant validity of a measure of resilient personality, because the constructs that comprise resilient personality overlap both conceptually and empirically with each other and empirically with children's behavioral dimensions, especially antisocial behavioral orientations (Huey and Weisz, 1997). Hence, the second aim is to determine if resilient personality is associated with academic achievement after controlling for measures of general cognitive ability, externalizing problems, and family economic adversity. Importantly, our measure of achievement is based on children's scores on a nationally standardized measure of reading and math rather than on teacher report. Thus, if an association between resilient personality and achievement is found, it would not be explained by shared source effects.

Third, we determine if resilient personality predicts children's academic achievement one year later, controlling for prior levels of achievement, general cognitive ability, externalizing problems, and family economic adversity. Using a prospective design, the finding of an effect for baseline resilient personality on subsequent achievement, controlling for baseline performance on the same measure of achievement, offers strong, but not conclusive, evidence for a causal role of resilient personality on achievement.

Finally, we test whether the hypothesized model is an equally good fit for boys and girls. It is important to test for gender moderation of findings because other researchers have found different patterns of association between constructs similar to those that define our resilient personality construct and behavioral adjustment (Funder, Block, & Block, 1983; Letzring, Block, & Funder, 2004).

We pursue these aims with a sample of first grade children whose scores on a test of literacy skills at entrance to first grade were below the median score for their school district (see below for details on participants). Children who enter school with low academic readiness skills are more likely than higher achieving students to encounter academic and social stressors at school (Ladd et al., 1999; Measelle, Ablow, Cowan, & Cowan, 1998). In a larger sample of first grade children that includes children in the current study, scores on this literacy measure were by far the strongest predictor of being retained in first grade (Willson, Hughes, Zhang, Gleason, & Wong, 2005). Children who are adaptable, emotionally regulated, friendly, and conscientious are expected to cope with school stressors better by, for example, maintaining task commitment, appropriately seeking help, and engaging in constructive problem solving. Thus, a resilient personality structure may be especially important to successful school adaptation for children who begin school with less developed academic readiness skills.

Methods

Participants

Participants were first-grade children attending one of three school districts (one urban, two small city) in southeast and central Texas drawn from a larger sample ($N=784$) of children participating in a longitudinal study examining the impact of grade retention on academic achievement. The student enrollment for the three schools was 42% White, 25% African American, and 27% Hispanic. Participants were recruited across two sequential cohorts in first-grade during the fall of 2001 and 2002. Children were eligible to participate in the longitudinal study if they scored below the median score on a state-approved measure of literacy administered by the district in either May of kindergarten or September of first grade and had not been previously retained in first grade. Based on school records, 1374 children were eligible to participate in the study. Consent forms were sent by teachers in children's weekly folders. Children were offered small incentives for returning the consent form, regardless of the consent decision. Of 1200 parents returning consent forms, 784 (65%) gave consent (57% of eligible participants). The ethnic composition was 23% African-American, 37% White-Hispanic, 34% White Non-Hispanic, and 6% other. Children with and without consent to participate did not differ on age, gender, ethnicity, eligibility for free or reduced lunch, bilingual class placement, or literacy test scores.

A total of 445 (52.1% male) participants (22% African-American, 37% White Hispanic, and 35% White non-Hispanic) had complete data for all study variables for year 1 and year 2. Children with and without complete data did not differ on any demographic variables or study variables at baseline. At entrance to first grade, children's mean age was 6.57 ($S.D.=.39$) years. Children's intelligence as measured with the Universal Nonverbal Intelligence Test (Bracken and McCallum, 1998) was 92.91 ($S.D.=14.62$). Based on family income, 62.9% of participants were eligible for free or reduced lunch. For 41.1%, the highest educational level in the household was a high school certificate or below. These 445 children were located in 133 first grade classrooms. Given the attrition rate, we test our model a second time using imputed data, to increase the generalization of our findings to the original sample.

