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## Is Resilience Only Skin Deep? Rural African Americans' Preadolescent Socioeconomic Status-Related Risk and Competence and Age 19 Psychological Adjustment and Allostatic Load

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### Abstract

Many African American youth may develop high levels of allostatic load (AL), a measure of physiological wear and tear on the body as a function of developing psychosocial competence under conditions of high SES-related risk. The current study was designed to test hypotheses based on John Henryism theory about such physiological costs. We tested these hypotheses with a representative sample of 489 African American youth living in the rural South. Cumulative SES-related risks and teacher-reported competence were assessed when the youth were 11 to 13 years of age; depressive symptoms, externalizing behavior, and AL were assessed at age 19. The results revealed that rural African American preadolescents who evinced high psychosocial competence under conditions of high cumulative SES-related risk displayed low levels of adjustment problems along with high AL at age 19. These results suggest that, for many rural African Americans, resilience may indeed be only “skin deep.”

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In the “Black Belt” that stretches across rural South Carolina, Georgia, Alabama, Mississippi, and Louisiana, poverty rates are nearly 20% (Proctor & Dalaker, 2003). The socioeconomic risk factors that characterize this region have considerable consequences for the development of rural African American children, adolescents, and young adults. These risk factors include chronic, endemic poverty and limitations in occupational and educational opportunities, frequent housing adjustments in response to economic pressures,

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changes in employment status, interpersonal and institutional racism, difficulty in accessing pediatric and adolescent medical care, and marginalization by health care professionals (Dressler, Oths, & Gravlee, 2005). Nevertheless, a remarkable number of rural African American children and adolescents evince high levels of planful self-regulation, academic achievement, and psychological adjustment despite a lifetime of exposure to the challenges they face in the rural South (Brody, Kogan, & Grange, 2012). These children have been called *resilient* because their competence develops in the face of the contextual adversity with which they must contend, enabling them to “beat the odds” that their lives present to them.

The resilience literature is characterized by a widespread assumption that, if children and youth are doing well in terms of external behaviors—for example, if they excel academically and evince high levels of self-esteem—they have successfully negotiated major adversities. An intriguing hypothesis, however, is that these types of external successes take an internal, physiological toll on youth, particularly rural African Americans. Thus, there may be a cost in maintaining high levels of self-regulation and psychosocial competence in the presence of the myriad risks associated with low socioeconomic status (SES). These youth may be incurring outwardly undetectable wear and tear on their bodies that renders them vulnerable over the long term to negative physiological health outcomes. Thus, for rural African American youth, conceptions of resilience may have to go beyond overt behavioral indicators to include manifestations of physiological well-being. The purpose of this study, then, is to test the following hypothesis: African American preadolescents whose teachers rate them as self-controlled, academically competent, and socially competent and who live with high levels of SES-related risk will, at age 19, (a) report low levels of depressive symptoms and externalizing behaviors, but (b) manifest high levels of biological indicators of physiological stress. In the following sections, we will use constructs from allostasis theory and John Henryism theory to explain this hypothesis.

The myriad stressors that African American youth of low SES encounter elicit changes in multiple bodily systems. As the concept of allostasis emphasizes, the body achieves stability during stress through changes in multiple, interconnected systems. When these systems are repeatedly perturbed by stress, a biological toll is thought to be exacted, with potential implications for long-term health status. Some refer to this presumptive toll as allostatic load (AL). Often, AL is operationalized as a composite reflecting various mediators and outcomes of the stress response, including the sympathetic adrenomedullary system, the hypothalamic-pituitary-adrenal axis, lipid metabolism, fat deposition, indices of inflammation, and immune functioning (McEwen, 2000; Seeman, McEwen, Rowe, & Singer, 2001). Only recently has a connection been established between exposure to SES-related stress and the development of AL among African American youth (Brody et al., 2012), despite the pivotal role that AL is conjectured to play in the development of chronic diseases and health disparities (see Shonkoff, Boyce, & McEwen, 2009). In the present study, we hypothesized that growing up with SES-related risk during preadolescence would forecast higher AL levels at age 19 years.

