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# persistence in the face of academic challenge for economically disadvantaged children

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## ABSTRACT

This study examined persistence in the face of academic challenge for economically disadvantaged children. Participants included 103 children attending Head Start preschools, as well as their caregivers and teachers. Child tasks measured persistence in the face of academic challenge, as well as emergent implicit theories of intelligence. Caregiver interviews provided information about poverty risks. Teacher interviews measured child attention problems. A cumulative index of poverty risks, as well as teacher-reported child attention problems, and child emergent implicit theories of intelligence predicted persistence in the face of challenge. Implications concern conceptualizing persistence in the face of academic challenge, understanding diversity in educational outcomes for economically disadvantaged children, and closing the achievement gap.

**KEYWORDS** *academic challenge, achievement gap, persistence, poverty, preschool*

Economic disadvantage places children at risk for school problems (McLoyd, 1998). An impoverished home learning environment portends cognitive skill gaps and low-income children face academic challenges at school entry (Duncan and Brooks-Gunn, 2000). Those low-income children who persist in the face of challenge benefit from the opportunities available in formal schooling and may catch up to their middle-income peers. In contrast, those who give up easily or lack the behavioral regulation to stay on task fall further behind over the course of the school years, leading to a widening of the achievement gap. This

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study examines persistence in the face of challenge for young, economically disadvantaged children.

Dweck and Leggett's (1988) social cognitive model of motivation provides a framework for understanding children's responses to academic challenge. According to Dweck and Leggett, individuals who implicitly conceptualize intelligence as a fixed entity outside of their control (entity theorists) hold a performance orientation toward achievement. These individuals approach tasks with the goal of performing, or proving their ability. Unless they perceive themselves to have high present ability, they show negative affect and expectations, and decreased effort, in response to academic challenge. In contrast, those who implicitly believe that traits are malleable (incremental theorists), possess a learning orientation. These individuals approach tasks with goals of learning, or improving their ability, and respond to challenge with positive attitude, as well as persistent effort and strategy shifting. Notably, entity and incremental theorists may show equivalent behavior in response to easy tasks. Evidence supports the idea, however, that they show differentially adaptive responses to frustrated academic efforts (Roedel and Schraw, 1995).

Individuals do not demonstrate mature concepts of ability until middle childhood, yet implicit theories of ability, and orientations toward achievement, may begin to emerge as early as preschool. Dweck and colleagues (Burhans and Dweck, 1995; Smiley and Dweck, 1994) suggest that preschoolers who express that they can be judged as 'good' or 'bad' based on their performance hold goals of documenting their self-worth through their performance, and tend to avoid challenge, showing an emergent entity theory of intelligence. Notwithstanding the well documented tendency for young children to appear overly optimistic in achievement situations, therefore, it seems some preschool and kindergarten children show key elements of a helpless, hopeless response pattern.

Economically disadvantage may mark particular vulnerability to helplessness and hopelessness in the face of academic challenge. Ecological poverty risks relate to a perceived lack of control for parents (Furstenberg and Hughes, 1995; Seifer et al., 1992). Additionally, lower socioeconomic status relates to diminished mastery beliefs in children (Bandura et al., 1996; Battle and Rotter, 1963). Thus, implicit ideas about achievement and self-worth may be important predictors of low-income children's persistence in the face of academic challenge. Alternatively, such ideas may not hold up as meaningful predictors within an economically disadvantaged preschool sample. Low-income children show lagged development in certain cognitive domains, and their ideas about self-worth may not be well enough developed to bear meaningful prediction of challenge responses in the preschool years. Even if conceptions of achievement and self-worth are well enough developed, these ideas will only predict responses to challenge if children possess the ability to regulate attention and behavior in the service of persistence.

Given documented relations between poverty and regulatory difficulties (Barocas et al., 1991; Evans, 2003), such ability cannot be assumed.

