

# Stability of resilience in children of adolescent mothers

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## Abstract

The current study examined the stability of resilience in a longitudinal sample of children born to adolescent mothers. Resilience was initially assessed in 106 children at age 5 in terms of intellectual, adaptive behavior, and psychosocial competence. Children's exposure to adversity was based on an index composed of maternal social and psychological functioning. Approximately 68% of the children retained their status as Resilient or Vulnerable when reassessed at age 8. Greater stability was observed for children in contexts characterized by either high or low levels of maternal adversity, in contrast to moderate adversity. Competence at age 8 was dependent upon children's intelligence scores at age 5 and changes in maternal self-esteem and anxiety between the children's ages of 5 and 8. Results suggested the importance of early development for establishing pathways toward resilience during childhood.

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## 1. Introduction

Birth to an adolescent mother often confers a compromised, unstable environment that restricts a child's long-term cognitive and psychosocial development (East & Felice, 1996; Furstenberg, Brooks-Gunn, & Morgan, 1987; Seitz & Apfel, 1993; Spieker, Larsen, Lewis, Killer, & Gilchrist, 1999; Whitman, Borkowski, Keogh, & Weed, 2001). For example, Whitman et al. (2001) reported that only 31% of children born to adolescent mothers in the Notre Dame Adolescent Parenting Project (NDAPP) met age-appropriate expectations for intelligence, adaptive behavior, and psychosocial adjustment at age 5. The current study provided a longitudinal follow-up of the children and mothers from the NDAPP, an on-going longitudinal project that followed a sample of adolescent mothers and their children from the prenatal period through adolescence (Weed, Keogh, & Borkowski, 2000; Whitman et al., 2001). Research reported in the current paper assessed the extent to which children who were classified as resilient at age 5 continued to meet age-appropriate expectations at age 8. Furthermore, both child and maternal characteristics were explored as predictors of changes in resiliency and vulnerability from ages 5 to 8.

### 1.1. Approaches to resilience

Resilience has been investigated from diverse conceptual perspectives. Variable-centered approaches have focused on the trait of ego-resilience, initially identified by Block and Block (1980), who defined it in terms of adaptation to

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changing circumstances and reinforcements, flexible responding to the demands of situations and use of problem-solving strategies. Consistent with trait theories, ego-resilience is assumed to have a biological or genetic basis and to be relatively stable over time (Caspi & Silva, 1995). Q-sort items most characteristic of ego-resilience include self-reliance, confidence, creativity, and approach to novelty. More recent person-centered perspectives have identified patterns of traits within children that allow classification into three major personality types: Resilient, Overcontrolled, and Undercontrolled (Asendorpf & van Aken, 1999; Hart, Atkins, & Fegley, 2003; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). The Resilient type is characterized by general competence across domains, with high scores on items for assertion, verbal expressiveness, energetic, and self-confidence. Children with Resilient personalities also maintain a balance of ego-control, neither Overcontrolled nor Undercontrolled.

In contrast to approaches identifying resilience as a trait or type, the current research does not locate resilience within the personality of the child, but rather as a process that emerges from the dynamic interactions between persons and their environments. This approach was originally promoted by Garmezy, Masten, and Tellegen (1984) and elaborated by Zimmerman and Arunkumar (1994). Resilience as a process refers to positive adaptation despite exposure to significant adversity (Luthar, Cicchetti, & Becker, 2000). From this conceptual viewpoint research designs must specify criteria for positive adaptation, significant adversity, and the dynamic relationships between adversity and adaptation. Resilience therefore does not reside within the person, but rather is an interactive process that occurs between the child and his or her environment that is inferred by the presence of successful outcomes.

### *1.2. Resilience implies competence*

Project Competence explored risk and resilience within the context of a 20-year longitudinal investigation of over 200 children initially interviewed during elementary school (Garmezy et al., 1984; Obradovic, Masten, & Shaffer, 2005). Resilience was defined as competence in the face of adversity. Domains of adult competence included academic, social, vocational, romantic, parenting, conduct, self-concept, and absence of psychopathology. Risk factors were differentiated from the adversity of the environments. Particularly important was young maternal age at first pregnancy, which was identified as a risk factor for a variety of children's outcomes. In addition, intelligence and parenting quality were found to be significant protective factors for children from adverse environments. Specifically, children's intelligence and the quality of parenting moderated the relationship between risk and competence: both variables were related to competence for high-risk children, but were unrelated to competence for children with few risk factors. Support was also obtained for intelligence and parenting quality as mediators between risks and competence.

In contrast to research from Project Competence that analyzed each domain of competence separately, Van Aken (1992) equated general competence to ego-resilience and proposed that domain-specific competencies were manifestations of an underlying personality trait. The dynamic relationships between ego-resilience and competence in achievement and social domains were explored in a longitudinal investigation with children from ages 7 to 12. Structural equation models were unable to substantiate the hypothesized causal influence from ego-resilience to school achievement, although achievement was predictive of later ego-resilience (Van Aken, 1992). Success or failure in domain-specific competencies predicted later ego-resilience, suggesting that domain-specific competencies can have long-term consequences for adaptation to subsequent developmental tasks.

Proponents of domain-specific views of resilience cite evidence of unique relationships between protective factors and resilience in one domain that differ from protective factors in other domains. A behavioral-genetic study of resilience to socioeconomic deprivation concluded that heredity played a larger role in behavioral resilience than in cognitive resilience (Kim-Cohen, Moffitt, Caspi, & Taylor, 2004). Results suggested that genetics accounted for approximately 46% of the variance in cognitive resilience, with additional variance attributed to the provision of stimulating activities within the family. In contrast, approximately 70% of the variation in children's behavioral resilience was attributed to genetic effects.

Although the benefits of domain-specific investigations are clear, other considerations favor conceptualizing resilience as a global process. From an applied perspective, evidence of dysfunction in any one critical domain may be seen as compromising developmental outcomes. If a child exhibits competence in one or more domains of functioning, yet exhibits important vulnerabilities in other equally important domains, then the child remains at-risk (Luthar et al., 2000). For example, Luthar et al. (2000) reported that some adolescents identified as resilient based on academic competence showed evidence of internalizing problems. Similarly, early internalizing problems have been found to be

related to later declines in achievement and cognitive competence (Asendorpf & van Aken, 1999), suggesting that definitions of resilience limited to one domain may not be stable over time.

Support for conceptualizing resilience as a more global process was provided in a 4-year prospective longitudinal study by Brody, Kim, Murry, and Brown (2004). Child competence was defined as a latent construct with significant loadings from teachers' ratings of both academic and social competence. Results from structural equation modeling indicated that this global measure of child competence was predictive of maternal psychological functioning one year later in samples of both older and younger siblings. Brody et al. (2004) used the concept of "basking" to interpret their results. In other words, mothers "basked" in their children's successes, whether social or academic, with evidence of improved maternal self-esteem and lower depression scores. Data from Brody et al. (2004) further indicated that more optimal maternal psychological functioning was significantly associated longitudinally with involved, supportive parenting and ultimately with children's social competence. This process-oriented model suggests that either academic or social competence may evoke positive changes in caregiving environments that serve to further strengthen children's pathways toward resilience.