The study hypothesis was also informed by John Henryism (JH) theory (James, 1994). JH is a high-effort coping style characterized by a determination to succeed by working hard even in the face of overwhelming stressors (James, 1994). The JH construct takes its name from the legend of John Henry, the “steel-driving man.” According to the story (B. Williams, 1983), John Henry was an African American railroad worker in the late 1800s who participated in a steel-driving contest in which he defeated a steam-powered drill. John Henry was forced to harness his great strength to overpower the mechanical drill but afterward died of exhaustion. For James (1994), the fabled actions of John Henry illuminate associations among high-effort coping, chronic nervous system arousal, and health problems

such as hypertension. The JH construct comprises three main characteristics: efficacious mental and physical vigor, a strong commitment to hard work, and a single-minded determination to succeed. Although there are no studies involving adolescents, low-SES adults who are high on JH show higher blood pressure, greater total peripheral resistance, and increased risk of hypertension in comparison with low-SES adults who are low on JH (James, Keenan, Strogatz, Browning, & Garrett, 1992; James, Strogatz, Wing, & Ramsey, 1987). Thus, in the context of the study hypothesis, JH theory can be used to predict that African American youth who show high levels of effort and determination in the form of planful self-control, academic competence, and social competence while growing up with high levels of SES-related risk will manifest higher levels of AL.

With respect to mental health outcomes, James (1994) speculated that the “mental vigor” component of JH protects against depression. Stress-coping research also proposes that persons who deal with challenges through problem-focused coping and who believe they will succeed through persistent effort are less likely to become depressed and more likely to refrain from antisocial behaviors and substance use (Bandura, 2002). Applying this to the current study, we hypothesized that African American preadolescents who are high in the hard work and success elements of JH, such as planful self-regulation and academic competence, and grow up with high SES-related risk would at age 19 exhibit good mental health, as evinced by low levels of depression and behavioral problems.

## Summary

We investigated SES-related risk  $\times$  competence interactions that were hypothesized to lead to variations in psychological adjustment and AL in a representative sample of 489 rural African American youth. Data on SES-related risk and teacher ratings of planful self-regulation and academic competence were gathered during preadolescence, when the youth were 11 to 13 years of age. Depressive symptoms, externalizing behaviors, and AL were assessed at the beginning of young adulthood, at age 19.

## Method

### Participants

African American primary caregivers and a target youth selected from each family participated in annual data collections; target youth mean age was 11.2 years at the first assessment and 19.2 years at the last assessment. The families resided in nine rural counties in Georgia, in small towns and communities in which poverty rates are among the highest in the nation and unemployment rates are above the national average (Proctor & Dalaker, 2003). Although the primary caregivers in the sample worked an average of 39.4 hours per week at the first assessment, 46.3% lived below federal poverty standards; at the last assessment the proportion was 49.1%. Of the youth in the sample, 53% were female. At the age 11 data collection, 78% of the caregivers had completed high school or earned a GED. The median family income per month was \$1655 at the age 11 data collection and \$1169 at the age 19 data collection. The decrease in family income and increase in the proportion of families living in poverty over time were due to the economic recession that was occurring in 2010, when the last wave of data was collected. Overall, the families can be characterized as working poor.

At the first assessment, 667 families were selected randomly from lists of 5<sup>th</sup>-grade students that schools provided (see Brody et al., 2004, for a full description). From a sample of 561 at the age 18 data collection (a retention rate of 84%), 500 youth were selected randomly to participate in assessments of allostatic load and other variables at the age 19 data collection. Of this subsample, 489 agreed to participate; they constituted the sample in the present

study. Analyses indicated that the sample providing data at age 19 was comparable to the larger sample who provided data at ages 11 through 13 on indicators of SES-related risk and self-control/ competence.