Exposure to poverty risks may compromise children's attention and behavioral regulation in the face of academic challenge. Barocas et al. (1991) demonstrate relations between cumulative risk and difficulties with attentional and inhibitory control for preschool children. Additionally, Evans (2003) links cumulative risk exposure to early childhood difficulties with self-regulation, as measured by a delay of gratification task, and learned helplessness, as measured by an impossible puzzle task. The instability and chaos associated with poverty increase allostatic load, or tax on physiological systems that respond to stress (2003). Over time, elevations in neuroendocrine activity, particularly in the HPA, may compromise self-regulation by impairing attention allocation and triggering hyperarousal (McEwen, 1998, 2000; McEwen and Stellar, 1993; Metcalf and Mischel, 1999; Repetti et al., 2002). Achievement-related beliefs may matter little in predicting persistence if children lack the attentional and behavioral control to stay on task.

This study examines persistence in the face of academic challenge for economically disadvantaged preschool children. The sample is limited to economically disadvantaged children to examine diversity within the ecology of poverty; diversity easily obscured by between-group differences in heterogeneous income samples. A focus on preschool promotes capturing responses to academic challenge before the influence of failure and comparison processes associated with formal schooling.

A challenging puzzle task provides the indicator of persistence in the face of academic challenge, and an experimental manipulation allows for comparison of persistence under conditions of moderate and extreme challenge. The study includes as predictors a cumulative index of ecological poverty risk, a measure of attention problems, and a measure of emergent entity theories of intelligence. The inclusion of a cumulative index of poverty risk best represents how children experience the ecology: as a whole, rather than one factor at a time (Ackerman et al., 1999; Sameroff et al., 1993). The study includes controls for child age, sex, race/ethnicity, family income, and verbal ability, all of which tend to predict aspects of achievement-related behavior.

The first hypothesis is that children randomly assigned to the condition of moderate challenge will show greater persistence than children assigned to the extreme challenge condition. The second hypothesis is that cumulative poverty risk, attention problems, and emergent implicit theories of intelligence will predict persistence in the face of challenge.

## method

This study examined concurrent relations between a cumulative index of poverty risk, attention problems, emergent implicit theories of intelligence, and

persistence in the face of academic challenge for economically disadvantaged preschool children, and also examined relations for control variables of child age, sex, race/ethnicity, family income, and verbal ability. Individual caregiver interviews provided information about ecological poverty risks as well as child age, sex, race/ethnicity, and family income. Teacher interviews provided information about child attention problems. Tasks individually administered to children provided information about verbal ability, emergent implicit theories of intelligence, and persistence in the face of challenge.

## **participants**

Participants were 103 Head Start children, as well as their caregivers and teachers. The mean age of the children was four years nine months ( $SD = 7.45$ , range = 27 months). The mean verbal ability of the children fell at the 17th percentile ( $SD = 17.37$ , range = 67). Of participating children, 38 per cent were female and, with regard to race/ethnicity, 87 per cent were African American, 11 per cent Hispanic American, one per cent Asian American and one per cent Caucasian American. Of the caregivers, 94 per cent were the children's biological mothers and the remaining six per cent were maternal grandmothers.

We established the economically disadvantaged status of the sample in two ways. First, we recruited the sample from Head Start programs, which are means-tested. We enrolled about 25 per cent of the children attending these centers. Second, we obtained self-reports from the caregivers concerning the total earned income of all residential adults in the family. The mean estimate of family income was \$16,300 ( $SD = \$15,300$ ) and our families averaged two residential adults and three children. At the time of the assessment, the poverty threshold was \$22,000 for a family of five. Thus, according to available information, 63 per cent of the families were below the poverty line, with the remaining 27 per cent of families falling in the low-income range (i.e. less than two times the poverty threshold).

## **procedure**

Ethical standards were followed in the conduct of this study and all procedures were approved by the appropriate institutional review boards. We recruited participants from eight Head Start Preschools in a mid-sized city on the east coast of the United States for the Closing the Achievement Gap Project, which involved family support and research on early childhood development. The current study represents one component of the research. Caregiver interviews took place in the caregivers' homes during February and March 2004. Caregiver consent for own and child's participation was obtained at the time of these interviews. Research assistants read the interviews aloud to caregivers and recorded their answers in writing. Caregivers received monetary compensation for their time as well as a

certificate of appreciation for their participation. The child portion of the study took place at the Head Start preschools during April and May 2004. Research assistants obtained children's verbal assent to participate before conducting tasks with children and recording their responses in writing. Children received small prizes for their participation.