For the purpose of the current study, competence was conceptualized globally. Children had previously been classified as Resilient or Vulnerable depending on their success in meeting age-appropriate standards in the domains of adaptive behavior, psychosocial adjustment, and intelligence (Whitman et al., 2001). In addition to these domains, academic success in reading was considered critical for the children who were contemporaneously 8-years old. Reading was considered an important developmental task for eight-year-old children; those who have trouble mastering reading at an age-appropriate level may be considered vulnerable to subsequent risks. Children were considered Resilient only if there was no evidence of delay or dysfunction in any of the four domains of development. The focus was person-centered as opposed to variable-centered, with an aim of understanding how children's lives change over time.

### *1.3. Resilience requires adversity*

In contrast to person-centered personality theories, definitions of resilience from a process-oriented approach require that the achievement of competence alone does not constitute resilience. Rather, resilience demands competence in the face of significant stress or adversity. According to Sandler (2001), adversity refers to "a relation between children and their environments that threatens the satisfaction of basic human needs and goals and impedes the accomplishment of age appropriate developmental tasks" (p. 19). Sandler (2001) differentiates adversity from stress: An environment relatively free of stress may still be considered adverse if children are not provided the cognitive resources or social skills needed for competent development. Although adolescent parents are a heterogeneous group, their children are more likely to encounter adversity than children born to adult parents (Furstenberg et al., 1987; Obradovic et al., 2005; Whitman et al., 2001). Adolescent mothers who are cognitively unprepared to parent may be unable to satisfy their children's basic needs or to facilitate their mastery of important developmental tasks, and thus create an adverse learning environment (Whitman et al., 2001).

Weed et al. (2000) previously categorized adolescent mothers from the NDAPP as Resilient or Vulnerable based on an index of maternal functioning. The index was viewed as a continuum with higher scores indicative of maternal competence and lower scores indicative of adversity. The index was based on work by Luthar and Zigler (1991) who suggested resilience should be assessed through social competence. These authors argued for the use of measures that consider success both in meeting societal expectations and in personal development or self-actualization. In this vein, Weed et al. (2000) included four important social outcomes (i.e., high school graduation, continued education, work history, and current job status) and three psychological outcomes (positive self-esteem, low depression, and low anxiety) in their index. The index was not intended to reflect underlying personality constructs, nor high consistency among all of the outcomes. Rather, the construction of the maternal index reflected the variability in possible pathways to success. For instance, employment or continued schooling may be equally important pathways, but doing both while parenting may be counterproductive. Similarly, psychological factors may be related to success in meeting vocational or educational expectations, with depression, anxiety, or low self-esteem acting as barriers to holding down a job or applying the knowledge gained through education to everyday life situations (Weed et al., 2000). However, strengths in two of these areas may compensate for weakness in the third. For example, low depression and high self-esteem may attenuate the negative effects of high anxiety. For these reasons, the index included multiple measures of valued social

outcomes as well as multiple measures of psychological functioning, reflecting the overall configuration of the mothers' lives at any point in time.

Consistent with our person-centered approach to resilience, the maternal index used in the earlier investigation was reapplied in the present study, 8 years after the birth of the first child, as an indicator of the degree of adversity within the caregiving context. Mothers with limited education and job skills and those who were experiencing some degree of psychological disturbance were classified as providing caregiving environments characterized by high adversity (Caspi et al., 2004; Caughy, 1996; Goodman & Gotlib, 1999; Myers & Taylor, 1998; Raver & Leadbeater, 1999; Taylor, Roberts, & Jacobson, 1997; Wyman et al., 1999). At the opposite end of the continuum, adolescent mothers who continued their education, acquired effective job skills, and had positive psychological adjustment were considered to provide caregiving environments characterized by low adversity. Thus, maternal functioning, broadly conceived, was considered an indicator of the degree of adversity to which the children were exposed. The adversity of the environment at age 5 was considered separately from positive or negative changes in maternal adversity as children developed from ages 5 to 8.

#### 1.4. *Stability of resilience during childhood*

Resilience implies age-appropriate adaptation to developmental tasks and may be more salient during times of important developmental transitions (Van Aken, 1992). An early transition in the lives of most children occurs with the advent of schooling. As children are confronted with new demands for school achievement as well as psychosocial expectations, vulnerabilities may emerge in some children whereas other children appear to thrive under these new learning opportunities. For instance, Van Aken (1992) concluded that the trait of ego resiliency at age 7, but not at age 10, was predictive of ego-resiliency at age 12. The saliency of ego-resiliency may be greatest at the beginning of elementary school around age 7, and again at age 12 when the children were preparing for secondary school in Holland (Van Aken, 1992).

Other recent studies of personality development have examined stability and changes in the Resilient personality type. Asendorpf and van Aken (1999) reported a correlation of .44 between German children's Q-factor score for Resilient personality type at age 4 to 6 with their Q-factor score at age 10. However, they reported less congruence in the Resilient, Overcontrolled, or Undercontrolled classifications over time, with many children changing from one type to another. Hart et al. (2003) used data from the *Children of the National Longitudinal Survey of Youth, 1979* data set to conduct secondary analyses on the stability and change of personality types during early childhood. Approximately 3,000 children were classified as Resilient, Overcontrolled, or Undercontrolled types based on maternal reports of temperament at ages 3 and 4, and again at ages 5 and 6. Just under 55% of the children retained their status over the 2-year-period, although close to 65% of the Resilient younger children remained Resilient; less stability was seen in the Undercontrolled personality type. Hart et al. (2003) used an index comprised of four risk factors: poverty, father absence, large family, and poor home environment to explain changes in personality type. Children who were initially classified as Resilient, but who were later reclassified as Undercontrolled were slightly younger, more likely to be African American, have mothers with less educational attainment, and were exposed to level of risk that increased over the two-year period. Stability was related to changes in the total number of risk factors, as opposed to one or more specific indicators of risk (Hart et al., 2003).

The purpose of the current research was to investigate the stability of resilience from age 5 to age 8 in a sample of children born to adolescent mothers. Following the concept of Waddington's (1975) developmental landscape, we anticipated that early challenging experiences compete, accumulate, and initiate pathways toward competence or vulnerability. Waddington's analogy depicts development as a ball rolling down an inclined surface, with a series of binary branching points. At the beginning of development, there is little predictability regarding the trajectory. However, as development proceeds with specific pathways taken at each branching point, trajectories become more firmly entrenched, making deviations more difficult. In this sense, resilience to adversity during the early years establishes a pathway toward competence that is resistant to adversity encountered later in development. However, it is unclear to what extent these developmental pathways have become entrenched by age 5. Deeply ingrained pathways toward positive or negative adaptation will resist diversion by intervening environmental events. Alternatively, changes in the level of adversity between the ages of 5 and 8 may be directly related to children's adaptation and competence if trajectories are less firmly established. These different scenarios have important implications for the timing of interventions designed to prevent developmental delays.

### 1.5. Maternal and child factors related to stability and change in resilience

By the time children enter school at age 5 directional pathways have been initiated. Past research, however, has identified protective factors within the child and the environment that provide opportunities to nudge the trajectory in a more positive direction, or alternatively, to divert initial positive pathways to less optimal outcomes. Much of this research has focused on aspects of the maternal, or caregiving environment. Data from Project Competence, for example, identified the quality of parenting as both moderating and mediating factors between adversity and competence (Obradovic et al., 2005). Similarly, follow-up data of high-risk infants from the Abecedarian Project, who are now entering their young adult years, found that the intervention was most effective for children with supportive home environments (Pungello et al., 2005). In addition, analyses of data from adolescent mothers from the National Longitudinal Study of Youth suggested that children's academic competence and psychosocial adjustment were positively related to emotional support and cognitive stimulation at home and negatively related to poverty, and low maternal self-esteem (Dubow & Luster, 1990). Other research has found that maternal education and the home environment were important predictors of achievement in both mathematics and reading (Caughy, 1996), that maternal negativity toward the child was associated with increases in behavior problems (Caspi et al., 2004), that maternal well-being, caregiver behaviors, and maternal efficacy were related to infant development (Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998), and that maternal self-esteem mediated the effects of family disruption and work stress on parenting behaviors (Taylor et al., 1997).