## Procedure

All data were collected in participants' homes using a standardized protocol. One home visit that lasted approximately 2 hours took place at each wave of data collection. Two African American field researchers worked separately with the primary caregiver and the youth. Interviews were conducted privately, with no other family members present or able to overhear the conversation. Written informed consent was obtained at each wave. Primary caregivers consented to their own and minor youths' participation in the study, and minor youth assented to their own participation. Upon reaching 18 years of age, youth consented to their own participation.

## Measures

**Preadolescent SES-related risk and self-control/competence**—Three waves of preadolescent data were collected when the target youth were 11, 12, and 13 years of age.

**Socioeconomic status-related risk:** Numerous studies of both physical morbidity and psychological dysfunction support the basic tenet of SES-related risk. Six standard risk indicators were assessed, with each risk factor scored dichotomously (0 if absent, 1 if present; see Evans, 2003; Kim & Brody, 2005; Rutter, 1993). The indicators were current family poverty according to United States government criteria, primary caregiver noncompletion of high school or an equivalent, current primary caregiver unemployment, single-parent family structure, current family receipt of Temporary Assistance for Needy Families, and income rated by the primary caregiver as currently inadequate to meet all needs. SES-related risk was defined as the average of the risk factors across the three preadolescent assessments. The resulting index ranged from 0 to 6 ( $M = 2.29$ ,  $SD = 1.34$ ).

**Self-control/competence:** One of each target youth's teachers assessed self-control and competence at each of the three waves of preadolescent data collection. Self-control was assessed using the 12-item Self-Control Inventory (Humphrey, 1982). Each item was rated on a Likert scale ranging from 0 (*never*) to 4 (*almost always*). Example items include, "sticks to what he/she is doing even during long, unpleasant tasks until finished," "works toward a goal," and "pays attention to what he/she is doing." Alphas across waves ranged from .94 to .95. Self-control was operationalized as the average of the teachers' ratings across the three preadolescent assessments. The teachers also completed a revised version of the Perceived Competence Scale (Harter, 1982), which measures scholastic and social competence. The scale consists of 14 items rated on a Likert scale ranging from 1 (*not at all*) to 4 (*always*). Example items include, "very good at his/her school work," "just as smart as other kids his/her age," and "has a lot of friends." Alphas across the three waves ranged from .86 to .88. Competence was operationalized as the average of the teachers' ratings across the three preadolescent assessments. The self-control and competence measures were highly correlated ( $p < .001$ ); they were standardized and then summed to form the youth self-control/competence score.

**Young adult depressive symptoms and externalizing behavior**—At age 19, youth reported their own depressive symptoms, externalizing behavior, and substance use. Self-reports of depressive symptoms were obtained using the Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977), which is widely used with community samples. Youth rated each of 20 symptoms on a scale of 0 (*rarely or none of the time*), 1 (*some or little of the time*), 2 (*occasionally or a moderate amount of time*), or 3 (*most or all of the*

time). Alpha was .86. Externalizing symptoms were measured using the Adult Self-Report (ASR; Achenbach & Rescorla, 2003). The Aggressive, Intrusive, and Rule Breaking subscales were used to index externalizing symptoms; alpha for the 36 items on the subscales was .92. Youth reported their past-month cigarette, alcohol, and marijuana use and their excessive drinking on a widely used instrument from the Monitoring the Future Study (Johnston, O'Malley, Bachman, & Schulenberg, 2007). Responses to these four items were summed to form a substance use composite, a procedure that is consistent with our own and others' prior research (Brody & Ge, 2001; Newcomb & Bentler, 1988). The measures of externalizing symptoms and substance use were highly correlated ( $p < .001$ ); they were standardized and then summed to form the externalizing problems score.