## **measures**

### **demographic interview**

The demographic interview for caregivers (Ackerman et al., 2004) measured the control variables of child age, sex, race/ethnicity (non-white versus white), and family earned income. Information about family composition is also collected and used in combination with federal poverty guidelines for the appropriate year to create an income-to-needs ratio for each family. A ratio of 1.0 represents the poverty threshold, and a ratio of 2.0 is the threshold for low-income status.

The demographic interview for caregivers also measured ecological poverty risks, including primary caregiver high school dropout, unemployment, and relationship status (the primary caregiver lacks a stable partner arrangement), disrupted primary caregiving (the primary caregiver has had a period of separation from the child for more than a month), residential instability (the family has changed residences one or more times per year since the child's birth), and family size (greater than the mean number of children living in the residence, with the mean equal to three). Presence of a factor receives a score of 1 and scores are combined to create an index which ranges from 0 (the absence of poverty risk) to 6 (presence of all six poverty risks). Cumulative risk indices from this interview predict children's school adjustment (Ackerman et al., 2004).

### **Peabody Picture Vocabulary Test**

The Peabody Picture Vocabulary Test-III (PPVT-III; Dunn and Dunn, 1997) measured children's verbal ability. The PPVT-III is a measure of receptive language, which is considered to be an important component in children's cognitive functioning and particularly in their successful transitions to school. The PPVT-III is well validated and has been used with ethnically diverse groups of children. Dunn and Dunn (1997) report a test-retest reliability of .89 for the PPVT-III.

### **Conners' Teacher Rating Scale**

The short form of the revised Conners' Teacher Rating Scale (CTRS-R; Conners et al., 1998) for children ages three to 17 was used to measure attention problems. The short form of the teacher questionnaire contains 28 items, and corresponds to

symptoms used in the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000) as criteria for ADHD. The questionnaire includes the following scales: Oppositional, Cognitive Problems, Hyperactive-Impulsive, and ADHD Index. Conners et al. (1998) report good validity and reliability for the rating scales. The current study used the Cognitive Problems subscale to measure attention problems. Cronbach's alpha was greater than .90 for this subscale. The mean score was 59.34 (SD = 14.66).

### **Emergent Implicit Theories of Intelligence Task**

This task represents a variation of task used by Burhans and Dweck (1995) as a measure of emergent entity theories of intelligence. First, children complete a series of four puzzles, the first three of which are insoluble. Then, in the original version of the task, children role play what their parents would say to them about their puzzle attempts and comments focusing on performance, as opposed to effort, are coded as belief in the contingency of self-worth. In our variant of this measure, children choose between the comments of two puppets regarding what their parents would say to them about their puzzle attempts. Choice of the puppet that focuses on performance, as opposed to effort, is coded as belief in contingency of self-worth. Finally, children are asked to pick which puzzle they would try again if given more time. Choice of the soluble puzzle that was already completed is coded as avoidance of challenge. Children who show belief in the contingency of self-worth and avoidance of challenge are coded as showing an emergent entity theory of intelligence. Emergent entity theories, as measured by this task, relate to negative affect and expectations, and lack of persistence in the face of challenge for heterogeneous income groups (Burhans and Dweck, 1995; Smiley and Dweck, 1994).

### **Persistence in the Face of Challenge Task**

Persistence in the face of challenge was measured with a standard behavioral protocol developed by Glass and Singer (1972) and adapted for preschool children. The child is given two puzzles to complete, the first of which is extremely challenging. For our experimental manipulation, approximately 20 per cent of children were randomly assigned to a condition of moderate challenge and received a painted guide that reduced the difficulty of the first puzzle. In both moderate and extreme challenge conditions, time on task for the second puzzle measures persistence. Children who score one standard deviation below the mean are coded as showing a lack of persistence. This protocol is sensitive to individual differences in control-related beliefs, experimental manipulations of perceived control, and chronic exposure to uncontrollable stressors (Cohen, 1980; Cohen et al., 1986; Evans, 2003; Glass and Singer, 1972).