The parallel continuities hypothesis suggests that stability of personality is associated with concomitant stability in the environment, especially in the parenting or family system (Branje, van Lieshout, & van Aken, 2004; Caspi, 1993). Instability is likely as important changes within the family system trigger changes in personality characteristics, just as unexplained personality changes may trigger changes within the family system. Some instability was expected in the adjustment of the adolescent mothers in the NDPP. For instance, at five years postpartum the majority of mothers were in their early twenties. This is a time when many young people are finishing their education, entering the work force, establishing intimate relationships, and achieving a degree of self-sufficiency. It is likely that adolescent childbearing may have delayed or interrupted this progression for many of the mothers in our project. To the extent that these young mothers were able to successfully negotiate their own developmental transition by meeting societal expectations, accompanied by psychological well-being, concomitant positive adaptation may be expected in their children. Alternatively, maternal psychological distress accompanied by instability in social outcomes may disrupt the processes that underlie children's resiliency.

Protective factors within the child may compensate for the adversity of the caregiving environments provided by mothers who experience psychological distress or who fall short of societal expectations. Children's intelligence has been related to resilience in several studies, including Project Competence (Obradovic et al., 2005), and a New Zealand study of high-risk adolescents (Fergusson & Lynskey, 1996) where intelligence was shown to be an important protective factor in the development of externalizing problems. In addition, Van Aken (1992) reported significant relationships between intelligence and ego-resiliency at age 7, but not at ages 10 or 12. In a later study, Asendorpf and van Aken (1999) found that children with Resilient personalities had higher intelligence scores, were more likely to be at grade level for their age, and had higher cognitive self-esteem than did children with Undercontrolled personality types. Furthermore, children classified as Overcontrolled were similar to Resilient children at younger ages, but showed a pattern of decline on these cognitive variables over time. Van Aken (1992) suggested, "that intelligent children, through, for instance, a higher information processing speed, or clearer and earlier detection of contingencies between behavior and environmental effects, develop clearer expectations about their personal efficacy and therefore become more competent" (p. 277). Although Hart et al. (2003) did not measure intelligence directly, they reported that Undercontrolled preschool children scored significantly lower on the Peabody Picture Vocabulary Test, an assessment often related to verbal intelligence, than children who were classified as Resilient or Overcontrolled.

Children's psychosocial adjustment may also be viewed as an important protective factor in a context of maternal adversity. Personality researchers have suggested a conceptual overlap between personality types and psychosocial adjustment (Robins et al., 1996). Weak empirical support was obtained for the hypothesized associations between the Overcontrolled personality and internalizing problems, and the Undercontrolled personality with externalizing problems (Hart et al., 2003). Asendorpf and van Aken (1999) suggested that characteristics associated with the Overcontrolled personality may undermine competence in achievement and intellectual domains leading to eventual

declines. As an alternative, however, they suggested that the cognitive competence of Overcontrolled children may have been exaggerated due to compliance in the classroom.

Little research has investigated the relationship of adaptive behaviors to resilience. However, the adaptive domain of socialization has received some attention. Using structural equation modeling, Van Aken (1992) reported reciprocal effects between Ego-Resiliency and socialization (as defined by sociometric measures): Ego-Resiliency at age 7 predicted later Social Preference, and, in turn, Social Preference at age 10 was related to Ego-Resiliency at age 12. Other research has also supported the buffering effects of social support in times of adversity (Werner & Smith, 1992).

### 1.6. *Aims of the present study*

The goals of the current research were to (1) examine the stability of resilience between the age of 5 and age 8; (2) explore the moderating effect of maternal adversity on stability; (3) investigate maternal and child variables as predictors of resilience at age 8; and (4) identify maternal and child variables related to change in resiliency status between age 5 and age 8. Criteria for resilience within the current study included the achievement of age-appropriate expectations within the domains of intelligence, psychosocial adjustment, and adaptive behavior. The classification as Resilient or Vulnerable at age 5 represented a history of acquiring knowledge and using that knowledge to solve problems, of adjusting to difficulties without internalizing or externalizing problems, of learning to communicate, of acquiring everyday life skills, and to socialize successfully with peers. These processes that culminated in a classification as Resilient or Vulnerable at age 5 were assumed to exert on-going influences on the developmental trajectories of children. Thus, early individual differences in measured intelligence, adjustment, and adaptive behavior may be directly related to subsequent classification of children as Resilient or Vulnerable. Considerable congruence was expected, with children considered Resilient at age 5 maintaining that status at age 8, and with similar congruence expected for children considered Vulnerable at age 5.

## 2. Method

### 2.1. *Participants*

Primiparous adolescent mothers in the current sample were participants in the Notre Dame Adolescent Parenting Project (NDAPP), an ongoing longitudinal study (Whitman et al., 2001). The majority of the participants (81%) were from a moderate-sized town in the Midwest, with a smaller subsample (19%) from a rural community in the Southeast. Most (68%) of the sample was African American, with 8.5% Mexican American, and the remaining 23.6% European American. Over one-half of the children were male (54.7%). The average age of the adolescent mothers was 17.1 ( $SD = 1.27$ ) years, with a range from 14 to 19.5, when their first child was born. Further demographic information about the current sample at the time of the 5- and 8-year assessments is provided in Table 1. Eight-year follow-up data were available for 109 of the 143 dyads (76%), who remained in the sample at the time of the five-year follow-up. Due to missing data on some of the measures, current analyses are based on 106 dyads with complete data.

Mothers who remained in the study were not significantly different from those who dropped out on any of the demographic variables, including recruitment site. Although African Americans and Mexican Americans were retained at somewhat higher rates (79% and 100%) than European Americans (69%), the differences only approached significance,  $\chi^2(2, n = 137) = 4.18, p < .15$ . Attrition was also unrelated to maternal adversity or to children's classification at age 5.

### 2.2. *Procedure*

All participants were seen in a university laboratory setting when their children were 5 and 8 years of age. Mothers and children participated in several joint activities, and were subsequently interviewed separately. Mothers completed a life history questionnaire, a measure of social support, and several measures of psychosocial adjustment. Children completed a variety of cognitive and achievement tests. The sessions lasted approximately 3 hours and mothers were paid for their participation. Children received a small gift for their participation.

Table 1  
Demographic characteristics of early childbearers

Characteristic	5 years post partum (%)	8 years post partum (%)
Marital status		
Single	74.53	52.38
Married/cohabiting	16.98	33.34
Divorced/separated	8.49	14.28
Number of children		
1 child	24.53	17.14
2 or 3 children	68.87	62.85
4 or 5 children <sup>a</sup>	6.60	20.0
Socioeconomic status		
Working class or higher	14.29	19.05
Upper low class	21.90	28.57
Low class	29.52	32.38
Lowest class	34.29	20.00
Educational attainment		
8–11	36.19	24.76
12	42.86	54.29
Some college	20.95	20.95
Age of child in months	61 (58–77)	97 (92–107)

<sup>a</sup> Only 1 mother had 5 children.