**Young adult AL**—The protocol for measuring AL when youth were 19 years of age was based on procedures that Evans (2003) developed for field studies involving children and adolescents. Resting blood pressure was monitored with a Critikon Dinamap Pro 100 (Critikon; Tampa, FL) while the youth sat reading quietly. Three readings were taken every 2 minutes, and the average of the last two readings was used as the resting index. This procedure yields highly reliable indices of chronic resting blood pressure (Kamarck et al., 1992). Overnight urinary catecholamines and cortisol were assayed. Beginning on the evening of data collection, all urine that the young adult voided from 8 p.m. to 8 a.m. was stored on ice in a container with metabisulfite as a preservative. Urine was delivered to the Emory University Hospital medical laboratory in Atlanta, Georgia, for assaying. Total unbound cortisol was assayed with a radioimmune assay (Contreras, Hane, & Tyrrell, 1986). Epinephrine and norepinephrine were assayed with high-pressure liquid chromatography with electrochemical detection (Riggin & Kissinger, 1977). Creatinine was assayed to control for differences in body size and incomplete urine voiding (Tietz, 1976). Technicians blind to the participants' SES-related risk status assayed the samples.

AL was calculated by summing the number of physiological indicators on which each young adult scored in the top quartile of risk; possible scores ranged from 0 to 6. The AL indicators included overnight cortisol, epinephrine, and norepinephrine; resting diastolic and systolic blood pressure; and body mass index (weight in kilograms divided by the square of height in meters).

**Young adult health problems**—Youth reported their health problems at age 19 using the General Health Perceptions subscale from the RAND 36-Item Short-Form Health Survey (Hays, Sherbourne, & Mazel, 1993). The five-item subscale included a single-item rating of overall health ranging from 1 (*excellent*) to 5 (*poor*) and four items assessing youths' ratings of their current health status ranging from 1 (*definitely false*) to 5 (*definitely true*); e.g., "I am as healthy as anybody I know" and "I seem to get sick a little easier than other people." Some of the items were reversed scored so that higher scores on the subscale indicated more health problems and poorer general health. After reverse scoring, all items were averaged to yield a General Health Problems score with a range of 0 to 100 ( $\alpha = .72$ ).

## Results

### Preliminary Analyses

Table 1 presents descriptive statistics for the sample, along with bivariate correlations. The bivariate correlations support the study hypothesis and the inclusion of gender and health problems as controls in the data analyses. Teachers reported that male youth evinced lower levels of self-control/competence than did female youth across preadolescence. At age 19, young men reported lower levels of depressive symptoms and higher levels of externalizing behavior than did young women. SES-related risk assessed across preadolescence was

associated positively with AL at age 19, and teacher-rated preadolescent self-control/competence forecast low levels of self-reported depressive symptoms and externalizing behavior at age 19.

### Hypothesis Testing

To test the study hypothesis derived from JH theory, we constructed regression equations in which young adult depressive symptoms, externalizing behavior, and AL were predicted from successive blocks of variables: gender and health problems as controls, main effects of SES-related risk and self-control/competence, and a product term representing the latter two variables. The analyses for depressive symptoms and externalizing behavior are presented in Table 2, Models 1 and 2, respectively.

Both analyses revealed robust main effects in which teacher-rated preadolescent self-control/competence forecast self-reported young adult outcomes. These main effects were qualified by the SES-related risk  $\times$  self-control/competence interaction; for depressive symptoms,  $\Delta F(1,483) = 4.271, p < .04, \Delta R^2 = .007$ ; for externalizing behavior,  $\Delta F(1,483) = 4.762, p < .03, \Delta R^2 = .009$ . To interpret these results, we plotted estimated levels of depressive symptoms (Figure 1a) and externalizing behavior (Figure 1b) at low ( $-1 SD$ ) and high ( $+1 SD$ ) levels of SES-related risk and preadolescent self-control/competence (Aiken & West, 1991). Figures 1a and 1b show that the interactions were consistent with the JH hypothesis. Teacher-rated preadolescent self-control/competence was not associated with depressive symptoms (simple-slope =  $-0.194, SE = 0.136, p = ns$ ) or externalizing problems (simple-slope =  $-0.034, SE = 0.025, p = ns$ ) during early adulthood when youths lived with low levels of SES-related risk. These associations became progressively stronger and, ultimately, significant as the levels of SES-related risk to which youths were exposed increased (simple-slope =  $-0.580, SE = 0.138, p < .001$  for depression; simple-slope =  $-0.109, SE = 0.025, p < .001$  for externalizing problems). Young adults' self-reports of depressive symptoms and externalizing behavior were highest among those who, during preadolescence, received low ratings on self-control/competence from their teachers and who experienced high levels of SES-related risk. The young adult outcome variables were lowest among those who, as preadolescents, experienced high levels of SES-related risk but received high ratings on self-control/competence from their teachers. Thus, young adults who, during preadolescence, manifested age-appropriate indicators of hard work and success while experiencing high levels of SES-related risk reported the lowest levels of internalizing and externalizing behaviors. According to JH theory, a single-minded focus on success protected these youths from psychological adjustment problems.