**results**

The initial stage of analysis examines the hypothesis that children randomly assigned to a condition of moderate challenge ( $n = 21$ ) would show greater persistence than those assigned to a condition of extreme challenge ( $n = 82$ ). An independent samples  $t$ -test showed significant differences between the groups  $F(1, 101) = 284.04, p < .01$ . Consistent with the hypothesis, analysis of frequencies revealed 20 per cent of children in the extreme challenge condition showed a lack of persistence, but no children in the moderate challenge condition showed a lack of persistence. In fact, all children in this condition persisted for the maximum time on the puzzle task, and thus, analyses of predictors of persistence included only children in the extreme challenge condition.

The next stages of analysis examine the hypothesis that cumulative poverty risk, attention problems, and emergent implicit theories of intelligence would predict persistence in the face of challenge. A correlational analysis examined zero-order relations among key variables of interest and controls (see Table 1). All predictors showed significant zero-order relations to persistence in the face of challenge, as did the control variable of age. Controls for sex, race/ethnicity, and family income showed no significant relations to persistence and thus were not included in further analyses.

A linear regression analysis for persistence examined the unique contribution of the predictor variables as well as the control variable of age. The overall model was significant  $F(4, 77) = 7.08, R^2 = .27, \text{adjusted } R^2 = .23, p < .01$ , and all predictors, as well as the control variable of age, showed significant relations to persistence in the face of challenge (see Table 2). Children who were younger, faced greater poverty risk, showed greater attention problems, and endorsed emergent entity theories of intelligence were more likely to show a lack of persistence in the face of academic challenge.

**table 1** Correlations for lack of persistence in the face of challenge, controls, and predictor variables ( $n = 82$ )

	Age in months	Sex	Race/ethnicity	Verbal ability	Family income	Poverty risk	Attention problems	Entity theory
Lack of persistence	-.31*	.01	.06	-.20	.04	.28*	.24*	.22*
Age in months	–	-.15	-.04	.04	-.17	-.09	.03	-.17
Sex		–	-.14	.14	.04	.04	.14	-.06
Race/ethnicity			–	-.19	-.17	-.12	-.19	.11
Verbal ability				–	.07	.10	.07	.03
Family income					–	-.28*	.09	.05
Poverty risk						–	.14	.20
Attention problems							–	-.13

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

**table 2** Summary of effects in regression for lack of persistence in the face of challenge ( $n = 82$ )

	$\beta$	$t$
Age	-.24	-2.42*
Poverty risk	.27	2.71**
Attention problems	.25	2.50*
Entity theory	.27	2.64**

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

## discussion

This study was motivated by an interest in understanding persistence in the face of academic challenge for economically disadvantaged preschool children. Low-income children face particular challenges at school entry, and persistence in response to these challenges matters for their educational trajectories. Despite the importance, developmental science has not fully explored persistence in the context of poverty risks.

Children in the current study faced a host of poverty risks. The mean family income was \$16,300 (SD = \$15,300), with an average of two adults and three children in each household. According to federal guidelines for determining poverty status, all of the families in the study were low-income and 63 per cent were poor. Income related to the level of ecological poverty risk. Children in low-income families faced an average of three of the risks measured, compared to five risks for those in poor families. Of children in the study, 13 per cent had experienced disruptions in primary caregiving, 17 per cent had changed residences one or more times per year since their birth, 31 per cent lived in households with four or more children, 33 per cent had caregivers who had dropped out of high school, 39 per cent had caregivers with unstable partner arrangements, and 67 per cent had unemployed caregivers. Although two per cent of children did not face any of these risks, 17 per cent faced all six.