### 2.3. Measures

#### 2.3.1. Child measures

Competence at ages 5 and 8 was assessed by performance in the domains of intelligence, adaptive behavior, and psychosocial adjustment. Reading skills were included at the 8-year assessment. Age-appropriate expectations were considered as scores within one standard deviation of the mean. All measures used to assess child competence were standardized instruments with demonstrated reliability and validity. Each measure represents a composite score of 2 or more subtests or subscales. Sex differences and differences in children from the 2 recruitment sites were examined with *t*-test analyses. Meaningful differences ( $p < .1$ ) were not found, except as indicated. Specific measures of each construct are described below.

**2.3.1.1. Intelligence.** The Stanford–Binet Intelligence Scale, Form L–M (Terman & Merrill, 1972) was administered at 5 years of age. A shortened form of the Wechsler Intelligence Scale for Children–Third Edition (WISC–III) was employed when the children were assessed at 8 years of age (Wechsler, 1991). Four subtests were administered, including Picture Completion, Information, Block Design, and Vocabulary. According to Sattler (1992), performance on this shortened form correlates .94 with the complete WISC–III. Cronbach’s alpha for the 4 subscales within the current sample was .76. Both the Stanford–Binet and the WISC–III are standardized tests with an average score of 100, and standard deviations of 15 (WISC–III) or 16 (S–B). Close to 35% ( $n = 37$ ) of the 5-year-old children and 44% ( $n = 47$ ) of the 8-year-old children scored less than 1 standard deviation below the mean on the intelligence assessments, with 26.4% ( $n = 28$ ) performing below this criteria at both assessment periods.

**2.3.1.2. Adaptive behavior.** The Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984) was used to assess adaptive skills in 3 areas: Communication (receptive, expressive, and written), Daily Living (personal, domestic, and community), and Socialization (interpersonal relationships, play and leisure time, and coping skills). The Vineland scale was completed through a structured interview process with the mother. Scores are standardized to a mean of 100 and a standard deviation of 15. Split-half reliabilities have been reported to be .89 for Communication, .90 for Daily Living Skills, and .86 for Socialization. Cronbach’s alpha for the Communication, Daily Living, and Socialization domains within the current sample was .66 at age 5 and .70 at age 8.

Average scores for the current sample were close to 1 standard deviation below the mean at age 5 and well below 1 standard deviation below the mean at age 8. Further, children in the Southeast received significantly lower scores,  $M(SD) = 80.90(9.38)$ , than children in the Midwest,  $M(SD) = 86.87(10.56)$ , at the 5-year-assessment,  $t(104) = 2.50, p < .05$ .

Approximately 42% ( $n = 45$ ) of children at 5 years and 75% ( $n = 80$ ) at 8 years scored less than 1 standard deviation below the mean, with close to 36% ( $n = 38$ ) scoring below this cutoff at both assessment periods.

The low average scores for both groups were attributed to both changing family and cultural norms, and to inaccurate expectations of adolescent mothers. For example, few families actually set the table for dinner, preferring instead to fix dinner plates from pots and pans left in the kitchen. In addition, many children elected electronic and video games rather than board or card games. The Vineland has been recently revised to reflect these cultural changes, with updated tasks and daily living skills more in tune with current societal expectations (Sparrow, Cicchitti, & Balla, 2005). Prior research with adolescent mothers has also reported less accurate expectations for behavior when compared with adult mothers (Whitman et al., 2001). In order to avoid these extremely low adaptive behavior scores from exerting an undue negative influence on the resiliency status of older children, age 8 scores were adjusted close to the mean of the 5-year scores by adding 10 points to all children's scores. Following this adjustment, 32% ( $n = 34$ ) of the children still did not score within 1 standard deviation of the mean.

*2.3.1.3. Psychosocial adjustment.* The Total Problems score from the Child Behavior Checklist (CBCL; Achenbach, 1991) was employed to assess psychosocial adjustment. Mothers rated each of approximately 100 items on the checklist as not true, sometimes true, or often true of their children. *T*-scores were utilized for data analysis. *T*-scores of 60 or greater indicate behavior problems in the clinical range. Girls' scores,  $M(SD) = 55.85(8.84)$ , tended to be higher than boys' scores,  $M(SD) = 52.62(8.74)$ , although the difference only approached significance,  $t(104) = -1.88, p = .06$ . Over 27% ( $n = 29$ ) of the 5-year-old children and 24.5% ( $n = 26$ ) of the 8-year-old children had scores above the clinical cutoff of 60, with 14.15% ( $n = 15$ ) above the clinical cutoff at both assessment periods. Cronbach's alpha was reported to be .96 for Total Problems (Achenbach, 1991). The relatively small number of participants compared to the number of items on this assessment prohibits computation of accurate within-sample alpha reliability.

*2.3.1.4. Reading.* Standardized scores from the Peabody Individual Achievement Test–Revised for Total Reading (Markwardt, 1989) were used to assess children's reading level at age 8. Total Reading included Reading Recognition, or the child's ability to pronounce words at an age-appropriate level, and Reading Comprehension. To test reading comprehension the child was given up to 81 individual sentences to read, and then was required to select 1 of 4 pictures that best matched each sentence. Scores were standardized with a mean of 100 and standard deviation of 15. The reliability estimate, based on Item Response Theory, was reported to be .98 for Total Reading scores (Markwardt, 1989). The alpha reliability of Reading Recognition and Reading Comprehension within the current sample was .93. Just under 54% ( $n = 57$ ) of the current sample scored less than 1 standard deviation below the mean on Total Reading.

*2.3.1.5. Resiliency status.* Resiliency was operationally defined as success in meeting age-appropriate expectations in socially valued domains. Three domains were considered in the classification of the 5-year-old children as Resilient: intelligence, adaptive behavior, and psychosocial adjustment. Children who scored within one standard deviation of the mean of 100 (i.e., over 84) on both intelligence and adaptive behavior and below the borderline-clinical cutoff on psychosocial adjustment (*T*-scores less than 60) were considered Resilient, whereas children who failed to meet any one of these three criterion were considered Vulnerable. Vulnerability was assigned based on both current failure in meeting critical age-appropriate expectations, and due to the potential for this single important deficit to influence more general functioning in the future (Van Aken, 1992). The same three indicators used to assess resiliency at age 5 were also considered at age 8: intelligence, adaptive behavior, and psychosocial adjustment. Reading was also included as an important criterion of resilience at age eight. Inability to read at age-appropriate levels during elementary school represents an important vulnerability for subsequent achievement and for self-concept (Chapman, Tunmer, & Prochnow, 2000). Therefore, children who met age-appropriate expectations in all 4 areas were considered Resilient at age 8. One-fourth of the 8-year-old children met these criteria and were considered Resilient.

### *2.3.2. Maternal measures*

A Maternal Adversity Index was created when children were 5 and again at age 8. The index was comprised of seven socially desirable outcomes and psychological functioning, with 1 point representing adversity within each outcome (Weed et al., 2000). The potential range of scores was 0 (indicating no adverse outcomes) to 7 (indicating adversity in all 7 areas). Educational attainment and vocational success are socially desirable outcomes that signify

adult status and are important for self-sufficiency. Adversity was indicated by lack of a high school degree (1 point), by lack of current progress toward further educational attainment (1 point), by current unemployment status (1 point) and by an inconsistent employment history (1 point). Table 2 contains the criterion for each outcome.