The data analysis for AL is presented in Table 2, Model 3. A main effect emerged for SES-related risk: High levels of risk during preadolescence forecast high AL at age 19. This main effect was qualified by the SES-related risk  $\times$  self-control/competence interaction,  $\Delta F(1,483) = 7.455, p < .01, \Delta R^2 = .015$ . To interpret this finding, we plotted estimated levels of AL at low and high levels of SES-related risk and preadolescent self-control/competence; the results are presented in Figure 2. High teacher-rated self-control/competence during preadolescence was not associated with AL when youths lived with low levels of SES-related risk (simple-slope =  $-0.032, SE = 0.021, p = ns$ ). Of particular importance was the finding that youths with high self-control/competence evinced higher AL than did youths with low self-control/competence under conditions of high levels of SES-related risk (simple-slope =  $0.046, SE = 0.021, p < .03$ ). Consistent with the JH hypothesis, the highest level of AL emerged among young adults who, during preadolescence, received from their teachers high ratings on self-control/competence and experienced high levels of SES-related risk. The success-oriented, high-active coping style these youth employed in the presence of high risk was associated with cumulative wear and tear on their bodies that was detected during young adulthood.

A comparison of Figure 1a, Figure 1b, and Figure 2 reveals a distinct pattern of psychological adjustment and physiological outcomes for this sample of young adults. Highly self-controlled/competent youth living with high levels of SES-related risk in preadolescence subsequently manifested both low levels of adjustment problems and particularly high levels of physiological stress during young adulthood.

## Discussion

In this study, we found that rural African American preadolescents who evinced high levels of self-control/competence under conditions of high SES-related risk displayed low levels of adjustment problems but high levels of physiological risk (high AL) during young adulthood, at age 19. These findings are consistent with a counterintuitive pattern of mental and physical health outcomes that JH theory suggests. This theory predicts that many rural African Americans will resemble the legendary folk hero John Henry; they would be highly goal oriented and hardworking while growing up in a high-risk context, focus persistently on success, and avoid unconventional behavior, but manifest indicators of physiological stress. Together, these findings are consistent with propositions that poor health and health disparities during adulthood are tied to earlier experiences; they also reinforce the importance of obtaining data on both overt behavioral adjustment and covert physiological distress (Shonkoff et al., 2009).

This study also has heuristic value for furthering the understanding of a counterintuitive set of findings in the health disparities literature that are remarkably similar to the pattern that emerged from this study. This literature indicates that, across the life span, African American adults experience greater physical morbidity and mortality than do adults of other ethnicities. For example, African Americans are twice as likely as are European Americans to die from heart disease, cancer, and diabetes (Lantz et al., 2001; Mensah, Mokdad, Ford, Greenlund, & Croft, 2005). Conversely, findings from epidemiologic surveys consistently indicate that African Americans report equal or lower rates of lifetime mental disorders than do European Americans, even with exposure to SES-related risk controlled (Breslau, Kendler, Su, Aguilar-Gaxiola, & Kessler, 2005; Kendler, Kuhn, Vittum, Prescott, & Riley, 2005; Riolo, Nguyen, Greden, & King, 2005). In this study, the discrepancy between the participants' psychological adjustment and health was found for AL, a biological indicator of health. This suggests that resilience is multidimensional, as illustrated when hidden indicators of physiological health, such as high AL, accompany observable competence and positive adjustment. In such cases, resilience may indeed be only "skin deep."