Children in the present study showed cognitive skill gaps and attentional difficulties. The mean verbal ability for this sample registers at the 17th percentile, suggesting moderately to extremely low scores. The level of attention problems also falls above average compared to the norm, with mean scores registering in the slightly atypical range. The findings for emergent implicit theories of intelligence suggest a further layer of risk facing economically disadvantaged children. Approximately 50 per cent of children in this study showed emergent entity theories, compared with 30–40 per cent in heterogeneous income groups (Burhans and Dweck, 1995).

Emergent entity theories of intelligence predicted persistence in the face of challenge, as did poverty risks and attention problems. The findings for emergent entity theories are consistent with results from heterogeneous income

groups (Burhans and Dweck, 1995). The findings for poverty risks and attention problems are novel, and suggest the importance of considering factors additional to personality to explain persistence for economically disadvantaged children. Although attention may not decide challenge responses for all children, it plays an important role for a subset whose regulatory capacities are taxed by poverty risks. Moreover, the unique variance explained by poverty risks suggests that teacher-reported attention problems do not account for the impact of poverty, which may engender learned helplessness and other self-regulatory difficulties that influence children's responses to academic challenge (Evans, 2003).

Research with mixed-income samples suggests the malleability of children's attitude toward challenge. Emphasizing effort and individual mastery enhances children's perceived control over their achievement and fosters the belief that they can improve their abilities (Elliot and Dweck, 1988; Kamins and Dweck, 1999; Mueller and Dweck, 1998; Skinner et al., 1990; Wentzel and Wigfield, 1998). The malleability of persistence in the face of challenge is less clear. To the extent that persistence involves executive control capacities of attentional flexibility, planning, and resistance to interference, it may be a neurocognitive process with relative stability (Dempster, 1992; Welsh et al., 1991; Zelazo et al., 1997). Even certain aspects of executive control, however, may be modifiable through intervention (Klingberg, et al., 2005; Rueda et al., 2005). Moreover, recent studies suggest that certain 'hot' aspects of executive control may be sensitive to affective and motivational influences (Bechara, 2004; Kerr and Zelazo, 2004). This resonates with the present findings of maximal persistence for all children facing moderate rather than extreme challenge, which suggests that even children operating under stressful poverty conditions can control attention and behavior in the service of persistence so long as they have a reasonable chance of attaining success. A high success-to-failure ratio in the early school years may play a key role in helping low-income children develop cognitive skills and training behavioral persistence.

The current study suffers from a number of limitations, including those typical of correlational designs. Most notably, it is possible that untapped variables could explain the observed relations between predictor variables and persistence. Also, the design includes a single time point only rather than assessing relations between challenge responses and school adjustment longitudinally. The study focused on preschool children to capture responses to challenge before the influence of formal school assessment experiences, yet the impact of the transition to kindergarten in and of itself may shape the manner in which children react to challenge and failure.

The economically disadvantaged nature of the sample highlights within-group diversity at the expense of between-group comparisons. Numerous studies document that low-income children show deficits compared to their middle-income peers, yet few describe diversity within economically disadvantaged

groups, and the present study makes a contribution in this regard. A restricted sample, however, has costs in a restricted range for environmental and child variables and may have limited the predictive power of variables such as child verbal ability. Also, a lack of a middle-income control group precluded the ability to compare across economic strata and draw conclusions about what findings are unique to low-income groups.

Despite limitations, this study makes an important contribution by focusing on persistence in the face of academic challenge for low-income preschool children. Unrealistic optimism is a hallmark of the preschool years, when children's confidence in their abilities often seems impervious to negative performance feedback (Burhans and Dweck, 1995). Nonetheless, 20 per cent of the children in this study showed lack of persistence when presented with challenging academic tasks. Some poor children, it seems, will face an academic double jeopardy: school entry cognitive skill gaps coupled with a lack of persistence in the face of challenge. The systematic variation in children's persistence may correspond to diverse patterns of educational growth.

Responses to academic challenge deserve further investigation for understanding educational experiences of economically disadvantaged children. Future work should examine academic challenge response with greater sophistication, expand the representation of ecological risk, and explore processes through which ecological risk relates to challenge responses. The results of such investigations should guide targeted interventions to promote adaptive responses to challenge.

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