**2.3.2.1. Depression.** The Beck Depression Inventory was used to assess the extent of depressive symptoms (Beck, 1987). This self-report inventory included 21 sets of items from which the mothers selected the one that best fit how they felt during the past week. High scores indicated more serious depression. A score of 13 or more signified moderate to severe depression, and was used as the criterion for adversity (1 point). Coefficient alpha for non-clinical samples was reported to be .81 (Beck, 1987).

**2.3.2.2. Self-esteem.** Self-esteem was assessed with the adult form of the Coopersmith (1981) Self-Esteem Scale. Mothers rated each of 25 statements as “like me” or “unlike me”. Items indicating high self-esteem were totaled, with higher scores indicative of higher self-esteem. Scores of 14 or less were considered adverse (1 point). Internal consistency reliabilities were reported to be between .71 and .74 in college samples (Coopersmith, 1981).

**2.3.2.3. Anxiety.** The State-Trait Anxiety Inventory (Spielberger, 1983) is a self-report measure consisting of 40 brief items, 20 to assess how the individual feels right now (state anxiety) and 20 items to assess how the individual generally feels (trait anxiety). Each item was rated on a 4-point-scale. Higher scores signify higher anxiety levels. A score of 43 or above on the trait subscale was used as an indicator of adversity (1 point).

Interrelationships and descriptive statistics for all measures used to construct the Maternal Adversity Index are shown in Table 3. The three measures of psychological functioning were moderately correlated at both the 5- and 8-year assessments (all  $r$ 's between .50 and .70). Educational attainment and work history were also moderately correlated at each time point ( $r$ 's between .30 and .45). Concurrent relationships between measures of psychological functioning with social outcomes were generally weak or nonsignificant. However, depression at 8 years postpartum was significantly and negatively related to earlier work status ( $r = -.25$ ) and educational attainment ( $r = -.27$ ). Self-esteem at 8 years postpartum was significantly related to both months of employment ( $r = .19$ ), and educational attainment ( $r = .21$ ) at the time of the 5-year assessment.

**2.3.2.4. Maternal adversity.** Mothers were divided into 3 groups, based on the degree to which they had obtained outcomes considered important to enable children's cognitive and social development. Classification considered both social and psychological outcomes (Luthar & Zigler, 1991). Mothers who received less than 4 points were classified as Low Adversity ( $n = 41$  at 5-years and  $n = 49$  at 8-years). This score indicated that the young mothers had to be working or furthering their education, or both, and had to have healthy scores on at least 1 of the psychological outcomes. Mothers receiving more than 4 points were categorized as High Adversity ( $n = 41$  at 5 years and  $n = 36$  at 8 years). To receive more than 4 points mothers had to have problems in both the social and psychological areas. For example, one mother may have evidence of depression, anxiety, and low self-esteem (3 points), plus at least 2 points based on lack of schooling and sporadic work history. Alternatively, another mother may have 4 points based on lack of schooling and sporadic work history, but would still have to score high in 1 of the 3 psychological areas to be classified as High Adversity. Mothers who received exactly 4 points were classed as Moderate Adversity ( $n = 24$  at 5 years and  $n = 21$  at

Table 2  
Maternal Adversity Index

Social outcomes	Criterion
1. High school graduation	Less than 12th grade; no G.E.D.
2. Current educational status	Not attending high school, technical or regular college, or certification program
3. Job status	Current unemployment
4. Employment history	Any combination (not necessarily consecutive) of full or part-time employment spanning less than 30 months at 5 year and 48 months at the 8 year assessment
Psychological functioning	
5. Self-esteem	A score 14 or below on Coopersmith's (1981) Self-esteem Inventory
6. Depression	A score of 13 or higher on the Beck (1987) Depression Inventory indicating moderate to severe depression
7. Anxiety	A score of 43 or higher on the trait subscale of the State-Trait Anxiety Index (Spielberger, 1983)

Note. One point was awarded for each adverse outcome.

Table 3  
Intercorrelations and descriptive statistics of items comprising the Maternal Adversity Index

5-year variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Working														
2. Months worked	.43***													
3. In school	.11	.09												
4. Ed. attainment	.24*	.33***	.18											
5. Dep.	-.09	-.04	-.25**	-.15										
6. Self-esteem	.10	.26**	.11	.10	-.53***									
7. Trait anxiety	-.03	-.10	-.10	-.18	.63***	-.55***								
8 year variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8. Working	.45***	.27**	.29**	.18	-.11	.05	-.01							
9. Months worked	.51***	.82***	.13	.38***	-.02	.18	.06	.46***						
10. In school	-.00	-.02	.01	.10	-.07	.05	-.19*	.19*	.08					
11. Ed. attainment	.28**	.36***	.10	.82***	-.07	.11	-.17	.17	.46***	.14				
12. Dep.	-.25*	-.11	-.10	-.27**	.19	-.19	.18	-.12	-.04	.02	-.23*			
13. Self-esteem	.17	.21*	-.03	.21*	-.23*	.50***	-.28**	.10	.17	-.04	.21*	-.51***		
14. Trait anxiety	-.10	-.11	.08	-.09	.13	-.23*	.28**	-.03	-.01	-.02	-.01	.68***	-.67***	
<i>M</i>	.51	27.32	.18	11.72	8.25	17.28	37.46	.59	48.17	.15	11.92	9.53	17.56	36.30
<i>SD</i>	.50	23.97	.39	1.42	6.71	4.15	9.53	.49	29.37	.36	1.34	7.83	4.19	10.35
Range	0–1	0–60	0–1	8–15	0–37	4–24	20–73	0–1	0–96	0–1	8–16	0–37	6–25	20–67

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

8 years). All analyses were based on these 3 summary classifications, with High Adversity (HA) coded as 3, Moderate Adversity (MA) coded as 2, and Low Adversity (LA) coded as 1. Consistent with Hart et al. (2003), change in maternal adversity between ages 5 and 8 was determined by subtracting the adversity rating obtained at age 5 (1, 2 or 3) from that obtained at age 8 (1, 2 or 3).

### 3. Results

#### 3.1. Preliminary analyses and descriptive statistics

Descriptive statistics and intercorrelations between predictor and outcome variables at the 5- and 8-year assessments are presented in Table 4. The pattern of intercorrelations was similar at both time periods. Intelligence was moderately intercorrelated with adaptive behavior, but unrelated to psychosocial adjustment. Psychosocial adjustment was intercorrelated with adaptive behavior at age 5, with the relationship approaching significance at age 8. At age 8, reading was strongly correlated with intelligence and, more moderately, with adaptive behavior. Maternal adversity was significantly correlated with all child outcomes except for intelligence at age 8, with the strength of the correlations being somewhat weak. Stability coefficients between constructs measured at age 5 and again at age 8 showed moderate stability, with all correlations between .49 and .70.

#### 3.2. Stability of resilience

Chi-square analyses were used to assess stability in children's Resilient or Vulnerable status from ages 5 to 8. Significant congruence was found, with 68% of the children maintaining the same status over time ( $\chi^2[1, n = 106] = 8.31, p < .01$ ). Changes in status were more likely in a negative direction, with 60% of the 40 children who were classified as Resilient at age 5 reclassified as Vulnerable at age 8. In contrast, only 15.2% of the 66 Vulnerable children were considered Resilient at age 8.