We applied John Henryism (JH) theory to test hypotheses involving a sample of rural African American youths. This raises the question of its application to a broader cross-section of disadvantaged youths, including urban African Americans or Latinos. We hypothesize that JH theory and the hypotheses it sponsors would be applicable to youths from other racial and ethnic groups who have the determination to succeed academically while grappling with chronic economic stressors, limitations in occupational and educational opportunities, and interpersonal and institutional racism.

A premise of this study was that, when low-SES rural African Americans make active efforts to "beat the odds," a toll may be exacted on bodily systems involved with AL. For example, low-SES adults who are high in JH, which involves the use of active coping to deal with stressors that are largely uncontrollable, have higher blood pressure, greater total peripheral resistance, and greater risk of hypertension than do low-SES adults who are rated low on active coping (James et al., 1992; Wright, Treiber, Davis, & Strong, 1996). The present results are consistent with these findings and suggest the need for further research that elucidates the mediating mechanisms responsible for the physiological costs associated

with active coping (Chen & Miller, 2012; Cohen, Evans, Stokols, & Krantz, 1986). Clearly, refined analyses of indices of coping that underlie the results presented here are needed.

Strengths of the present study include the prospective, longitudinal design that included a large sample of African Americans living in the rural South. The measurement of the constructs minimized common method variance. SES-related risk across preadolescence was indexed from mothers' reports; preadolescent self-control and competence were assessed from teacher reports; indicators of AL at age 19 were measured with a standard protocol that included overnight urine voids, blood pressure readings, and BMI; and psychological adjustment was evaluated through young adults' self-reports. Limitations of the study also should be noted. It is not known whether the results would generalize to low-SES European American or Latino families living in either urban or rural communities. The JH construct was not assessed directly because no valid measure of it is available for children and adolescents. Instead, age-appropriate indicators that exemplify JH, self-control and competence, were assessed and hypotheses were tested using those indicators. Nevertheless, the results suggest that rural African American youth living in low-SES circumstances who manifest psychological resilience may be at risk for developing high AL.