Measures

During the spring semester of first grade, teachers were mailed a questionnaire packet for each study participant. This packet included the measures of the teacher's perception of the student's ego-resiliency, agreeableness, and conscientiousness. Teachers received compensation for completing and returning the questionnaires. Sociometric interviews were also completed in the spring semester of first grade. Children's achievement was tested in individual testing sessions at school, conducted between November and March of first grade, and 1 year later, when the majority of students were in second grade. Prior to testing children at school, assessors (undergraduate and graduate students) received 30 h of training in the measures and demonstrated their proficiency in each test in two videotaped administrations. All test protocols were checked for accuracy by a school psychology doctoral student.

Academic achievement—*The Woodcock Johnson Tests of Achievement*, 3rd edition (WJ-III; Woodcock, McGrew, & Mather, 2001), is an individually administered measure of academic achievement for individuals ages 2 to adulthood. For our purposes, we used the WJ-III Broad Reading age-based standard scores (Letter-Word Identification, Reading Fluency, Passage Comprehension subtests) and the WJ-III Broad Math age-based standard scores (Calculations, Math Fluency, and Math Calculation Skills subtests). Broad Reading and Broad Math age standard scores have a mean for the standardization sample of 100 and standard deviation of 15. Extensive research documents the reliability and construct validity of the WJ-

III and its predecessor (Woodcock & Johnson, 1989; Woodcock et al., 2001). The 1-year stability for this age group ranges from .92 to .94 (Woodcock et al., 2001).

The *Bateria Woodcock-Muñoz: Pruebas de aprovechamiento-Revisada* (Bateria-R; Woodcock & Munoz-Sandoval, 1996a) is the comparable Spanish version of the *Woodcock Johnson Tests of Achievement-Revised* (WJ-R; Woodcock & Johnson, 1989), the precursor of the WJ-III. If children or their parents spoke any Spanish, children were administered the *Woodcock-Muñoz Language Test* (Woodcock & Munoz-Sandoval, 1993) to determine the child's language proficiency in English and Spanish and selection of either the WJ-III or the Bateria-R. The Woodcock Compuscore program yields scores for the Bateria-R that are comparable to scores on the WJ-R (Woodcock & Munoz-Sandoval, 1996b). The Broad Reading and Broad Mathematics age standard scores were used in this study. In all analyses, we report the age scores for Reading and Math from the WJ-III or the Bateria-R and refer to these scores as reading and math achievement scores.

Teacher-rated ego-resiliency—The measure of ego-resiliency was derived from a 15-item scale of ego-control and ego-resiliency adapted from the California Child Q-Set, a language simplified personality inventory for use by nonprofessionals (Caspi, Block, Block, & Klopp, 1992). Different researchers have used different sets of items to assess ego-control and ego-resiliency, and it is often difficult to trace the origin of items for different scales (Letzring et al., 2004). These 15 items were selected based on previous research demonstrating that they are consistently rated as prototypical of ego-undercontrol and ego-resiliency (Block & Block, 1980; Funder et al., 1983). A cross-validation approach was applied to examine the underlying structure because of the unclear factor structure of the measure (Thompson, 2004). The time 1 dataset was randomly split into two even halves. An exploratory factor analysis (EFA) was performed for the first half data. The factor structure found from this analysis was then cross-validated by performing confirmatory factor analysis on the second half data. The EFA results of the data yielded a four-factor model ($\chi^2(51)=100.6, p<.001, SRMR=0.03$), and this four-factor model fitted the second half sample adequately ($\chi^2(84)=281.3, p<.001, CFI = 0.94, RMSEA=0.085, SRMR=0.065$). The four factors were: pro-social, antisocial, ego-resiliency, and ego brittle. Because the ego-resiliency and ego brittle factors were moderately correlated (standardized path coefficient = .55), we created a single ego-resiliency scale from the four items on the ego-resiliency factor (resourceful in initiating activities; curious, eager to learn, open; self-reliant, confident; persistent; does not give up easily) and the three items on the ego brittle factor (becomes rigidly repetitive, falls to pieces under stress, rapid mood shifts; emotionally labile). All items are rated on a 1–5 Likert scale. The resulting alpha for this scale for the study sample was .85.