Since the Vulnerable status included children with competences in some domains, a Child Resilience Index (CRI) was established to more fully explore stability. The Index was based on the number of domains in which the children met age-appropriate expectations. At age 5, the CRI ranged from 0 (failed to meet expectations in any domain) to a high of 3 (met expectations in all 3 domains). Close to 38% of the 5-year-old children received a CRI = 3 (meeting the criteria for resilience) by achieving age-appropriate scores on intelligence and adaptive behavior assessments, with no evidence of psychosocial adjustment problems. Approximately 26% of the children received a CRI = 2, with evidence of problems in only one domain, evenly distributed among the domains of intelligence, adaptive behavior, and psychosocial adjustment. Of those children with a CRI = 1 (29%), indicating problems in two domains, the most frequent combination was failure to meet expectations in both intelligence

Table 4  
Intercorrelations and descriptive statistics of five-year predictor variables and eight-year outcomes

	5 year				8 year				
	1	2	3	4	5	6	7	8	9
5 year variables									
1. Intelligence									
2. Adp. behavior	.45***								
3. Adjustment	-.12	-.28**							
4. Mat. adversity	-.29**	-.22*	.25**						
8 year variables									
5. Intelligence	.69***	.32***	-.10	-.22*					
6. Adp. behavior	.53***	.49***	-.19	-.22*	.47***				
7. Adjustment	-.08	-.23*	.62***	.12	-.06	-.18			
8. Reading	.60***	.28**	-.05	-.13	.61***	.46***	-.05		
9. Mat. adversity	-.23*	-.24*	.34***	.51***	-.15	-.29**	.25*	-.21*	
<i>M</i>	88.11	85.74	54.08	2.00	87.25	78.72	53.28	87.46	1.88
<i>SD</i>	14.33	9.85	8.90	.88	15.18	9.67	9.36	17.42	.89
Range	38–125	60–116	34–75	1–3	56–124	58–111	32–73	55–131	1–3

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

and adaptive behavior, with adequate psychosocial adjustment (58% of those with a CRI of 1). Approximately 29% of children with a CRI = 1 had average intelligence scores, but low adaptive behavior and significant psychosocial problems. The remaining 13% of children with a CRI = 1 scored low in both intelligence and psychosocial adjustment, but their adaptive behavior was typical for their age. Finally, 6.6% of the children failed to meet expectations in all three domains, resulting in a CRI = 0.

At age eight, 25% of the children met age-appropriate expectations in all four domains of intelligence, adaptive behavior, psychosocial adjustment, and reading and received a CRI = 4, indicating resilience. Approximately 30% of the children had a CRI = 3, with 44% of these falling below one standard deviation in reading, but demonstrating competence in the other three areas. Approximately 28% had low intelligence scores only, and 22% exhibited behavioral problems; only 6% of the children failed to meet the adjusted standard for adaptive behavior. Just under 18% received a CRI = 2, with approximately 53% of these falling below one standard deviation in both reading and intelligence. Approximately 21% of the children had a CRI = 1 indicating problems in three areas, and 7% failed to meet expectations in any of the four domains, resulting in a CRI = 0. Table 5 contains the cross-classification of children's CRI score at age 5 with their CRI score at age 8. Significant congruence was obtained using both chi-square analyses,  $\chi^2(12, n = 106) = 45.08, p < .001$ , and Spearman's correlation,  $r_s = .51, p < .0001$ . Just under 80% of children at age 8 scored within one point of their 5-year score. Furthermore, none of the 5-year-old children with CRI = 0 met expectations in more than two domains at age 8. In addition, none of the Resilient children with CRI scores = 3 at age 5 failed to meet expectations in all domains at age 8.

### 3.3. Moderating effect of maternal adversity

Despite the overall stability of resilience between ages 5 and 8 years, approximately 9.4% of the children showed positive changes and were reclassified as Resilient at age 8, and 22.6% showed evidence of decline from resiliency at 5 to vulnerability at 8. Maternal adversity at age 5 was hypothesized to moderate the stability of resilience, with greater stability expected for children exposed to either High Adversity (HA) environments or Low Adversity (LA) environments. In contrast, less stability was expected for environments characterized by Moderate Adversity (MA).

Separate analyses were conducted between resiliency status at ages 5 and 8 for each of the three adversity classifications. Fig. 1 shows children's resiliency status at age 8 as a function of children's status at age 5 and of the degree of maternal adversity. The two leftmost bars of Fig. 1 represent the number of 5-year-old children in High Adversity (HA) environments, with the shorter bar representing Resilient children (22%) from HA environments and the taller bar representing Vulnerable children (78%). The division within the bars shows the number of children who retained their original status compared to those who were subsequently reclassified. As shown in Fig. 1, significant stability was achieved for HA children with 78% congruent in resiliency status at ages 5 and 8,  $\chi^2(1, n = 41) = 4.56, p < .05$ . Although much of this stability was accounted for by children retaining their Vulnerable status, 12.5% of Vulnerable children in HA environments improved their status, and 44.4% of Resilient 5-year-olds maintained their Resilient status. Correlational analysis confirmed the stability of the CRI between ages 5 and 8 for children in HA environments,  $r_s = .52, p < .001$ .

The two rightmost bars in Fig. 1 represent children from Low Adversity (LA) environments. Slightly more of these children were classified as Resilient (54%) than Vulnerable (46%). However, 63% were stable in their resiliency classification,  $\chi^2(1, n = 41) = 4.14, p < .05$ . Negative change was observed even with a more supportive maternal environment, with only 45% of the Resilient 5-year-old children maintaining the same status at age 8. Spearman

Table 5  
Number of children in each resilience category based on Child Resilience Index (CRI) at ages 5 and 8

CRI at age 5	CRI at age 8					Total
	0	1	2	3	4	
0	2	2	3	0	0	7
1	3	12	10	3	3	31
2	2	4	1	14	7	28
3	0	4	5	15	16	40
Total	7	22	19	32	26	106

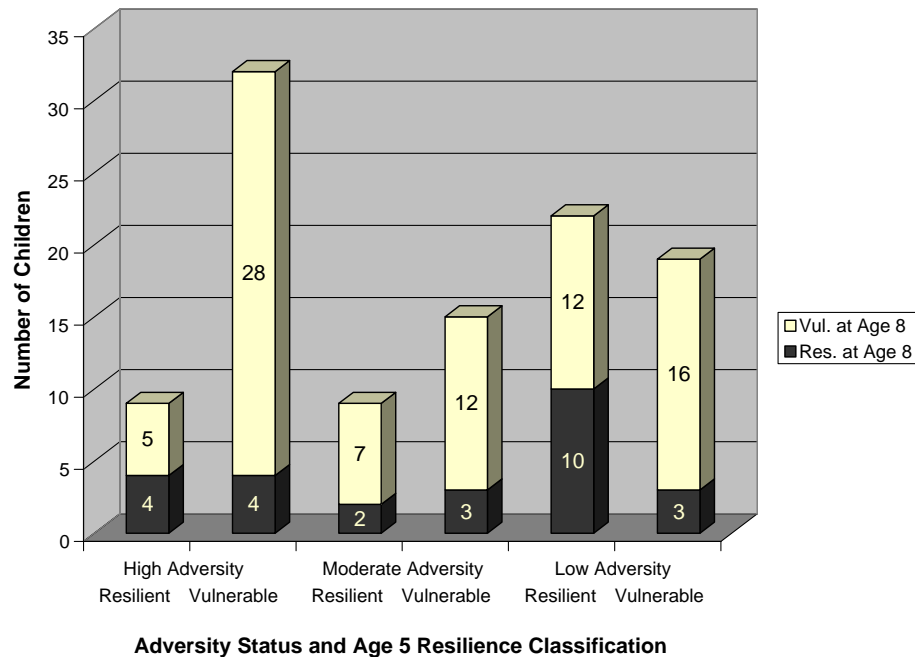


Fig. 1. Stability of resilience: Number of children classified as Resilient and as Vulnerable at age 8 as a function of age 5 resilience status and of maternal adversity.

correlations, using the CRI at ages 5 and 8, confirmed overall stability,  $r_s = .53, p < .001$ . As shown in the two middle bars of Fig. 1, significant stability was not found for children in Moderate Adversity (MA) environments, with most of the children considered Vulnerable at age 8.