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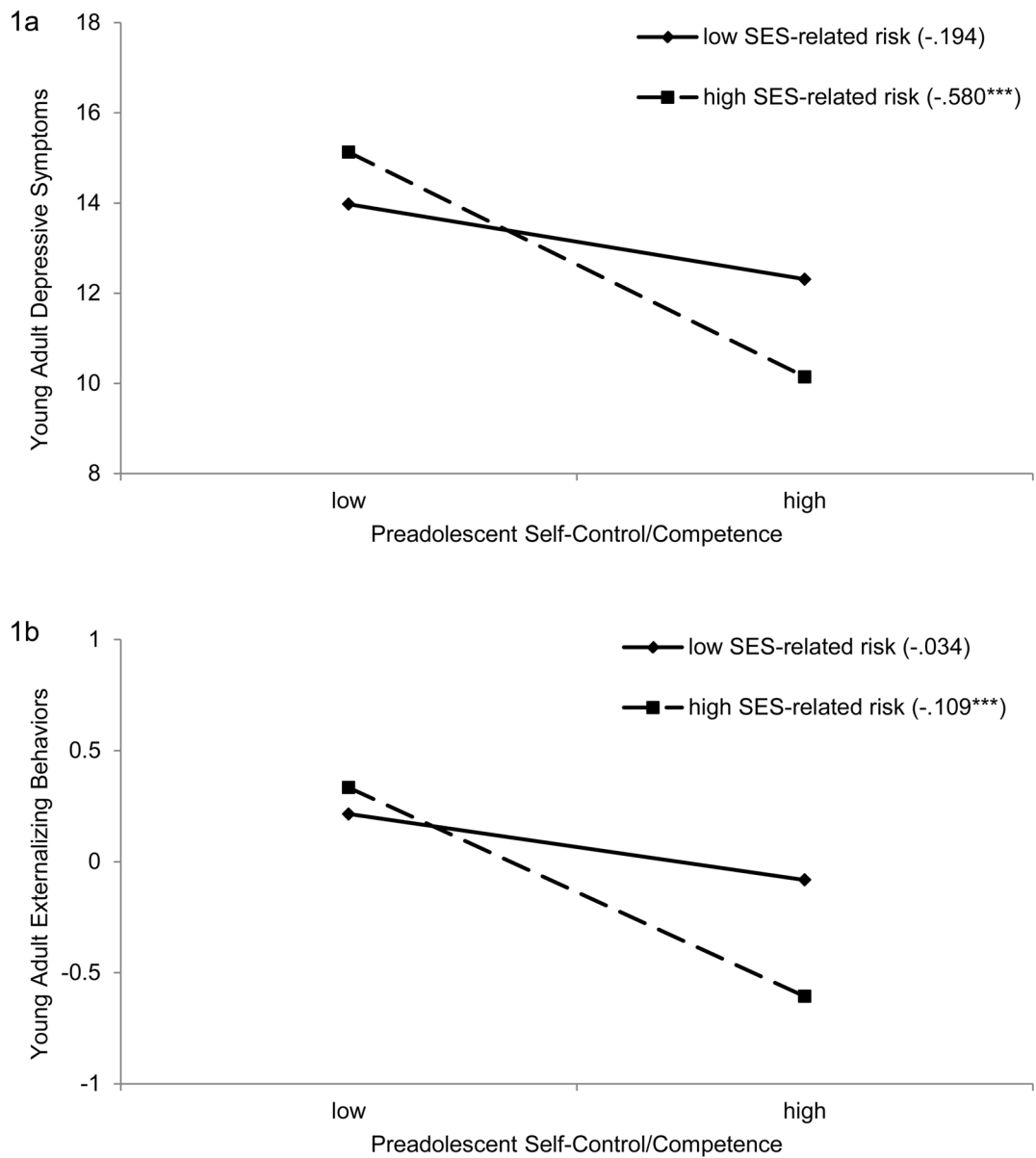
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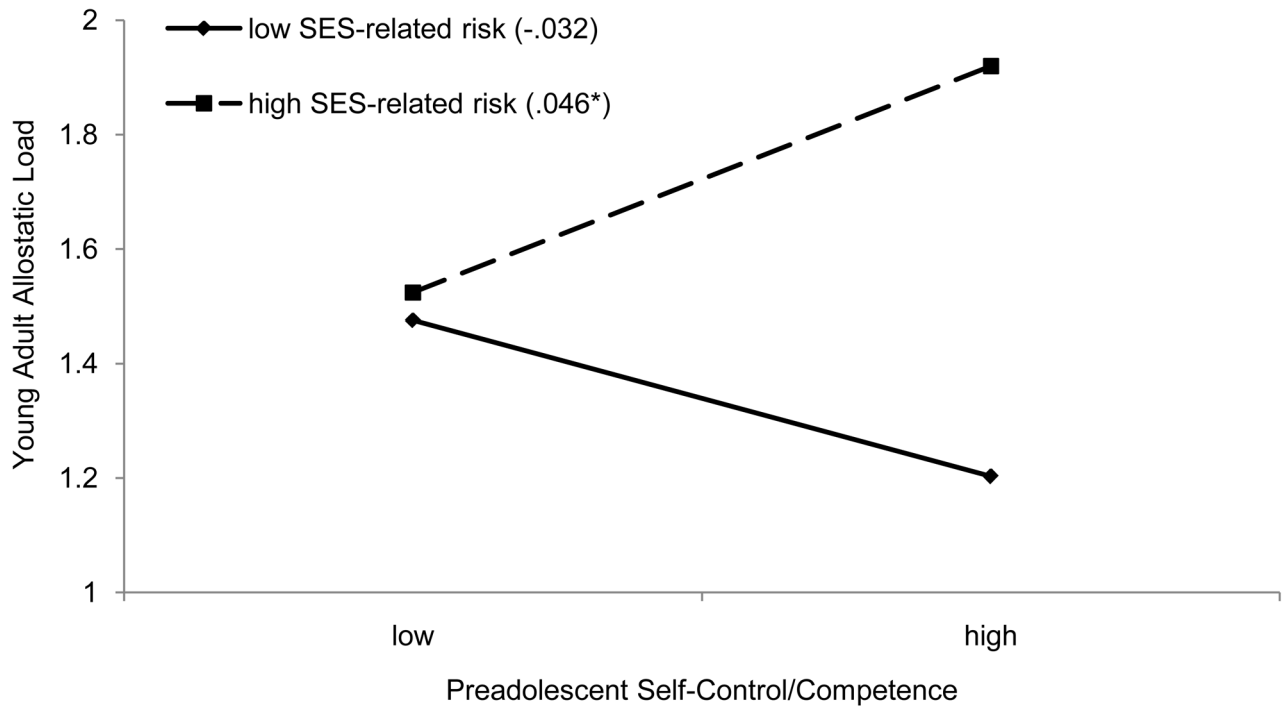