Teacher-rated agreeableness and conscientiousness—To address the need for a brief instrument measuring the prototypical components of the Big 5 dimensions that are common across studies, John, Donahue, and Kentle (1991, cited in Cumberland-Li et al., 2004) constructed the Big Five Inventory (BFI). “The 44-item scale was developed to represent the prototype definitions developed through expert ratings and subsequent factor analytic verification in observer personality ratings” (John & Srivastava, 1999, p. 114). The BFI is an empirically developed scale and is not dependent on, or derived from, any single theory of personality. The BFI uses short phrases using everyday vernacular, based on trait adjectives known to be prototypical markers of the Big Five (John, 1990). The scales have demonstrated very good internal consistency and factorial validity and are highly correlated with scores derived from the 240-item NEO Personality Inventory, Revised (Costa & McCrae, 1992).

In our study, teachers completed only the agreeableness and conscientiousness subscales from The Big Five Inventory. The agreeableness scale consists of nine items and the conscientiousness scale consists of eight items. All the items are rated on a 1–5 Likert scale.

Sample agreeableness items include “is helpful and unselfish with others; likes to cooperate with others; is sometimes rude to others” (reverse scored). Sample conscientiousness items include “does a thorough job; is a reliable worker; tends to be disorganized” (reverse scored). The α for each scale was .94.

Peer-rated aggression and hyperactivity—A modified version of the Class Play (Masten, Morison, & Pelligrini, 1985) was used to obtain classmates' evaluations of children's social behaviors. Research assistants individually interviewed children at school. Children were asked to nominate as few or as many classmates as they wished who could best play each of several parts in a class play. Of interest to this study are two items assessing *aggression* (“Some kids start fights, say mean things, or hit others”) and *hyperactive* (“Some kids do strange things and make a lot of noise. They bother people who are trying to work”). Following each item, students were asked, “What kids in your class are like that?” Each classmate received an aggression and hyperactive score based on the number of nominations that child received for that item.

Elementary children's peer nomination scores derived from procedures similar to those used in this study have been found to be stable over periods from 6 weeks to 4 years and to be associated with concurrent and future behavior and adjustment (for review, see Hughes, 1990). Children as young as first grade provide reliable reports of classmates' behaviors (Conduct Problems Prevention Research Group, 1999; Ialongo, Edelesohn, Werthamer-Larsson, & Crockett, 1996). To ensure reliable results, sociometric scores were computed only for children located in classrooms in which more than 40% of classmates participated in the sociometric assessment (Terry, 1999, 2000). Of the 784 children in the sample, peer data were available for 595 (76%). The mean rate of classmate participation in sociometric administrations was .65 (range .40 to .95), and the median number of children in a classroom providing ratings was 12. Although only children with written parent consent provided ratings and nominations, all children in the class were rated and eligible for nomination. All peer scores were standardized based on scores for all children in the classroom.

Cognitive ability—Children were individually tested at school with the Universal Nonverbal Intelligence Test (UNIT; Bracken & McCallum, 1998). The UNIT is a nationally standardized non-verbal measurement of the general intelligence and cognitive abilities of children and adolescents. The UNIT is administered with the use of culturally and linguistically universal hand and body gestures without any use of receptive or expressive language. It measures general intelligence by measuring complex memory and reasoning abilities. We used the abbreviated version of the UNIT, which yields a full scale IQ that is highly correlated ($r=.91$) with scores obtained with the full battery and which has demonstrated good test-retest and internal consistency reliabilities as well as construct validity (Bracken & McCallum, 1998; Hooper, 2003).

Economic adversity—This dichotomous variable was based on the child's income eligibility for free or reduced school lunch. A score of 0 indicated the child was not eligible, and a score of 1 indicated the child was eligible. This information was provided by the child's school.

Results

The results are presented in two sections. First, confirmatory factor analysis of the cross-sectional data is used to test a second-order measurement model of resilient personality. Second, this measurement model is used in cross-sectional and longitudinal structural model testing to determine whether resilient personality is associated with academic achievement after controlling for general cognitive ability, externalizing problems, and family economic

adversity. Gender difference on the relation between resilient personality and academic achievement is also examined.

Measurement model of resilient personality

A confirmatory factor analysis utilizing maximum likelihood estimation with robust standard errors and a mean-adjusted chi-square statistic test (MLM; Muthén & Muthén, 2004) was performed to test the proposed second-order measurement model (see Table 1). To account for the dependency among the observations (children) within cluster (classrooms), analyses were conducted using the “complex analysis” feature in Mplus (v.3.13, Muthén & Muthén, 2004), which accounts for the nested structure of the data by adjusting the standard errors of the estimated coefficients. A second-order model was tested with three first-order factors: (a) ego-resilient (seven indicators), (b) agreeableness (nine indicators), and (c) conscientiousness (eight indicators) (see Fig. 1). However, the overall model fit of the hypothesized second-order measurement model was not fully satisfactory ($\chi^2(249)=1022.99, p<.001$, CFI=.878, RMSEA=.084, SRMR=.072). To improve the overall model fit, the model has been modified by adding several paths of correlated residual variances between different indicators *within* each first-order factor. The pattern and the significance of the coefficients were very similar between the original model and modified model; all coefficients were significant in the same direction and the changes of the standardized factor loadings were less than .10. Because adding the extraneous parameters did not in any way change the substantive interpretations of the model, the modifications were deemed appropriate (Bentler, 2000, September 2). The modified model shown in Fig. 1 fit the data fairly ($\chi^2(240)=648.08, p<.001$, CFI=.94, RMSEA=.062, SRMR=.069). All loadings were significant at $p<.05$. To take the missing responses into account, we also analyzed the entire dataset (i.e., $N=784$) with the same model using the full information maximum likelihood (FIML) method under MPLUS, which applies the EM algorithm described in Little and Rubin (1987). We found a very similar pattern of results (i.e., coefficients presented in the parentheses in Fig. 1).

Continuing to estimate the measurement model in the cross-sectional and longitudinal analyses would lead to a very low ratio of parameters to participants (see Bentler & Chou, 1988). Consequently, unit-weighted observed composites for each resilient personality factor were created (i.e., ego-resilient, agreeableness, and conscientiousness) corresponding to the indicators for each of the three factors in the measurement model (see Fig. 1). These composites were used as indicators for resilient personality in the structural equation models testing mediation (see Table 2).

Cross-sectional and longitudinal SEM

The results of the cross-sectional and longitudinal models are presented in Fig. 2. The cross-sectional effect of resilient personality on academic achievement (i.e., Reading and Math scores) after controlling for general cognitive ability, externalizing problems, and family economic adversity is shown on the left side (i.e., time 1 model) of Fig. 2. The longitudinal effect of resilient personality on academic achievement measured in the following year after controlling for the same set of variables and academic achievement measured in previous year is also presented in Fig. 2. The target hypothesized paths are bolded. The overall model provided an acceptable fit to the data ($\chi^2(24)=76.22, p<.001$, CFI=.97, RMSEA=.070, SRMR=.033). All paths related to the hypothesized effects (i.e., resilient personality to academic achievement) were significant (at $p<.05$), except the effect of the resilient personality to time 1 Math score ($\gamma=.07, p>.05$).

We also analyzed the full dataset with the same model using MPLUS missing data procedure and found a very similar pattern of results (i.e., coefficients presented in the parentheses in Fig. 2). That is, all target path coefficients associated with the hypothesized effects (i.e., resilient

personality to academic achievement) were significant, including the effect of resilient personality to time 1 Math score ($\gamma=.13, p<.05$). The significant result of this effect based on the missing data procedure implies that the non-significant effect of resilient personality to time 1 Math score with complete data may be due to insufficient statistical power. The significant direct effects of resilient personality on academic achievement over time indicated that students who scored higher on the resilient personality were more likely to score higher on both Reading and Math tests over time, after controlling for the effects of cognitive ability, externalizing problems, and family economic adversity.

Gender effects

We also examined mean gender differences on analysis variables and the possible gender difference on the relations between resilient personality and academic achievement using the multiple-sample SEM approach (Kline, 2005). That is, gender difference was examined by comparing the chi-square values of two nested models in which equivalent constraints of the target paths (i.e., paths from resilient personality to academic achievement) were imposed for both male and female groups in one model but not the other one.

As shown in Table 2, relative to boys, girls were rated as more agreeable, ego-resilient, and conscientious and as less aggressive and hyperactive, and girls scored higher on the measure of reading achievement. Due to the use of robust estimator, Satorra-Bentler adjusted chi-square difference test (Satorra, 2000) was adopted to examine the possible gender difference in the structural relations in the longitudinal model under the multiple-sample SEM framework. The adjusted chi-square difference test was not significant, indicating that the relation between resilient personality and academic achievement was invariant across different gender groups.

Discussion

The latent construct of resilient personality uniquely predicted first grade children's concurrent and future reading and math achievement above the effects of general cognitive ability, externalizing problems, and family economic adversity. The finding that personality resiliency measured in first grade predicts reading and math scores one year later, although predicted, is remarkable given the stability of both reading (.75) and math (.81) achievement. Although other researchers have found that similar positive personality dispositions are associated with achievement (Barbaranelli et al., 2003; Digman, 1989), this study is the first study to investigate the unique, prospective contribution of these dispositions to academic achievement. Furthermore, the effect of resilient personality on achievement cannot be due to shared measurement source, because achievement was assessed by performance on a nationally standardized test rather than by teacher ratings. Notable also are differences in the relative magnitude of the paths from resiliency to time 1 reading and math ($\gamma=.39$ and $\gamma=.13$, respectively) compared to the relative magnitude of the paths from resiliency to time 2 reading and math ($\gamma=.14$ and $\gamma=.15$, respectively). The greater effect of resiliency on time 1 reading, relative to time 1 math, may reflect the fact that children were selected for the study based on low literacy scores at the beginning of first grade, and not on low math scores. Future research should determine if personality resilience has a stronger effect on achievement in those areas in which students face more academic challenge.

Given the well-established relation between externalizing behaviors and early achievement (Rabiner et al., 2000; Spira & Fischel, 2005), it is noteworthy that children's externalizing behaviors, defined by peer-rated aggression and hyperactivity, no longer predicted children's concurrent or future achievement, above the effects of personality resiliency, cognitive ability, and family economic adversity. The latent variable externalizing problems was moderately and negatively correlated with resilient personality (standardized coefficient = $-.54$). Thus, the

failure to find an effect for externalizing problems on achievement is likely explained by its covariation with personality resilience.

Role of positive dispositions in conceptualization of school readiness

These findings underscore the importance of children's positive, or adaptive, dispositions to school readiness and are consistent with kindergarten teachers' perceptions of school readiness. A national survey of kindergarten teachers' ratings of child characteristics considered to be essential or very important to a child's readiness found that teachers placed a higher importance on social and emotional competencies and personality dispositions than on academic readiness skills (Lewit & Baker, 1995). Noteworthy is that 76% of teachers endorsed the idea that children need to be enthusiastic and curious, and 60% endorsed that children need to be able to follow directions, not be disruptive of the class, and be sensitive to other children's feelings. In contrast, only 21% of teachers endorsed the need for children to be able to use a pencil or paintbrush, and only 10% and 7%, respectively, thought it was very important for children to name the letters of the alphabet or to count to 20 to be ready to start kindergarten. Thus, according to early educators, ready to learn is indexed more by personality dispositions (curious, motivated to get along with others) and self-regulatory abilities (inhibit impulsive responses; task perseverance) than by academic knowledge and skills.

A direct longitudinal effect for personality resilience is also consistent with the "broaden and build" theory, which holds that positive mindsets have "long-term adaptive value because broadening builds enduring personal resources, like social connections, coping strategies, and environmental knowledge" (Fredrickson & Losada, 2005, p. 679). First grade children who openly explore their environments and positively approach others will accumulate additional social resources and general knowledge about their environment that enhance their adaptive competencies.

Measurement of resilient personality

Confirmatory factor analysis confirmed a measurement model positing a latent construct of resilient personality defined by teacher-rated conscientiousness, agreeableness, and ego-resiliency. Conscientiousness and agreeableness are derived from the Five Factor Model of Personality, a non-theoretical, empirically driven model (John, 1990), whereas ego-resiliency is derived from a theoretical model of self-regulation, the Ego-Control/Ego-Resiliency Model (Block & Block, 1980). Rarely are these personality dimensions included in the same study (for exception, see Huey & Weisz, 1997), and no study has investigated whether these dimensions are defined by a higher-order construct and whether they are distinct from measures of externalizing behaviors. Results from the current study provide evidence of both good convergent and discriminant validity for this measure of resilient personality. Resilient personality shows low but statistically significant associations (coefficient=.28) with general cognitive ability but is not associated with family economic adversity. The failure to find the expected association between resilient personality and family economic adversity may be explained by a lack of sensitivity to varying levels of economic adversity of our measure of economic adversity (the dichotomous variable of eligibility for free or reduced lunch). As expected, resilient personality is moderately correlated with peer-rated externalizing behaviors but is uniquely associated with achievement, above its association with externalizing behaviors.

Gender findings

Consistent with previous empirical findings (Cumberland-Li et al., 2004; Huey & Weisz, 1997), girls were rated more positively than boys on each of the three scales that define resilient personality. However, we did not find a moderating role for gender. Thus our findings differ from those of Denham et al. (2003) who found that emotional competence (an adaptive dimension of personality) in preschoolers was a stronger predictor of social competence in

kindergarten for girls than for boys. Perhaps differences in outcomes between this study and the Denham et al. study account for the differing results. Denham et al. suggested that more stringent expectations for girls to “be nice” than for boys might account for the larger role of emotional competence in the peer acceptance of girls versus boys. Following this reasoning, if expectations for achievement are more similar for boys and girls than are expectations for social competence, one might expect the association between positive personality dispositions and achievement would be similar for boys and girls.

Study limitations and implications

These findings must be considered in the context of study limitations. Because children were selected on the basis of scoring below the median on a measure of literacy at entrance to first grade, results may not generalize to children who are above average in literacy. The low achieving sample, however, presents an excellent opportunity to study resiliency processes among children who are at risk for school failure.

These findings have implications for school psychologists and other professionals working with young children. Because the measurement of problem behaviors can not substitute for the assessment of positive personality dimensions, assessments of children's psychological functioning should include the assessment of children's adaptive personality functioning and not only problem behaviors. When these positive characteristics are known, more accurate predictions can be made about children's future achievement trajectories. Additionally, information about positive dimensions of personality can be used to tailor educational programs to children's needs. For example, a child who exhibits low levels of personality resilience might benefit from instruction in ways to cope with stressors. It is also important to identify classroom and teacher practices that promote children's personality resilience. Self-regulatory competence has been described as an adaptive dimension of personality (Eisenberg et al., 1997), and researchers have documented longitudinal effects of regulatory control on social and behavioral adjustment in the early school years (Denham et al., 2003; Eisenberg et al., 2003). Given the concurrent associations documented between regulatory control and achievement (Howse et al., 2003), it is reasonable to expect that regulatory control would also predict growth in achievement. Future empirical studies will need to address the empirical overlap between self-regulation and personality resilience as well as the relative and combined contribution of each to early school achievement.

It is also important to identify the proximal processes that account for the effect of resilient personality on achievement. Perhaps children high in personality resilience are better able, or more motivated, to inhibit impulsive responding, to maintain attention to academic tasks, or to cope effectively with negative interpersonal and academic challenges. Additionally, children low in personality resilience may be less likely to build supportive social relations in the classroom that support adjustment and learning. Consistent with transactional and ecological models of readiness (Pianta, in press), it is likely that child entry characteristics and classroom experiences conspire such that initial intra individual differences predict diverging developmental pathways.

It is also likely that personality resiliency's effect on achievement will differ as a result of variations in classroom contexts. For example, Rimm-Kaufman et al. (2002) found that children classified as temperamentally “bold” at 15 months of age were more off-task in kindergarten than were socially wary children. Furthermore, kindergarten teacher sensitivity, a classroom context variable, differentially affected kindergarten behavior of socially bold and socially wary children. Specifically, bold children with sensitive teachers showed more self-reliant behavior and fewer negative and off-task behaviors compared to bold children with less sensitive teachers. Similarly, children low in personality resilience may be more affected by teacher sensitivity than are children high in personality resilience. Further research is also

required to determine whether personality resilience buffers children who are low in regulatory control or high in externalizing problems from academic failure. Finally, research on the ontology of resilient personality is needed to identify its environmental and neurobiological precursors.

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Fig. 1.

Second-order measurement model of resilient personality. $\chi^2(240)=648.08$, $p<.001$; CFI=.94; RMSEA=.062; SRMR=.069. All coefficients are significant at $p<.05$ (two-tailed). All coefficients are standardized ($N=445$); coefficients in parentheses are based on the results from MPLUS missing data procedure. AGR = Agreeableness; EGO = Ego resiliency; CON = Conscientiousness; RES = Resilient personality.

Fig. 2.

Cross-sectional and longitudinal structural model on examining the direct effect of resilient personality on academic achievement. $\chi^2(24)=76.22, p<.001$; CFI=.97; RMSEA=.070; SRMR=.033. All coefficients are significant at $p<.05$ (two-tailed), except the ones associated with dashed paths. All coefficients are standardized ($N=445$); coefficients in parentheses are based on the results from MPLUS missing data procedure. The target hypothesized paths are bolded. AGR = Agreeableness; EGO = Ego resiliency; CON = Conscientiousness; RES = Resilient personality; ECON = Economic adversity; ZAGG = Aggression; ZHYP = Hyperactivity; EXT = Externalizing problems; MATH1 = Time 1 math score; MATH2 = Time 2 math score; READING1 = Time 1 reading score; READING2 = Time 2 reading score.

Table 1
Zero-order correlations for all variables in the second-order measurement model of resilient personality

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Ego1	—																							
2. Ego2	.63	—																						
3. Ego3	.61	.64	—																					
4. Ego4	.57	.56	.59	—																				
5. Ego5 ^a	.36	.32	.44	.29	—																			
6. Ego6 ^a	.36	.36	.52	.35	.69	—																		
7. Ego7 ^a	.22	.31	.34	.32	.45	.58	—																	
8. Agr1 ^a	.24	.36	.32	.32	.36	.45	.53	—																
9. Agr2 ^a	.20	.27	.27	.31	.35	.42	.47	.76	—															
10. Agr3 ^a	.27	.40	.33	.34	.36	.45	.53	.78	.76	—														
11. Agr4	.29	.43	.33	.36	.32	.36	.43	.63	.63	.66	—													
12. Agr5	.30	.42	.37	.32	.35	.36	.42	.53	.52	.57	.60	—												
13. Agr6 ^a	.29	.44	.36	.35	.40	.40	.41	.52	.48	.59	.57	.50	—											
14. Agr7	.30	.48	.37	.41	.32	.39	.52	.70	.64	.76	.72	.61	.54	—										
15. Agr8	.34	.51	.42	.44	.35	.38	.47	.67	.66	.70	.71	.60	.57	.80	—									
16. Agr9	.37	.53	.42	.42	.32	.39	.47	.66	.59	.69	.64	.62	.55	.78	.76	—								
17. Con1 ^a	.43	.45	.46	.53	.32	.35	.35	.46	.41	.41	.30	.30	.34	.43	.49	.45	—							
18. Con2 ^a	.35	.39	.35	.47	.27	.31	.32	.49	.48	.45	.40	.28	.31	.43	.47	.41	.66	—						
19. Con3 ^a	.39	.40	.41	.51	.23	.27	.27	.34	.31	.27	.25	.24	.23	.34	.40	.37	.66	.63	—					
20. Con4 ^a	.44	.50	.43	.58	.29	.31	.28	.44	.38	.40	.36	.31	.38	.39	.45	.41	.64	.61	.64	—				
21. Con5	.50	.55	.54	.69	.29	.36	.33	.43	.37	.40	.40	.33	.33	.50	.50	.50	.68	.61	.66	.69	—			
22. Con6	.53	.58	.55	.63	.32	.38	.35	.41	.36	.41	.39	.37	.39	.45	.45	.50	.64	.61	.64	.65	.77	—		
23. Con7	.56	.58	.60	.65	.35	.39	.29	.38	.29	.36	.30	.29	.28	.38	.42	.45	.67	.58	.62	.65	.77	.79	—	
24. Con8	.53	.60	.57	.67	.34	.37	.33	.47	.43	.48	.44	.35	.39	.53	.89	.54	.67	.65	.65	.69	.81	.78	.79	—

Note: N=445.

^a Reverse-coded items. Ego1=resourceful in initiating activities; Ego2=curious, eager to learn, open; Ego3=self-reliant, confident; Ego4=persistent, does not give up easily; Ego5=becomes rigidly repetitive or immobile under stress; Ego6=falls to pieces under stress; Ego7=rapid mood shifts, emotionally labile; Agr1=starts quarrels; Agr2=find fault in others; Agr3=sometimes rude;

Agr4=forgiving nature; Agr5=generally trusting; Agr6=cold and aloof; Agr7=considerate and kind; Agr8=helpful, unselfish; Agr9=likes to cooperate; Con1=easily distracted; Con2=somewhat careless; Con3=disorganized; Con4=lazy; Con5=perseveres; Con6=does things efficiently; Con7=makes plans and follows through; Con8=thorough job.

Table 2
Zero-order correlations for all variables in the cross-sectional and longitudinal structural model

	1	2	3	4	5	6	7	8	9	10	11	12
1. Agr	—											
2. Ego	.63**	—										
3. Con	.57**	.70**	—									
4. Econ	-.05	-.04	-.00	—								
5. IQ	.22**	.21**	.24**	-.16**	—							
6. Zagg	-.45**	-.26**	-.32**	.02	-.16**	—						
7. Zhyp	-.47**	-.30**	-.41**	.03	-.14**	.67**	—					
8. Math1	.11**	.15**	.19**	-.30**	.41**	-.09**	-.13**	—				
9. Math2	.16**	.21**	.22**	-.34**	.34**	-.10**	-.13**	.75**	—			
10. Read1	.22**	.33**	.31**	-.15**	.25**	-.12**	-.14**	.49**	.45**	—		
11. Read2	.23**	.32**	.31**	-.15**	.25**	-.07**	-.12**	.45**	.53**	.81**	—	
12. Gender	-.13**	-.10*	-.24**	-.05	.05	.28**	.31**	.03	.07	-.11**	-.08	—
Mean	3.80	3.54	3.11	0.63	0.01	0.27	0.02	101.69	101.34	97.67	98.00	0.52
Std.	0.90	0.82	1.05	0.48	0.98	1.01	1.00	13.42	12.30	17.82	16.57	0.50

Note: N=445. Agr=agreeableness; Ego=ego-resiliency; Con=conscientiousness; Econ=economic adversity; Zagg=aggression; Zhyp=hyperactivity; Math1=time 1 math score; Math2=time 2 math score; Read1=time 1 reading score; Read2=time 2 reading score.

* Correlation is significant at the .05 level (two-tailed).

** Correlation is significant at the .01 level (two-tailed).