#### 3.4. Maternal and child predictors of competence

Logistic regression analysis was used to explore the associations between maternal and child predictors at age 5 with resiliency status at age 8. Possible childhood predictors of resiliency status included intelligence, adaptive behavior, and psychosocial adjustment. Change in level of maternal adversity was included as a maternal predictor. Consistency in level of maternal adversity was observed for 61% of the sample, positive change was observed in 24%, and negative change in 15%. Logistic regression with a forward stepwise process selected the variables significantly related to resiliency status at age 8, based on the maximum-likelihood method of estimating parameters of the predictor variables. Table 6 contains means and standard deviations for Resilient and Vulnerable children on each of the predictor variables, Wald  $\chi^2$ , and the odds ratio associated with the significant predictors.

Children's intelligence scores were selected in the first step, accounting for approximately 36% of the variance in resiliency status at age 8 (max  $r^2$  rescaled = .36). With only intelligence in the model, 81% of the children were correctly classified as Resilient or Vulnerable at age 8. Change in maternal adversity was entered during the second step and increased the amount of variance accounted for by approximately 6% (max  $r^2$  rescaled = .42). Prediction accuracy increased to 85%. Neither adaptive behavior nor psychosocial adjustment at age 5 was significantly related to resiliency status at age 8. Logistic regression also provided odds ratios to estimate the strength of the relationship of each predictor variables to the outcome (see Table 6). The odds ratio for intelligence at age 5 suggests that an increase of 1 point on the WISC-III increased the likelihood of resiliency by 1.13 times. The odds ratio for change in maternal adversity indicated that a change in classification from MA to HA (or from LA to MA), was associated with a .45 reduction in the likelihood of resiliency.

In order to more fully understand the contributions of each variable comprising the Maternal Adversity Index, an expanded logistic regression analysis was conducted with changes in the three psychological measures entered separately, along with changes in educational attainment, and the number of months employed between the assessment periods. As documented in the bottom half of Table 6, changes in both self-esteem and level of anxiety

Table 6  
Mean (and *SD*) of predictor variables used in logistic regression analysis of resiliency status at age 8 with Wald  $\chi^2$ , and odds ratios of significant predictors

Maternal and child predictors	Resilient ( <i>n</i> = 26)	Vulnerable ( <i>n</i> = 80)	Wald $\chi^2$	Odds ratio with 95% conf limits
Intelligence at 5	100.15 (11.55)	84.20 (12.95)	19.36***	1.14, 1.07–1.20
Adaptive behavior at 5	90.08 (8.47)	84.34 (9.90)	.82	
Psychosocial adjustment at 5	51.34 (6.33)	54.97 (9.45)	2.19	
Change in maternal adversity	-.35 (.74)	.05 (.91)	5.26*	.45, .22–.89
Model with expanded maternal predictors				
Intelligence at 5	100.15 (11.55)	84.20 (12.95)	19.06***	1.14, 1.07–1.21
Change in depression	-.08 (5.74)	1.50 (10.05)	.25	
Change in anxiety	-2.65 (6.34)	-.66 (13.00)	4.55*	1.10, 1.01–1.20
Change in self-esteem	2.31 (3.33)	-.39 (4.19)	9.44**	1.48, 1.15–1.89
Grades attained	.08 (.63)	.26 (.87)	.00	
Months worked	26.46 (14.74)	21.78 (17.50)	.04	

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

were related to children's resiliency status at age 8, after controlling for the effects of intelligence. The 3-variable model accounted for just under 50% of the variance in 8-year resiliency status (max  $r^2$  rescaled = .49), with a prediction accuracy of 88%.

### 3.5. Children with discordant resiliency status

Approximately 29% of the children changed their resiliency status between the ages of 5 and 8. Subsamples of children with discordant resiliency classifications were too small for valid logistic regression analyses. Therefore, in order to explore predictors of change, *t*-tests were conducted separately for the subsample of children classified as Resilient ( $n = 40$ ), and as Vulnerable ( $n = 66$ ) at age 5. Children's intelligence, adaptive behavior, and psychosocial adjustment scores at age 5 as well as the five variables extracted from the Maternal Adversity Index were examined as predictors of instability; significance levels were adjusted downward to the .01 level due to the number of separate analyses.

Of the 40 children classified as Resilient at age five years, 24 had significant problems in one or more areas of development by age 8 and were subsequently reclassified as Vulnerable. Children who were reclassified as Vulnerable at age 8 had significantly lower intelligence scores at age 5 than those who remained classified as Resilient [ $t(38) = 3.92, p < .001; M(SD) = 92.1 (7.2)$  versus  $M(SD) = 102.9 (10.3)$ , respectively], and mothers whose level of self-esteem declined over time,  $t(38) = 2.68, p = .01; M(SD) = -.96 (4.3)$ . In contrast, children who retained their Resilient status had mothers whose level of self-esteem increased,  $M(SD) = 2.49 (3.4)$ .

Fifty-six of the 66 children classified as Vulnerable at age 5 retained their Vulnerable status 3 years later. Analyses indicated that intelligence scores at age 5 were the only significant predictor of 8-year resiliency status,  $t(64) = 3.26, p < .01, M(SD) = 80.8 (13.4)$  versus  $M(SD) = 95.7 (12.6)$ , respectively.

## 4. Discussion

Resilience, defined as general competence within the context of adversity, was relatively stable from age 5 to age 8 in an at-risk sample of children born to adolescent mothers. Few children who exhibited vulnerability in one or more critical domain at age 5 altered the trajectories in a more positive direction. Less stability was observed for children initially considered Resilient: only 40% of these children were able to maintain their positive developmental trajectories. These results are supportive of past research suggesting children born to adolescent mothers are more likely than children of adult mothers to have trouble meeting age appropriate expectations in cognitive, academic, and psychosocial domains (Dubow & Luster, 1990; Furstenberg et al., 1987). A major objective of the current research was to further the understanding of problems and strengths within families of adolescent mothers that would provide directions for optimizing developmental outcomes.

The effectiveness of early intervention in the lives of at-risk children has been substantiated by a growing body of research (Ramey & Ramey, 1998). Unfortunately, however, many children who may have benefitted from early

intervention do not receive services until the risks are transformed into specific academic or behavioral problems that often surface once children begin formal schooling around age 5. Our results indicated that only 15% of the children who were experiencing problems in at least one critical domain of functioning at the start of schooling had met age-appropriate expectations in cognitive, academic, and psychosocial domains by age 8, and that many who had begun school with adequate levels of competence showed marked deficiencies over the early elementary years. More targeted interventions during the early school years may be critical to maintain competencies of Resilient children and to overcome the initial vulnerabilities of other children. Our results suggest changes in the psychological functioning of mothers during this time period have important consequences for children's Resilience, and may be important targets of intervention efforts.

Maternal adversity, defined by deficits in desirable social outcomes such as educational and vocational success and by psychological vulnerability, was related to children's resilience in three important ways. First, the percentage of children identified as Resilient at age 5 was dependent on level of adversity. In environments characterized by high maternal adversity—including anxiety, depression, or low self-esteem and limited educational or occupational successes—only 22% of the children were Resilient. In contrast, the percentage of Resilient children rose to over 53% in environments characterized by low maternal adversity. Second, maternal adversity at the child's age 5 moderated the stability of resilience: Five-year-old children who demonstrated competence in important domains, despite high adversity, were more likely to continue to be Resilient. Children in environments with minimal adversity also generally maintained their status. However, few Vulnerable 5-year-olds were able to use the advantages of maternal competence to improve their status to Resilient. Changes in resiliency status were more likely in environments characterized by moderate adversity: Mothers in this category showed competence in some aspects of their lives, yet important deficits in others. For instance, some may have had occupational or educational success, yet were depressed or anxious. Others had little depression or anxiety, but were unable to hold a job. Perhaps mothers in the Moderate group, whose lives were bordering on competence or adversity, were more likely to be influenced by their children's successes and failures outside the home, taking credit for their academic successes or feeling the blame for educational or behavioral problems.

The third role of maternal adversity in children's resilience related to the observed changes over time. A close examination of changes in maternal adversity suggested that many adolescent mothers were able to provide less adverse environments as they became adults. Maternal psychological functioning generally improved, along with educational and occupational successes. Over 40% of mothers from the High Adversity group improved their functioning, with close to 22% being reclassified as Low Adversity at the time of the 8-year assessment. In contrast, only 33% of mothers in the Moderate Adversity group improved, whereas 29% regressed. Although a few of the mothers in the Low Adversity group regressed, 78% maintained a supportive environment. Moreover, change in maternal adversity was an important predictor of eight-year resilience: Children were unlikely to maintain resilience with declines in maternal psychological functioning. These results support the parallel continuities hypothesis (Branje et al., 2004; Caspi, 1993), suggesting that stability of functioning is associated with stability of family environments, and conversely, changes in the family system are likely to create instability in individual functioning. Results also suggest potential benefits to be gained by interventions that provide support to mothers as their children begin formal schooling.

Among the indicators of maternal social and psychological functioning, positive change in self-esteem was the best predictor of continued resiliency in children. Anecdotal reports from adolescent mothers suggest that adult family members, educators, and other social services workers they are involved with often questioned the mother's competence. These negative perceptions may serve to undermine self-esteem. An ongoing challenge for providers of service to adolescent mothers and their children is to ensure needs are met while enhancing feelings of self-efficacy among the young mothers. However, due to the small number of children with discordant resiliency classifications, our analyses did not have sufficient power to determine the direction of causality. It is possible that increased maternal self-esteem altered the quality of mother-child interactions, thus providing environments favorable for resilience. This interpretation is supported by research by Taylor et al. (1997), who concluded that maternal self-esteem was positively associated with mothers' acceptance of African American adolescents and negatively associated with firm control. In addition, self-esteem mediated the effects of family disruption and work stress on parenting. In contrast, depression was unrelated to individual differences in parenting practices (Taylor et al., 1997). An alternative explanation for the association between maternal self-esteem and resilience, however, suggests that the self-esteem of some mothers may have improved due to their children's demonstrated competence.

Intelligence at age 5 was the strongest predictor of children's resilience three years later. Although adaptive behavior and psychosocial competence were included along with intelligence to initially classify children as Resilient or Vulnerable, intelligence was the only child factor that accounted for unique variance in their 8-year status. Sandler (2001) conceived of adversity as threats to children's basic needs and goals and barriers to achieving competence, suggesting that resilience operates through changes in the quality of adverse environments. From this perspective, children with higher levels of intelligence may be better able to overcome barriers to development to fulfill their needs and achieve competence. Children's intelligence allows them to achieve resilience by altering the adverse nature of their environments. For instance, teachers may provide more stimulating environments to children who show early signs of learning competence. Moss and St-Laurent (2001), for example, have shown that teachers encourage the development of metacognitive skills among children who show signs of satisfactory adjustment during preschool. An alternative explanation linking intelligence to resilience has been offered by Brody et al. (2004): Maternal psychological functioning may depend on children's intelligence or academic achievements, especially if they attribute their children's successes or failures to their own efforts. Children's school success may also motivate mothers to resume their own education. To the extent that caregiving environments are actually altered, children's intelligence not only protects them from concurrent adversities but may also contribute to the emergence of more enriching home and school environments.

The emphasis on intelligence does not imply a belief that either intelligence or resilience is a constitutional or genetic characteristic. Previous research has suggested that maternal cognitive readiness for parenting during the prenatal period at least partially mediated the relationship between maternal and child intelligence (Whitman et al., 2001): Adolescent mothers with higher levels of intelligence tended to be more cognitively ready to assume their maternal roles. These young mothers had more accurate expectations for their children's development, more knowledge about developmental needs, and more adaptive attitudes about their maternal role and responsibilities. Adolescent mothers who were more cognitively prepared were more likely to satisfy their infants' basic needs and to facilitate the development of their early competencies. Provision of verbal stimulation and encouragement of exploratory activities likely supported early intellectual development, setting the stage for a positive trajectory into resilience (Ramey & Ramey, 1998). Children who begin schooling at age 5 without this intellectual advantage may need more specialized learning opportunities that would allow them to acquire the cognitive tools to overcome deficiencies within their home environments.

In terms of Waddington's (1975) developmental landscape, the overall stability of resilience suggests some entrenchment by age 5 that is resistant to outside forces. The stability appears to be closely aligned to children's assessed intelligence and to consistency within mothers' lives. Intelligent children are likely to make better choices when given the opportunity, to solve problems within and outside of the home, to understand reinforcement contingencies, and to evoke more favorable responses. Despite the general stability associated with the resiliency process, positive and negative deviations from developmental pathways were related to corresponding changes in assessed intelligence as well as to changes in mothers' lives. Our results, along with the findings of Wyman et al. (1999) and Myers and Taylor (1998), substantiated the importance of early intervention with at-risk mothers. Positive changes in maternal social and psychological functioning during childhood may contribute to competences in potentially vulnerable children.

Three equally plausible explanations may account for the pattern of results obtained. First, it is possible, as suggested by Kim-Cohen et al. (2004), that stability in children's resilience may be heavily influenced by genetic factors operating passively through the parents to determine the quality of environment and the children's engagement with their environments. Second, early competence may have reciprocal effects on maternal functioning, as observed by Brody et al. (2004). From this perspective, mothers with more stable adjustment and educational/occupational successes stimulate early competence in their children that, in turn, fosters maternal development. Third, normative levels of intelligence at age 5 may provide children with the relevant and necessary cognitive tools that allow them to take full advantage of opportunities in a range of expanding environments outside the home. Of course, these three options are not mutually exclusive and may work in concert to provide pathways to resilience.

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