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**Figure 1.** Young adults' depressive symptoms (1a) and externalizing behaviors (1b) as a function of SES-related risk and preadolescent self-control/competence. The lines represent the regression lines for different levels of SES-related risk (low: 1 *SD* below the mean; high: 1 *SD* above the mean). Numbers in parentheses refer to simple slopes. \*\*\* $p < .001$



**Figure 2.** Young adults' allostatic load as a function of SES-related risk and preadolescent self-control/competence. The lines represent the regression lines for different levels of SES-related risk (low: 1 *SD* below the mean; high: 1 *SD* above the mean). Numbers in parentheses refer to simple slopes.  
\* $p < .05$ .

Table 1

Descriptive Statistics and Correlations among Study Variables (N = 489)

Variables	1	2	3	4	5	6	7
1. Gender (male)	—						
2. SES-related risk (ages 11–13)	-.003	—					
3. Self-control/competence (ages 11–13)	-.289***	-.229***	—				
4. Allostatic load (age 19)	.069	.147**	-.044	—			
5. Externalizing problems (age 19)	.112*	.023	-.251***	.000	—		
6. Depression (age 19)	-.093*	.069	-.213***	-.040	.449***	—	
7. Health problems (age 19)	-.222***	.151**	-.181***	.040	.261***	.389***	—
<i>Mean</i>	0.458	2.294	0.087	1.495	-0.001	13.065	24.908
<i>SD</i>	0.499	1.339	4.049	1.255	1.589	8.920	17.478

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

**Table 2**  
 Cumulative SES Risk and Self-Control/Competence as Predictors of Depression, Externalizing Problems, and Allostatic Load (N = 489)

Predictors	Model 1			Model 2			Model 3				
	Depressive Symptoms			Externalizing Problems			Allostatic Load				
	B	SE	$\beta$	B	SE	$\beta$	R <sup>2</sup>	B	SE	$\beta$	R <sup>2</sup>
1. Gender (male)	-1.169	.804	-.065	.381	.147	.120*		.209	.122	.083	
2. Health problems	.175	.022	.343***	.024	.004	.260***	.151	.003	.003	.046	.008
2. Cumulative SES risk	-.190	.284	-.028	-.076	.052	-.064	.151	.143	.043	.153**	.028
3. Self-control/competence	-.387	.100	-.176***	-.072	.018	-.183***	.176	.007	.015	.023	.028
4. Cumulative SES risk $\times$ self-control/competence	-.144	.070	-.085*	-.028	.013	-.093*	.183	.029	.011	.122**	.043

SE = standard error.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .